Statewide Water Education Action Plan (SWEAP) Task Force

Critical Water Concepts and Colorado Academic Standards

Toolkit for Colorado Educators and Organizations

Updated November 5, 2021

SWEAP Task Force

Critical Water Concepts and Colorado Academic Standards

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A NOTE FROM THE TASK FORCE: CRITICAL WATER CONCEPTS AND COLORADO ACADEMIC STANDARDS - CONCLUSIONS AND RECOMMENDATIONS

It's a simple fact that we can't live without water. Water is essential to growing our food, fueling our economy, providing recreational opportunities, and supporting our overall quality of life. While we rely on clean, safe water for nearly every aspect of our lives, long-term sustainability of this critical resource is threatened by increasing demands from a growing human population, as well as reduced supply from drought and climate change. In Colorado, our ability as a state to have a sustainable water future depends on informed and engaged leaders, decision makers, community members -- including youth -- who recognize its importance. Coloradans need to be equipped to enact policies and adopt behaviors that support wise and careful water stewardship. Not only is it critical that today's voters, constituents, and policy makers be informed on the biggest water challenges and opportunities, but consider:

- A kindergarten student during the 2002 drought will be old enough to serve as U.S. Representative in 2022.
- A sixth grader at the time of the adoption of the first Colorado Water Plan (in 2015) will be old enough to vote in 2022.
- A child born in 2015 could be the governor of Colorado in 2050, when we reach the Colorado Water Plan's goal of sustainable water.

Our youth are Colorado's water future. It is essential that we as educators and community partners prepare today's students with the water knowledge, skills, attitudes, motivations, and commitment to make informed decisions about Colorado's water resources and introduce them and to potential career pathways in the water sector. The Statewide Water Education Action Plan (SWEAP) is the first-of-its-kind, a water education framework that organizations and individual educators can use to realize the "Outreach, Education and Public Education" goals set forth in the Colorado Water Plan. In order to assist implementation of SWEAP to help meet the Colorado Water Plan's education goals, Water Education Colorado convened a task force of eight water educators and additional advisors from around the state experienced in standards-based education for PK-12 audiences.

The role of this group was to advise on connections between Critical Water Concepts identified in SWEAP and Colorado Academic Standards for Science and Social Studies. The six SWEAP Critical Water Concepts represent foundational understandings for water education throughout Colorado. These concepts were previously reviewed by a Coalition of more than 40 water educators and other stakeholders. The following represent findings from the task force on Critical Water Concepts and Colorado Academic Standards.

Conclusions and Recommendations

1. Water connects in many relevant and compelling ways to the Colorado Academic Standards. The study of Colorado's critical and scarce water resources supports students' achievement of Colorado Essential Skills and in becoming Prepared Graduates.

2. Preconceptions may currently be held by water educators about Critical Water Concepts in relationship to the Colorado Academic Standards. We concluded that:
    a. The study of water resources can be leveraged as a focus topic or theme to investigate across disciplines and grade levels; as many opportunities exist in Social Studies as in Science.
    b. The study of water resources is relevant at all grade levels, with particularly strong and/or explicit connections at certain grades and applications from early childhood through high school.

3. Learning can be most effective and memorable when embedded in and supported by a learner's immediate community and environments. Water is among the most significant components of community and environment.

    Recommendation: Leverage water examples as cross-cutting phenomena to investigate across disciplines and grade levels.

4. Learning happens anytime, anyplace -- family and community play a critical role in learning about water.

    Recommendations:
    i. Leverage local and place-based stories, community connections, and personal experiences as part of the learning experience;

    ii. Water educators and teachers can invite water-relevant stories from students' personal experiences into the classroom. Learning from the classroom can be incorporated into experiences outside of school as well.

5. Incorporation of water in the implementation of Colorado Academic Standards requires informed, inspired, and supported teachers and administrators, alongside active community partners, who can engage and inspire students with compelling water lessons. Partnerships with the community/community partners (e.g. water education organizations) are critical to build support and capacity for this work.

    Recommendations:
    i. Water educators can support teachers as they learn about Colorado's water and how to ensure our collective water future by highlighting

compelling water phenomena. This can be done by telling a local story related to a phenomenon and its attendant Critical Water Concepts, as well as by providing supplemental materials and trainings;

ii. Teachers and water professionals can support students by providing examples of natural resource careers, introducing professionals, highlighting how concepts are utilized in real life (agriculture, water quality, recreation), and in modeling civic engagement and supporting youth in taking thoughtful action on water issues;

iii. Community partners and community members can refer to Colorado Academic Standards to better provide support to student learning around Critical Water Concepts.

Although not a conclusion from this specific analysis, the task force shared the understanding that the study of water is lifelong. Certain Critical Water Concepts are introduced at different grade levels as learning builds and scaffolding of water education throughout grade levels will create more informed and engaged adults. Furthermore, understanding of water-related issues requires continued learning about Critical Water Concepts and the current state of Colorado's water resources into adulthood.

Initial Task Force Participants
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SUMMARY REPORT AND TOOLKIT

AUDIENCES

This toolkit was developed for the following audiences:

- Water education and environmental education organizations
- Water Educator Network affiliates and Colorado Alliance for Environmental Education members
- Colorado Water Conservation Board staff
- Basin Roundtable members, especially Public Education, Participation, and Outreach liaisons
- Colorado Department of Education
- Educational/curriculum developers and publishers
- PK-12 school board members
- PK-12 administrators, especially those involved in curriculum development
- PK-12 curriculum team or district leads
- PK-12 teachers
- Higher education natural resource, outdoor stewardship, and outdoor education faculty & students

INTRODUCTION

This document identifies areas of alignment between the Critical Water Concepts identified in the Statewide Water Education Action Plan (SWEAP) and the Colorado Academic Standards for Science and Social Studies. The document identifies connections between the Colorado Prepared Graduate statements with water education objectives in the Colorado Water Plan as reflected in the Impact statement for SWEAP.

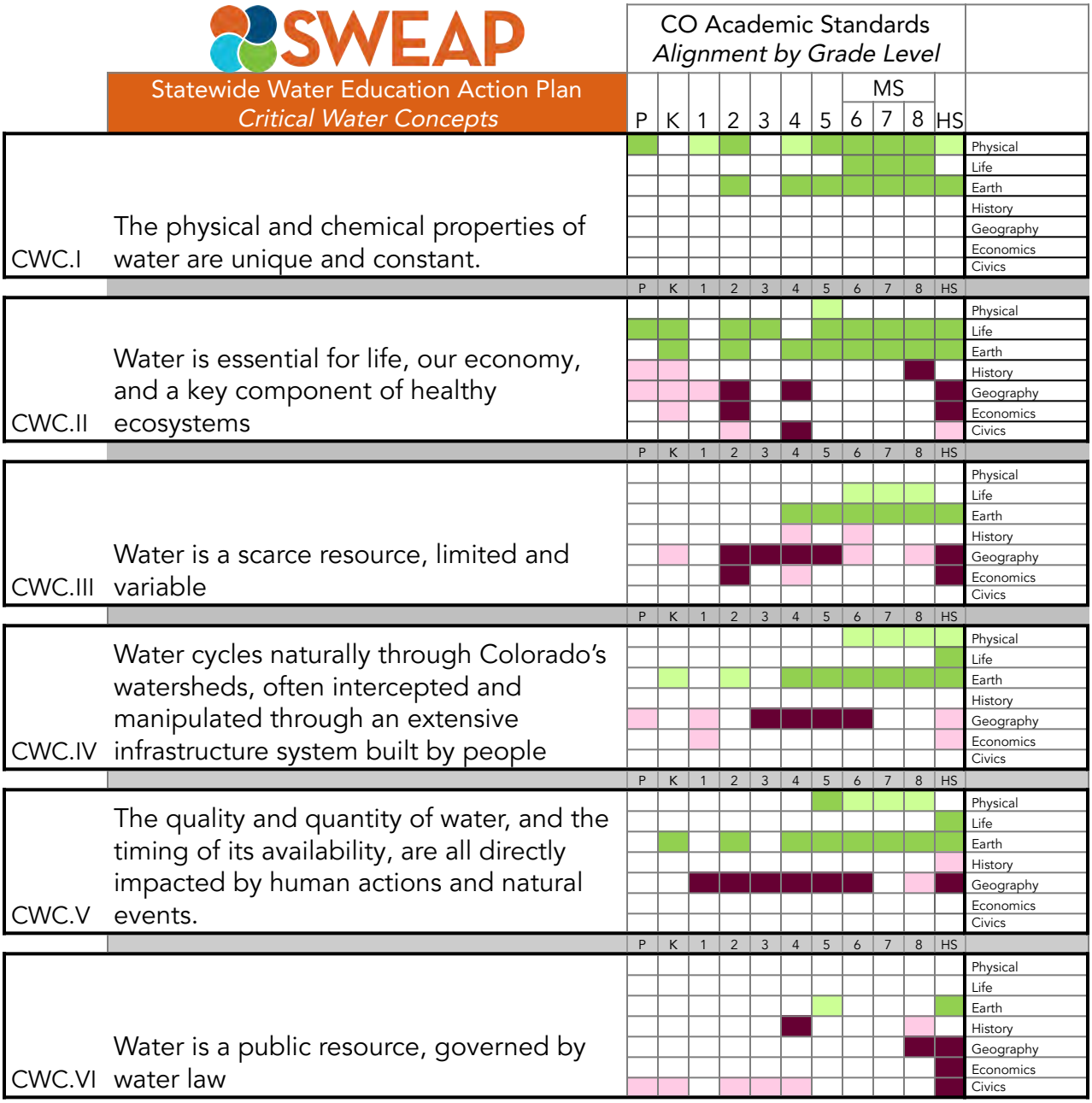
Outlined in the appendix is the process for determining these connections, including details for each step and potential next steps for the task force. The content portion of the document starts with an analysis of the Skills Progression, then Grade Level Expectations, identification of example Colorado-related phenomena and case studies, and concludes with recommendations for assessing student understanding of Critical Water Concepts. Included in the appendices are descriptions of Critical Water Concepts and Colorado Academic Standards.

To begin, we highlight the depth of connections between the Critical Water Concepts and the Colorado Academic Standards across grade levels, subject and content areas through a summary figure.

Figure 1 provides an overall visual for when Critical Water Concepts or the foundational elements (e.g. concepts of sharing in Pre-K and Kindergarten) contribute to the understanding of the sharing of water through Colorado's water laws. This figure also helps illustrate content area- and grade-level opportunities to introduce water concepts if emphasized by a teacher, even if water is not explicitly referenced in the standard.

Areas of alignment - Critical Water Concepts and Colorado Academic Standards

Figure 1: Critical Water Concept Relevance by Grade Level and Subject with Color-Coding (e.g. civics) *(Audience: all proposed audiences).*



KEY - *Alignment to CO Academic Standards*

	Science: Mild Support if emphasized by teacher and/or provides foundation for concept.
	Science: Moderate to Strong Support/alignment of concept within grade-level standards.
	Social Studies: Mild Support if emphasized by teacher and/or provides foundation.
	Social Studies: Moderate to Strong Support/alignment of concept within grade-level standards.

SKILLS PROGRESSION

The SWEAP Impact Statement states:

"Coloradans are engaged in well-informed community discourse and decision making regarding balanced water solutions, and are empowered to take thoughtful action regarding critical water challenges facing the state and their communities."

Per the Impact Statement, SWEAP-related skills include skills related to discourse, decision-making, identifying balanced solutions, and taking thoughtful action. Also implied in the SWEAP Impact statement are critical thinking and analysis skills that are a key element of the skills progressions in Colorado's Science and Social Studies Standards.

The following Figures relate these skills to the Colorado Prepared Graduates Statements for Science and Social Studies.

Figures 2 and 3 demonstrate that students meeting the Colorado Prepared Graduates statement are positioned to help achieve the SWEAP Impact, and, by association, contribute to the Colorado Water Plan's goal of reaching sustainable water by 2050.

Figures 4a and 4b demonstrate that the skills needed to fully implement the Colorado Water Plan objectives are intentionally fostered in Colorado's education system. Figure 4a demonstrates connections to the recently updated (2021) Colorado Essential Skills. Figure 4b utilizes the skills progressions from the 2018 Colorado Essential Skills to demonstrate how skills are developed by individuals over time. These figures can be further updated as progressions are developed for the new (2021) Colorado Essential Skills. Skills may be developed in content areas without a direct link to specific Critical Water Concepts (e.g. analyzing opportunity cost in economics or engaging in civil discourse in civics).

Figure 2: SWEAP Impact to Colorado Prepared Graduates Statement for Science

Colorado Prepared Graduates	Statewide Water Education Action Plan Impact Statement				
SCIENCE	*Coloradans are engaged in…*				
Students can use the… ↴	Well-informed…	community discourse and…	decision-making regarding balanced water solutions…	and are empowered…	to take thoughtful action regarding critical water challenges facing the state and their communities.
↪ full range of science and engineering practices ↴		✓		✓	
↪ to make sense of natural phenomena ↴	✓				✓
↪ and solve problems ↴			✓		✓
↪ that require understanding: 1. Structure, properties and interactions of matter 2. Interactions between objects and within systems of objects 6. How living systems interact with the biotic and abiotic environment. 10. How and why Earth is constantly changing 11. How human activities and the Earth's surface processes interact. *Note: See crosswalk between Critical Water Concepts and standards for detail.*	✓				✓

Figure 3: SWEAP Impact to Colorado Prepared Graduates Statement for Social Studies

Colorado Prepared Graduates	Statewide Water Education Action Plan Impact Statement				
SOCIAL STUDIES	*Coloradans are engaged in..*				
Prepared Graduates:	Well-informed…	community discourse and…	decision-making regarding balanced water solutions…	and are empowered…	to take thoughtful action regarding critical water challenges facing the state and their communities.
3. Apply geographic representations and perspectives to analyze human movement, spatial patterns, systems, and the connections and relationships among them.	✓		✓		
5. Understand the allocation of scarce resources in societies through analysis of individual choice, market interaction, and public policy	✓		✓		
6. Apply economic reasoning skills to make informed personal financial decisions (PFL).				✓	✓
7. Express an understanding of how civic participation affects policy by applying the rights and responsibilities of a citizen.		✓	✓	✓	✓

Figure 4a: Updated Colorado Essential Skills (as of August 2021) by SWEAP-related skill (Audience: principals, curriculum facilitators, team leads, organizational program managers)

Colorado Essential Skills by SWEAP-Related Skill:

Community Discourse

Colorado Essential Skill Category: Communicator

Communicates experiences, ideas, information, and feelings effectively through verbal and non-verbal language, media, art, and data, as well as listening to others' experiences, ideas, and feelings. Communicators use literacy, numeracy, and computational thinking skills to interpret and create new understanding from spoken language and writing, and from a wide variety of visual representations and media.

RELEVANT COLORADO ESSENTIAL SKILL	Communicator
Interpersonal Communication	The ability to establish and maintain healthy and supportive relationships, including: the capacity to communicate clearly by successfully conveying information and feelings, listening actively, setting boundaries, negotiating conflict constructively, and seeking or offering support and help when needed.
Media Literacy	The ability to access, analyze, evaluate, create, and act through the various forms of media, including: the ability to analyze the reliability of information, claims, and sources presented in the various forms of media.
Digital Literacy	The ability to learn, access, and evaluate information through digital platforms and networks using digital devices, including: the practice of digital citizenship and the prevention of cyberbullying, norms of appropriate, and responsible behavior and discourse.
Data Literacy	The ability to identify, collect, evaluate, analyze, interpret, present, and protect data.

Colorado Essential Skills by SWEAP-Related Skill:

Community Discourse (Continued)

Colorado Essential Skill Category: Community Member

Demonstrates concern for the welfare of others, for cultural resources, and for the natural world. Community members are respectful and inclusive, consider multiple perspectives, and honor others regardless of differences.

RELEVANT COLORADO ESSENTIAL SKILL	Community Member
Social Awareness	The ability to understand the perspectives of, empathize with, feel compassion for, and recognize strengths in others, including those from diverse backgrounds, cultures, and contexts and how they affect social interactions.
Civic Engagement	The ability to develop and apply knowledge, skills, and habits gained from experiences - within communities of diverse perspectives - to address issues, affect change, and/or solve problems
Global and Cultural Awareness	The ability to collaborate with individuals from diverse backgrounds and/or cultures to address national and global issues, and to develop complex, appropriate, and workable solutions.

Colorado Essential Skill Category: Empowered Individual

RELEVANT COLORADO ESSENTIAL SKILL	Empowered Individual
Self-Advocacy and Initiative	Self-Advocacy and Initiative: The ability to effectively communicate personal interests, desires, needs, and rights, and take action to request and/or acquire them.

Colorado Essential Skills by SWEAP-Related Skill:

Decision-Making

Colorado Essential Skill Category: Problem Solver

Generates, evaluates, and implements solutions to problems. A capable decision-maker can identify alternatives, think computationally, and weigh trade-offs to make well-reasoned decisions and solutions individually or in collaboration with others.

RELEVANT COLORADO ESSENTIAL SKILL	Problem Solver
Critical Thinking and Analysis	The ability to apply a deliberate process of identifying problems, gathering information, and weighing possible solutions, including: making choices rooted in understanding patterns, cause-and-effect relationships, and the impacts that a decision can have on the individual and others.

Colorado Essential Skills by SWEAP-Related Skill:

Identifying Balanced Solutions

Colorado Essential Skill Category: Problem Solver

Generates, evaluates, and implements solutions to problems. A capable decision-maker can identify alternatives, think computationally, and weigh trade-offs to make well-reasoned decisions and solutions individually or in collaboration with others.

RELEVANT COLORADO ESSENTIAL SKILL	Problem Solver
Critical Thinking and Analysis	The ability to apply a deliberate process of identifying problems, gathering information, and weighing possible solutions, including: making choices rooted in understanding patterns, cause-and-effect relationships, and the impacts that a decision can have on the individual and others.
Creativity and Innovation	The ability to demonstrate curiosity and imagination through experimenting with new and emerging ideas.
Collaboration and Teamwork	The ability to work with individuals from diverse backgrounds to identify the goal of a team, understand roles and responsibilities, contribute by fulfilling those roles and responsibilities, and include all members of the team.
Adaptability and Flexibility	The ability to recognize emotional responses that differ from one's own and demonstrate a willingness to compromise to reach workable solutions.

Colorado Essential Skills by SWEAP-Related Skill:

Taking Thoughtful Action

Colorado Essential Skill Category: Empowered Individual

Empowered to make a difference by understanding strengths and limitations, acting on curiosity, taking leadership roles, demonstrating respect and responsibility, taking informed risks, and persisting in the face of challenges.

RELEVANT COLORADO ESSENTIAL SKILL	Empowered Individual
Self-Advocacy and Initiative	Self-Advocacy and Initiative: The ability to effectively communicate personal interests, desires, needs, and rights, and take action to request and/or acquire them.
Career Awareness	The ability to apply the knowledge and understanding of how one's dreams, experiences, and interests translate into career fulfillment and lifelong pursuits in local, regional, national, and global career pathways and opportunities
Perserverance and Resilience	The ability to endure and overcome challenges to achieve desired outcomes and in doing so, building the confidence to believe that one's abilities can improve over time with determination and continued effort.

Figure 4b: Colorado Essential Skills (2018) progression by SWEAP-related skill (Audience: principals, curriculum facilitators, team leads, organizational program managers)

Skills Progression in Colorado Essential Skills by SWEAP-Related Skill:

Community Discourse

COLORADO ESSENTIAL SKILL	Novice	Advanced Beginner	Strategic Learner	Emerging Expert
Communication	Articulate personal strengths and challenges using different forms of communication to express oneself	… and consider purpose, formality of context and audience, and distinct cultural norms when planning content, mode, delivery and expression	… and "establish goals for communication and plan out steps accordingly"[7]	… and articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts (including multi-lingual)
Civic Engagement	Identify and reflect upon personal connections to community systems	… and connect knowledge (facts, theories, etc.) from personal ideas and understandings to civic engagement	… and participate in social or community activities	… and "participate effectively in civic life"[8]
Self-Advocacy	Appropriately express a range of emotions to communicate personal ideas/needs	… and ask questions to develop further personal understanding	… and demonstrate confidence in sharing ideas/feelings	… and demonstrate an accurate and clear sense of goals, abilities, needs and know how to request and/or acquire them

Skills Progression in Colorado Essential Skills by SWEAP-Related Skill:

Decision-Making

COLORADO ESSENTIAL SKILL	Novice	Advanced Beginner	Strategic Learner	Emerging Expert
Collaboration/ Teamwork	Recognize how personal actions have had a positive or negative impact on others with feedback as needed	… and recognize how members of a community rely on each other, considering personal contributions as applicable	… and "follow a process identified by others to help generate ideas, negotiate roles and responsibilities, and respects consensus in decision making"[6]	… and use interpersonal skills to learn and work with individuals from diverse backgrounds
Character	Demonstrate an understanding of cause and effect related to personal decisions	… and state a position and reflect on possible objections to, assumptions and implications of the position	… and apply ethical perspectives/ concepts to an ethical question/ situation/ scenario	… and "apply a fundamental understanding of the ethical/legal issues in many context including the access and use of information"[9]

Skills Progression in Colorado Essential Skills by SWEAP-Related Skill:

Identifying Balanced Solutions

COLORADO ESSENTIAL SKILL	Novice	Advanced Beginner	Strategic Learner	Emerging Expert
Adaptability/ Flexibility	Recognize emotional response to ideas that differ from one's own	… and regulate reactions to differing perspectives	… and look for and value in different perspectives expressed by others	… and demonstrate ways to adapt and reach workable solutions
Critical Thinking/ Problem Solving	Recognize that problems can be identified and possible solutions can be generated	… and define the problem using a variety of strategies	… and make connections between information gathered and personal experiences to apply and/or test solutions	… and "interpret information and draw conclusions based upon information gathered to formulate a new problem."[4]
Global/Cultural Awareness	Compare attitudes and beliefs as an individual to others	… and identify and explain multiple perspectives (cultural, global) when exploring events, ideas and issues	… and plan and evaluate complex solutions to global challenges that are appropriate to their contexts using multiple disciplinary perspectives (such as cultural, historical and scientific)	… and apply knowledge and skills to implement sophisticated, appropriate and workable solutions to address complex global problems using interdisciplinary perspectives independently or with others
Creativity/ Innovation	Demonstrate curiosity, imagination and eagerness to learn more	… and build on personal experience to specify a challenging problem to investigate	… and engage in novel approaches, moves, directions, ideas and/or perspectives	… and synthesize ideas in original and surprising ways

Skills Progression in Colorado Essential Skills by SWEAP-Related Skill:

Taking Thoughtful Action

COLORADO ESSENTIAL SKILL	Novice	Advanced Beginner	Strategic Learner	Emerging Expert
Initiative/ Self-direction	Recognize personal characteristics, preferences, thoughts and strengths	… and pursue opportunities to engage and learn interests	… and apply knowledge to set goals, make informed decisions and transfer to new contexts	… and take responsibility for and pursue opportunities
Informed Risk Taking	Demonstrate a willingness to try new things	… and demonstrate flexibility, imagination and inventiveness in taking on tasks and activities	… and innovate from failure, connect learning across domains and recognize new opportunities	… and act on creative ideas to make a tangible and useful contribution
Leadership	Model positive behaviors for others	… and demonstrate leadership skills (e.g., organizing others, taking initiative, team-building)	… and demonstrate confidence while recognizing that personal actions impact others	…and educate and inspire others to realize their potential

GRADE LEVEL EXPECTATIONS

According to the Colorado Department of Education, *standards are constructed backwards, starting with the competencies of prepared high school graduates, to create learning expectations. Grade Level Expectations (GLEs) are what students need to know and be able to do at the end of each grade level and in each content area, they are not curriculum. While the standards provide shared expectations for students across Colorado, they allow for local flexibility in how to reach and exceed those standards. Through district- and teacher-created curriculum and lesson plans, teachers bring the standards to life, inspiring students to reach their full potential.*

Reviewers on the SWEAP Task Force were assigned a subset of Grade Level Expectations (GLEs) based on Content Area (e.g. Civics, History, etc.) and considered each GLE for potential connections to Critical Water Concepts. Additional peer-review and consistency checks were done on this analysis. When considering connections, the Task Force considered the grade-level expectations statement and the evidence outcomes and 21st Century Skills that build students' mastery of the standards at each grade level.

In our analysis, the Task Force concluded that:

- The study of water resources can be leveraged as cross-cutting phenomena to investigate across disciplines and grade levels; as many opportunities exist in Social Studies as in Science.
- The study of water resources is relevant at all grade levels, with particularly strong and/or explicit connections at certain grades and applications from early childhood through high school.

To help identify opportunities for incorporating standards-aligned water examples, the Task Force created several summary figures that are included in this section.

Figure 5 builds off of Figure 1 to provide a more specific content area- and grade-level opportunities to introduce water concepts if emphasized by a teacher, even if water is not explicitly referenced in the standard. This figure includes relevant GLE codes for educators to reference. Each GLE code indicates the strength of the connection between the Critical Water Concept and the Grade Level Expectation.

Figure 6 is a series of tables arranged by Critical Water Concept that provide example water-based objectives for each of the Grade Level Expectations with strong connections to each of the SWEAP Critical Water Concepts.

Figure 7 is another series of tables arranged by Grade Level that provide example water-based objectives for each of the Grade Level Expectations with all connections to SWEAP Critical Water Concepts.

Similarly, Figure 8 and Figure 9 (*see appendix*) utilize the same format as Figures 6 and 7, respectively, but include *all* connections, including moderate and mild connections. To see all connections, refer to the appendix.

Figure 5 Critical Water Concept by Grade Level and Subject with GLE Code (*Audience: CDE, educators developing unit and lesson plans*).

SWEAP STATEWIDE WATER EDUCATION ACTION PLAN | 2020-2025

COLORADO Department of Education

	SWEAP Critical Water Concept		Colorado Academic Standards Grade Level Expectations										
			P	K	1	2	3	4	5	MS 6	MS 7	MS 8	HS
CWC.I	The physical and chemical properties of water are unique and constant.	Science	**SC.P.1.1;** SC.P.1.2		*SC.1.1.1*	SC.2.1.1; *SC.2.3.1;* **SC.2.3.2**		*SC.4.1.5;* *SC.4.3.1;* SC.4.3.2	**SC.5.1.1;** SC.5.1.2; SC.5.3.4;		SC.MS.1.1; SC.MS.1.5; *SC.MS.1.6;* SC.MS.2.3; **SC.MS.3.6;** *SC.MS.3.7*		*SC.HS.1.1;* *SC.HS.1.7;* *SC.HS.1.9;* *SC.HS.1.10;* *SC.HS.3.4;* **SC.HS.3.6;** *SC.HS.3.7*
		Social Studies											
CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems	Science	**SC.P.2.1;** SC.P.2.2	**SC.K.2.1;** SC.K.3.2		**SC.2.2.1;** SC.2.3.2	SC.3.2.5	SC.4.3.2; SC.4.3.4	*SC.5.1.4;* SC.5.2.1; SC.5.2.2; SC.5.3.3		SC.MS.2.3; SC.MS.2.5; *SC.MS.2.6;* SC.MS.2.7; **SC.MS.3.8**		*SC.HS.2.1;* *SC.HS.2.3;* SC.HS.2.4; SC.HS.2.5; SC.HS.2.6; *SC.HS.2.12;* SC.HS.2.13; **SC.HS.3.6;** *SC.HS.3.7;* **SC.HS.3.9;** *SC.HS.3.10;* *SC.HS.3.11*
		Social Studies	*SS.P.1.1;* *SS.P.2.1*	*SS.K.1.1;* *SS.K.2.2;* *SS.K.3.2*	*SS.1.2.2*	**SS.2.2.2;** SS.2.3.1; *SS.2.4.2*		**SS.4.2.2;** SS.4.4.1				SS.8.1.2	SS.HS.2.3; SS.HS.3.1; *SS.HS.4.1*
CWC.III	Water is a scarce resource, limited and variable	Science						SC.4.3.4	**SC.5.3.4**		*SC.MS.2.5;* *SC.MS.3.7;* **SC.MS.3.8**		SC.HS.3.4; *SC.HS.3.7;* **SC.HS.3.9;** SC.HS.3.10; SC.HS.3.12
		Social Studies		*SS.K.2.2*		**SS.2.2.2;** **SS.2.3.1**	SS.3.2.1; SS.3.2.2	*SS.4.1.1;* SS.4.2.1; SS.4.2.2; *SS.4.3.2*	SS.5.2.1; *SS.5.2.2*	*SS.6.1.2;* *SS.6.2.2*		*SS.8.2.2*	SS.HS.2.2; SS.HS.2.3; SS.HS.3.1; SS.HS.3.2
CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Science		*SC.K.3.2*		*SC.2.3.1*		SC.4.3.1; SC.4.3.2; SC.4.3.4; SC.4.3.5	**SC.5.3.3;** SC.5.3.5		*SC.MS.1.5;* *SC.MS.1.6;* **SC.MS.3.6;** SC.MS.3.7; SC.MS.3.8		*SC.HS.1.7;* *SC.HS.1.9;* SC.HS.2.6; SC.HS.3.4; **SC.HS.3.6;** SC.HS.3.7; SC.HS.3.9
		Social Studies	*SS.P.2.1*		*SS.1.2.1;* *SS.1.3.1*		SS.3.2.1	SS.4.2.1; SS.4.2.2	SS.5.2.2	SS.6.2.1; SS.6.2.2			*SS.HS.2.1;* *SS.HS.2.2;* *SS.HS.2.3;* *SS.HS.3.1*
CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Science		SC.K.3.1; *SC.K.3.2*		SC.2.3.2		*SC.4.3.4;* SC.4.3.5	SC.5.1.2; SC.5.3.3; SC.5.3.4; SC.5.3.5		*SC.MS.1.1;* **SC.MS.3.6;** SC.MS.3.7; **SC.MS.3.8**		SC.HS.2.6; SC.HS.2.13; **SC.HS.3.4;** **SC.HS.3.6;** **SC.HS.3.7;** **SC.HS.3.9;** SC.HS.3.10; SC.HS.3.11; SC.HS.3.12
		Social Studies			SS.1.2.2	**SS.2.2.2**	SS.3.2.1; SS.3.2.2	*SS.4.2.1;* SS.4.2.2	**SS.5.2.2**	**SS.6.2.1;** **SS.6.2.2**		*SS.8.2.1;* *SS.8.2.2*	*SS.HS.1.2;* **SS.HS.2.2;** SS.HS.2.3; SS.HS.3.1
CWC.VI	Water is a public resource, governed by water law	Science							SC.5.3.5				SC.HS.3.9; SC.HS.3.11
		Social Studies	*SS.P.4.2*	*SS.K.4.1;* *SS.K.4.2*		*SS.2.4.2*	*SS.3.4.2*	*SS.4.1.1;* SS.4.1.2; *SS.4.4.2*				*SS.8.1.1;* *SS.8.1.2;* *SS.8.2.1;* SS.8.2.2	**SS.HS.2.2;** **SS.HS.2.3;** SS.HS.3.2; SS.HS.4.1; *SS.HS.4.2;* SS.HS.4.3

Key:
Text Format: GLEs in **Bold** = strong connections; Normal = moderate connections; *Italics* = mild connections
Coding: Content Area.Grade Level.Standard Category.Grade Level Expectation
Coding Example: *SC.2.3.1* (SC = Science; 2= Second Grade; 3 = Earth & Space Science; 1 = Grade Level Expectation (GLE): "*Some events on Earth occur quickly...*"

Figure 6 (Multiple Tables): Critical Water Concept Focus - Progression of Relevant Grade Level Expectations by Critical Water Concept with Evidence Outcomes for a Water Focus (Strong Connections) (*Audience: all proposed audiences*)

The following tables provides the Evidence Outcomes for each of the Grade Level Expectations with strong connections to each of the SWEAP Critical Water Concepts. These Evidence Outcomes were adapted for a water focus and to incorporate local/state context.

CO Academic Standards - Progression by SWEAP Critical Water Concept (Strong connections)

CWC.I The physical and chemical properties of water are unique and constant.

Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
High School	Science	SC.HS.3.6	The planet's dynamics are greatly influenced by water's unique chemical and physical properties.	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. (HS-ESS2-5)
Middle School	Science	SC.MS.3.6	Water cycles among land, ocean, and atmosphere, and is propelled by sunlight and gravity. Density variations of sea water drive interconnected ocean currents. Water movement causes weathering and erosion, changing landscape features.	Construct an explanation based on evidence for water's role in how geoscience processes have changed Earth's surface at varying time and spatial scales. (MS-ESS2-2)
Second Grade	Science	SC.2.3.2	Wind and water can change the shape of the land; models can show the shape and these changes to the land.	1. Obtain information to identify where water is found on Earth and that it can be solid or liquid. (2-ESS2-3) 2. Develop a model to demonstrate how water can change the shape of land (e.g. through flooding or erosion). (2-ESS2-2)
Pre-K	Science	SC.P.1.1	Recognize that physical properties of objects and/or materials help us understand the world.	Use senses to explore the properties of water by investigating changes in liquid water and solid ice when water is heated, cooled, or combined.

CWC.II Water is essential for life, our economy, and a key component of healthy ecosystems.

Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
High School	Science	SC.HS.3.6	The planet's dynamics are greatly influenced by water's unique chemical and physical properties.	Plan and conduct an investigation of how the properties of water and its effects on Earth materials and surface processes may alter dynamics within an ecosystem. (HS-ESS2-5)
High School	Science	SC.HS.3.9	Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.	Construct an explanation based on evidence for how the availability of water (e.g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts), and changes in precipitation related to changes in climate have influenced human activity (e.g. types of crops and livestock that can be raised). (HS-ESS3-1)
Middle School	Science	SC.MS.3.8	Humans depend on Earth's land, ocean, atmosphere, and biosphere for different resources, many of which are limited or not renewable. Resources are distributed unevenly around the planet as a result of past geologic processes.	Construct a scientific explanation based on evidence for why water resources are unevenly distributed, limited or not renewable, such as groundwater. (MS-ESS3-1)
Fourth Grade	Social Studies	SS.4.2.2	Connections are developed within and across human and physical systems.	Analyze how people use geographic factors in creating settlements and have adapted to and modified the local physical environment in order to use water resources through the development of irrigation ditches/acequias (to support food production) and hardrock mining.
Fourth Grade	Social Studies	SS.4.4.1	Identify, investigate, and analyze multiple perspectives on civic issues.	Give example of issues faced and multiple perspectives in regards to allocation and availability of water as Colorado's population grows and the state faces uncertainty over future climate and provide possible solutions.
Second Grade	Science	SC.2.2.1	Plants depend on water and light to grow and on animals for pollination or to move their seeds around.	Plan and conduct an investigation to determine if plants need sunlight and water to grow. (2-LS2-1)
Second Grade	Social Studies	SS.2.2.2	People in communities manage, modify, and depend on their environment.	1. Explain that people settle in certain areas because of the need to access freshwater. 2. Explain how access to freshwater affects a community's ability to thrive. 3. Identify examples of how water draws people and wildlife to particular areas.
Kinder garten	Science	SC.K.2.1	To live and grow, animals obtain food they need from plants or other animals, and plants need water and light [and nutrients].	Use observations of patterns among all living things that describes plants and animals (including humans) need water to survive (and humans and other animals need food that we get from plants and animals). (K-LS1-1)
Pre-K	Science	SC.P.2.1	Recognize that living things have unique characteristics and basic needs that can be observed and studied.	Describe how habitats provide for the basic needs of plants and animals, including water, to grow and survive by observing familiar living things (e.g. a classroom pet or a classroom garden that can also produce food).

CWC.III Water is a scarce resource, limited and variable

Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
High School	Science	SC.HS.3.9	Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.	Construct an explanation based on evidence for how the availability of water (e.g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts), and changes in precipitation related to changes in climate have influenced human activity. (HS-ESS3-1)
Middle School	Science	SC.MS.3.8	Humans depend on Earth's land, ocean, atmosphere, and biosphere for different resources, many of which are limited or not renewable. Resources are distributed unevenly around the planet as a result of past geologic processes.	Construct a scientific explanation based on evidence for how the uneven distribution of Colorado and Earth's groundwater resources are the result of past and current geoscience processes. (MS-ESS3-1)
Fifth Grade	Science	SC.5.3.4	Most of Earth's water is in the ocean and much of Earth's freshwater in glaciers or underground.	Describe and graph the amounts and percentages of saltwater and freshwater in various reservoirs to provide evidence for the statement "water is a scarce resource, limited and variable" by comparing the amount of water available for human use in Colorado (e.g. for a local drinking water supply or food production) from various sources (e.g. surface vs. groundwater). (5-ESS2-2)
Second Grade	Social Studies	SS.2.2.2	People in communities manage, modify, and depend on their environment.	Explain how communities manage and use scarce freshwater resources and certain nonrenewable groundwater sources.
Second Grade	Social Studies	SS.2.3.1	Resources are scarce, so individuals may not have access to the goods and services they want.	1. Explain scarcity by giving examples of behaviors related to water and limited water (i.e., water restrictions). 2. Investigate how different individuals and communities water use varies.

CWC.IV Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people.

Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
High School	Science	SC.HS.3.6	The planet's dynamics are greatly influenced by water's unique chemical and physical properties.	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes by investigating stream transportation and deposition using a stream table. (HS-ESS2-2)
Middle School	Science	SC.MS.3.6	Water cycles among land, ocean, and atmosphere, and is propelled by sunlight and gravity. Density variations of sea water drive interconnected ocean currents. Water movement causes weathering and erosion, changing landscape features.	1. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity by using a Colorado watershed as an example. (MS-ESS2-4) 2. Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions in Colorado. (MS-ESS2-5) 3. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates and precipitation patterns within Colorado. (MS-ESS2-6)
Fifth Grade	Science	SC.5.3.3	Earth's major systems interact in multiple ways to affect Earth's surface materials and processes.	Develop a model using an example to describe why 85% of Colorado's precipitation falls west of the Continental Divide by modeling the influence of the hydrosphere (e.g. gulfs of Mexico and California, Pacific Ocean, Mississippi Valley), atmosphere (prevailing winds), and the geosphere (e.g. the state's mountain ranges) on precipitation patterns in the state. (5-ESS2-1)

CWC.V The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.

Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
High School	Science	SC.HS.3.4	Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes, and these effects occur on different time scales, from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles.	Analyze geoscience data to make the claim that one change to Earth's surface (e.g. loss of ground vegetation from fire, flood, etc.) can create feedbacks that cause changes to other Earth systems (e.g. increase in water runoff and soil erosion or changes in food production). (HS-ESS2-2)
High School	Science	SC.HS.3.6	The planet's dynamics are greatly influenced by water's unique chemical and physical properties.	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes by investigating stream transportation and deposition using a stream table or testing the solubility of different materials as evidence of chemical weathering and recrystallization. (HS-ESS2-2)
High School	Science	SC.HS.3.7	The role of radiation from the sun and its interactions with the atmosphere, ocean, and land are the foundation for the global climate system. Global climate models are used to predict future changes, including changes influenced by human behavior and natural factors.	1. Analyze geoscience data to make the claim that one change to Earth's surface (e.g. loss of ground vegetation from fire, flood, aridification, etc.) can create feedbacks that cause changes to other Earth systems (e.g. increase in water runoff and soil erosion). (HS-ESS2-2) 2. Analyze geoscience data to make the claim that one change to Earth's surface (increase in water vapor or carbon dioxide in the atmosphere, etc.) can create feedbacks that cause changes to other Earth systems (increase in variability and severity of weather patterns, increasing surface temperatures, etc.) (HS-ESS2-2)
High School	Science	SC.HS.3.9	Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.	Construct an explanation based on evidence for how the availability of water (e.g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts), and changes in precipitation related to changes in climate have influenced human activity. (HS-ESS3-1)
High School	Social Studies	SS.HS.2.2	Geographic variables influence interactions of people, places, and environments.	Explain how altering the environment by altering water supplies has brought prosperity to some places and created environmental dilemmas for others by examining differences between tribal nations and nontribal communities, consequences of poverty on access to clean drinking water, rural versus urban access to water, immigration/settlement and its impact on access to water resources, etc.).
Middle School	Science	SC.MS.3.6	Water cycles among land, ocean, and atmosphere, and is propelled by sunlight and gravity. Density variations of sea water drive interconnected ocean currents. Water movement causes weathering and erosion, changing landscape features.	1. Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions in Colorado. (MS-ESS2-4) 2. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates within Colorado. (MS-ESS2-6)
Middle School	Science	SC.MS.3.8	Humans depend on Earth's land, ocean, atmosphere, and biosphere for different resources, many of which are limited or not renewable. Resources are distributed unevenly around the planet as a result of past geologic processes.	Construct a scientific explanation based on evidence for how the uneven distribution of Colorado and Earth's groundwater resources are the result of past and current geoscience processes and how their distributions are significantly changing in Colorado and on Earth as a result of removal by humans. (MS-ESS3-1)
Sixth Grade	Social Studies	SS.6.2.1	Use geographic tools and resources to research and make geographic inferences and predictions about the Western Hemisphere.	Identify uses of technology in agriculture for maximum water efficiency such as automated headgates and sprinkler systems.
Sixth Grade	Social Studies	SS.6.2.2	Regional differences and perspectives in the Western Hemisphere impact human and environmental interactions.	1. Classify and analyze how water affects human interactions with the environment. 2. Identify physical water features (e.g. transbasin diversions, irrigation canals and mountain snowpack) and the positive and negative impacts on human systems in different regions.
Fifth Grade	Social Studies	SS.5.2.2	Causes and consequences of movement.	1. Discuss allocation of water resources amongst different user groups. 2. Describe how migration patterns reflect application of technology often involving water quantity for agriculture and manufacturing (e.g. construction of irrigation ditches/acequias allowed for food production in new areas).

CWC.VI Water is a public resource governed by water law

Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
High School	Social Studies	SS.HS.2.2	Geographic variables influence interactions of people, places, and environments.	Research and interpret multiple viewpoints on issues that shape policies and programs for water resource use and explain how the management of water supplies has brought prosperity to some places and created environmental dilemmas for others by examining Colorado examples (e.g differences between tribal nations and nontribal communities, consequences of poverty on access to clean drinking water, rural versus urban access to water, immigration/settlement and its impact on access to water resources, etc.).
High School	Social Studies	SS.HS.2.3	3. The interconnected nature of the world, its people and places.	Analyze how cooperation and conflict influence the division and control of Earth by using examples of Colorado's water administration and treaties/interstate compacts over water resources as an example.

Figure 7 (Multiple Tables): Grade-level Focus - Progression of Relevant Grade Level Expectations and Critical Water Concepts by Grade Level with Evidence Outcomes Adapted for a Water Focus (All Connections) *(Audience: educators developing unit and lesson plans and assessments)*

CO Academic Standards - Progression by Grade Level (Strong connections)

HIGH SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Science	SC.HS.3.4	Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes, and these effects occur on different time scales, from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Analyze geoscience data to make the claim that one change to Earth's surface (e.g. loss of ground vegetation from fire, flood, etc.) can create feedbacks that cause changes to other Earth systems (e.g. increase in water runoff and soil erosion or changes in food production). (HS-ESS2-2)
Science	SC.HS.3.6	The planet's dynamics are greatly influenced by water's unique chemical and physical properties.	CWC.I	The physical and chemical properties of water are unique and constant.	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. (HS-ESS2-5)
Science	SC.HS.3.6	The planet's dynamics are greatly influenced by water's unique chemical and physical properties.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Plan and conduct an investigation of how the properties of water and its effects on Earth materials and surface processes may alter dynamics within an ecosystem. (HS-ESS2-2)
Science	SC.HS.3.6	The planet's dynamics are greatly influenced by water's unique chemical and physical properties.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes by investigating stream transportation and deposition using a stream table. (HS-ESS2-2)
Science	SC.HS.3.6	The planet's dynamics are greatly influenced by water's unique chemical and physical properties.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes by investigating stream transportation and deposition using a stream table or testing the solubility of different materials as evidence of chemical weathering and recrystallization. (HS-ESS2-2)
Science	SC.HS.3.7	The role of radiation from the sun and its interactions with the atmosphere, ocean, and land are the foundation for the global climate system. Global climate models are used to predict future changes, including changes influenced by human behavior and natural factors.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	1. Analyze geoscience data to make the claim that one change to Earth's surface (e.g. loss of ground vegetation from fire, flood, aridification, etc.) can create feedbacks that cause changes to other Earth systems (e.g. increase in water runoff and soil erosion). (HS-ESS2-2) 2. Analyze geoscience data to make the claim that one change to Earth's surface (increase in water vapor or carbon dioxide in the atmosphere, etc.) can create feedbacks that cause changes to other Earth systems (increase in variability and severity of weather patterns, increasing surface temperatures, etc.) (HS-ESS2-2)

HIGH SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Science	SC.HS.3.9	Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Construct an explanation based on evidence for how the availability of water (e.g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts), and changes in precipitation related to changes in climate have influenced human activity (e.g. types of crops and livestock that can be raised). (HS-ESS3-1)
Science	SC.HS.3.9	Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.	CWC.III	Water is a scarce resource, limited and variable.	Construct an explanation based on evidence for how the availability of water (e.g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts), and changes in precipitation related to changes in climate have influenced human activity. (HS-ESS3-1)
Science	SC.HS.3.9	Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Construct an explanation based on evidence for how the availability of water (e.g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts), and changes in precipitation related to changes in climate have influenced human activity. (HS-ESS3-1)
Social Studies	SS.HS.2.2	Geographic variables influence interactions of people, places, and environments.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Explain how altering the environment by altering water supplies has brought prosperity to some places and created environmental dilemmas for others by examining differences between tribal nations and nontribal communities, consequences of poverty on access to clean drinking water, rural versus urban access to water, immigration/settlement and its impact on access to water resources, etc.).
Social Studies	SS.HS.2.2	Geographic variables influence interactions of people, places, and environments.	CWC.VI	Water is a public resource, governed by water law.	Research and interpret multiple viewpoints on issues that shape policies and programs for water resource use and explain how the management of water supplies has brought prosperity to some places and created environmental dilemmas for others by examining Colorado examples (e.g differences between tribal nations and nontribal communities, consequences of poverty on access to clean drinking water, rural versus urban access to water, immigration/settlement and its impact on access to water resources, etc.).
Social Studies	SS.HS.2.3	3. The interconnected nature of the world, its people and places.	CWC.VI	Water is a public resource, governed by water law.	Analyze how cooperation and conflict influence the division and control of Earth by using examples of Colorado's water administration and treaties/interstate compacts over water resources as an example.

MIDDLE SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Science	SC.MS.3.6	Water cycles among land, ocean, and atmosphere, and is propelled by sunlight and gravity. Density variations of sea water drive interconnected ocean currents. Water movement causes weathering and erosion, changing landscape features.	CWC.I	The physical and chemical properties of water are unique and constant.	Construct an explanation based on evidence for water's role in how geoscience processes have changed Earth's surface at varying time and spatial scales. (MS-ESS2-2)
Science	SC.MS.3.6	Water cycles among land, ocean, and atmosphere, and is propelled by sunlight and gravity. Density variations of sea water drive interconnected ocean currents. Water movement causes weathering and erosion, changing landscape features.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	1. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity by using a Colorado watershed as an example. (MS-ESS2-4) 2. Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions in Colorado. (MS-ESS2-5) 3. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates and precipitation patterns within Colorado. (MS-ESS2-6)
Science	SC.MS.3.6	Water cycles among land, ocean, and atmosphere, and is propelled by sunlight and gravity. Density variations of sea water drive interconnected ocean currents. Water movement causes weathering and erosion, changing landscape features.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	1. Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions in Colorado. (MS-ESS2-4) 2. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates within Colorado. (MS-ESS2-6)
Science	SC.MS.3.8	Humans depend on Earth's land, ocean, atmosphere, and biosphere for different resources, many of which are limited or not renewable. Resources are distributed unevenly around the planet as a result of past geologic processes.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Construct a scientific explanation based on evidence for why water resources are unevenly distributed, limited or not renewable, such as groundwater. (MS-ESS3-1)
Science	SC.MS.3.8	Humans depend on Earth's land, ocean, atmosphere, and biosphere for different resources, many of which are limited or not renewable. Resources are distributed unevenly around the planet as a result of past geologic processes.	CWC.III	Water is a scarce resource, limited and variable.	Construct a scientific explanation based on evidence for how the uneven distribution of Colorado and Earth's groundwater resources are the result of past and current geoscience processes. (MS-ESS3-1)
Science	SC.MS.3.8	Humans depend on Earth's land, ocean, atmosphere, and biosphere for different resources, many of which are limited or not renewable. Resources are distributed unevenly around the planet as a result of past geologic processes.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Construct a scientific explanation based on evidence for how the uneven distribution of Colorado and Earth's groundwater resources are the result of past and current geoscience processes and how their distributions are significantly changing in Colorado and on Earth as a result of removal by humans. (MS-ESS3-1)

MIDDLE SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Social Studies	SS.6.2.1	Use geographic tools and resources to research and make geographic inferences and predictions about the Western Hemisphere.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Identify uses of technology in agriculture for maximum water efficiency such as automated headgates and sprinkler systems.
Social Studies	SS.6.2.2	Regional differences and perspectives in the Western Hemisphere impact human and environmental interactions.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	1. Classify and analyze how water affects human interactions with the environment. 2. Identify physical water features (e.g. transbasin diversions, irrigation canals and mountain snowpack) and the positive and negative impacts on human systems in different regions.

FIFTH GRADE

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Science	SC.5.3.3	Earth's major systems interact in multiple ways to affect Earth's surface materials and processes.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people.	Develop a model using an example to describe why 85% of Colorado's precipitation falls west of the Continental Divide by modeling the influence of the hydrosphere (e.g. gulfs of Mexico and California, Pacific Ocean, Mississippi Valley), atmosphere (prevailing winds), and the geosphere (e.g. the state's mountain ranges) on precipitation patterns in the state. (5-ESS2-1)
Science	SC.5.3.4	Most of Earth's water is in the ocean and much of Earth's freshwater in glaciers or underground.	CWC.III	Water is a scarce resource, limited and variable.	Describe and graph the amounts and percentages of saltwater and freshwater in various reservoirs to provide evidence for the statement "water is a scarce resource, limited and variable" by comparing the amount of water available for human use in Colorado (e.g. for a local drinking water supply or food production) from various sources (e.g. surface vs. groundwater). (5-ESS2-2)
Social Studies	SS.5.2.2	Causes and consequences of movement.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	1. Discuss allocation of water resources amongst different user groups. 2. Describe how migration patterns reflect application of technology often involving water quantity for agriculture and manufacturing (e.g. construction of irrigation ditches/acequias allowed for food production in new areas).

FOURTH GRADE

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Social Studies	SS.4.2.2	Connections are developed within and across human and physical systems.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Analyze how people use geographic factors in creating settlements and have adapted to and modified the local physical environment in order to use water resources through the development of irrigation ditches/acequias (to support food production) and hardrock mining.
Social Studies	SS.4.4.1	Identify, investigate, and analyze multiple perspectives on civic issues.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Give example of issues faced and multiple perspectives in regards to allocation and availability of water as Colorado's population grows and the state faces uncertainty over future climate and provide possible solutions.

SECOND GRADE

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Science	SC.2.2.1	Plants depend on water and light to grow and on animals for pollination or to move their seeds around.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Plan and conduct an investigation to determine if plants need sunlight and water to grow. (2-LS2-1)
Science	SC.2.3.2	Wind and water can change the shape of the land; models can show the shape and these changes to the land.	CWC.I	The physical and chemical properties of water are unique and constant.	1. Obtain information to identify where water is found on Earth and that it can be solid or liquid. (2-ESS2-3) 2. Develop a model to demonstrate how water can change the shape of land (e.g. through flooding or erosion). (2-ESS2-2)
Social Studies	SS.2.2.2	People in communities manage, modify, and depend on their environment.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	1. Explain that people settle in certain areas because of the need to access freshwater. 2. Explain how access to freshwater affects a community's ability to thrive. 3. Identify examples of how water draws people and wildlife to particular areas.
Social Studies	SS.2.2.2	People in communities manage, modify, and depend on their environment.	CWC.III	Water is a scarce resource, limited and variable.	Explain how communities manage and use scarce freshwater resources and certain nonrenewable groundwater sources.
Social Studies	SS.2.3.1	Resources are scarce, so individuals may not have access to the goods and services they want.	CWC.III	Water is a scarce resource, limited and variable.	1. Explain scarcity by giving examples of behaviors related to water and limited water (i.e., water restrictions). 2. Investigate how different individuals and communities water use varies.

KINDERGARTEN

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Science	SC.K.2.1	To live and grow, animals obtain food they need from plants or other animals, and plants need water and light [and nutrients].	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Use observations of patterns among all living things that describes plants and animals (including humans) need water to survive (and humans and other animals need food that we get from plants and animals). (K-LS1-1)

PRESCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus
Science	SC.P.1.1	Recognize that physical properties of objects and/or materials help us understand the world.	CWC.I	The physical and chemical properties of water are unique and constant.	Use senses to explore the properties of water by investigating changes in liquid water and solid ice when water is heated, cooled, or combined.
Science	SC.P.2.1	Recognize that living things have unique characteristics and basic needs that can be observed and studied.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Describe how habitats provide for the basic needs of plants and animals, including water, to grow and survive by observing familiar living things (e.g. a classroom pet or a classroom garden that also produces garden or classroom that can also produce food).

EXAMPLE PHENOMENA AND CASE STUDIES

(*Audience: formal and non-formal educators*)

The following section contains examples of phenomena and case studies for potential inclusion in school curricula within Colorado. This includes considerations for locally and culturally-relevant phenomena. While many more resources exist, we added some initial resources on where to find more water phenomena, including images, video links, data links, news article links, etc.

The goal of these examples is to provide compelling anchor phenomena that could engage students from a variety of backgrounds at the beginning of a lesson or unit of study. These Colorado-specific examples could also be used in an assessment at the end of a unit. These are examples that could spark teacher/administrator interest in identifying locally-relevant water phenomena for their students.

The identification of example phenomena was a learning process as the task force discussed the most effective way to define, brainstorm and show results from the task of identifying example phenomena. Individual task force members contributed phenomena and case studies based on their expertise and interests. In addition, these examples include input from Water Education Colorado staff. These examples should be considered a first step with more work to build out this resource with support from the Water Educator Network and water educators from around the state.

Definition of Phenomena (from Colorado Department of Education):
Local, community-related phenomena engage students and make science meaningful, preparing students for life beyond school in college, in careers, and as citizens. A good phenomenon often has no one right answer, but is a specific event or connection within the natural or designed world, ideally that students can directly experience.

Consider:

- How do our example phenomena tell a bigger story?
- Whose story are we telling?
- In what ways are we incorporating connections to local and indigenous culture?
- Are we considering and elevating history?
- How and when do we introduce different topics (e.g. climate change)?
    - There are students, including very young students, who are living the reality every day (water scarcity, lack of access to water, poor water quality, impacts of climate change, etc.). These can be introduced earlier, but how they are introduced is important.

Example Phenomena and Case Studies by Critical Water Concept

CWC.I. The physical and chemical properties of water are unique and constant.		
Example Phenomena and Case Studies	Evidence Outcome (with GLE) *[see more Evidence Outcomes in Figures 7 and 8]*	Links or Other Resources
Ice dams breaking in spring	Use senses to explore the properties of water by investigating changes in liquid water and solid ice when water is heated, cooled, combined etc. (SC.P.1.1) Develop a model that predicts and describes changes in particle motion, temperature, and state of water when thermal energy is added or removed. (SC.MS.1.1)	https://youtu.be/F6_LRjBHGSI https://youtu.be/P2Qq9e2lI1o
Place where water and wind went wild: Grottos, Paint Mines, Wheeler Geologic Area Local erosion (find a nearby spot with obvious water damage to soils)	Develop a model to demonstrate how water can change the shape of land. (SC.2.3.2)	

Aerial photos and drone footage of canyons and floodplains	Construct an explanation based on evidence for water's role in how geoscience processes have changed Earth's surface at varying time and spatial scales. (SC.MS.3.6)	https://www.moxiecranmedia.com/uploads/8/9/6/5/8965616/riogrande-june-19-2.jpg https://www.nps.gov/grca/learn/photosmultimedia/b-roll_hd08.htm https://vimeo.com/356739699
Above suggestions plus Flooding - before and after shots (2013, 1965, 1933, 1864)	Construct an argument from evidence of how the properties of water and its effects on Earth materials and surface processes may alter dynamics within an ecosystem. (SC.HS.3.6)	Headwaters Magazine Summer 2014: Flooded. https://5008.sydneyplus.com/HistoryColorado_ArgusNet_Final/Portal/portal.aspx?lang=en-US&p_AAEZ=tab2 https://5008.sydneyplus.com/HistoryColorado_ArgusNet_Final/Portal/portal.aspx?lang=en-US&p_AAEZ=tab2 https://www.westword.com/news/the-1965-flood-how-denvers-greatest-disaster-changed-the-city-6668119

Unique properties of water are utilized when treating water/cleaning water	Conduct an investigation to determine whether the mixing of two or more substances results in new substances by conducting water quality testing of a local waterway and observing reactions in test tubes. (SC.5.1.2)	South Platte Renew Video Tour: https://youtu.be/yX2-ZV4Cgbw Aurora Water Virtual Tour of Water Purification Facilities: https://storymaps.arcgis.com/collections/245f2bb7556a408fb24fd02842415b73?item=5 https://www.agclassroom.org/matrix/lesson/802/

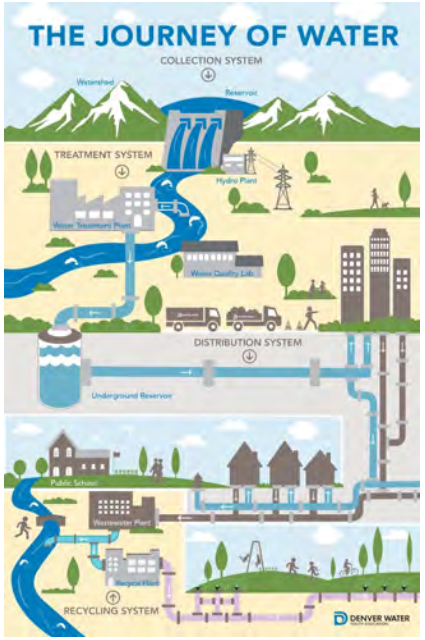
CWC.II. Water is essential for life, our economy, and a key component of healthy ecosystems.		
Example Phenomena and Case Studies	Evidence Outcome (with GLE) *[see more Evidence Outcomes in Figures 7 and 8]*	Links or Other Resources
Side-by-side images of a dryland farm and irrigated farm (or xeriscape and irrigated lawn) or center pivot irrigation patterns and dry land.	Discuss how communities allocate water resources so that all members have access. (SS.2.2.2) Analyze how people use geographic factors in creating settlements and have adapted to and modified the local physical environment in order to use water resources through the development of irrigation ditches/acequias (to support food production) and hardrock mining. (SS.4.2.2) Construct an explanation based on evidence for how the availability of water (e.g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts), and changes in precipitation related to changes in climate have influenced human activity. (SC.HS.3.9)	Northern Water's Conservation Gardens: To juxtapose local images, consider using collage maker websites, e.g.: https://www.kapwing.com/explore/side-by-side-collage-maker Or photo comparison slider website, e.g.: https://codyhouse.co/gem/css-jquery-image-comparison-slider
Observing organisms nearby: Water tiger (larvae of a predaceous diving beetle, a type of insect) found in a stormwater outfall Growing a classroom garden that also produces food	Describe how habitats provide for the basic needs of plants and animals, including water, to grow and survive by observing familiar living things (e.g. a classroom pet or a classroom garden that can also produce food). (SC.P.2.1)	https://drive.google.com/file/d/1-d97oBUEaLAp_aIzblHFv_UcjQzpBAab/view?usp=sharing Resources on school gardens: https://www.agclassroom.org/matrix/search_result/?search=garden

CWC.III. Water is a scarce resource, limited and variable.		
Example Phenomena and Case Studies	Evidence Outcome (with GLE) *[see more Evidence Outcomes in Figures 7 and 8]*	Links or Other Resources
What does it mean to be a "Headwaters State?" (Image of Continental Divide sign in CO covered in snow - displays CO is Headwaters state) Time series of snowpack in Colorado Comparing population and precipitation pattterns: Colorado's human population is more concentrated on the front range and average annual precipitation is much higher west of the Continental Divide.	Describe how the geography of Colorado and western states differ from other regions of the United States, including the role of snowpack as a main source of water, along with more limited average annual rainfall, versus the eastern United States region where average annual rainfall is generally more plentiful. (SS.4.2.1) Develop and use a model to describe how unequal heating, rotation of the Earth and geographic land distribution causes patterns of atmospheric and oceanic circulation that determine regional climates and precipitation patterns in regions of Colorado. (SC.MS.3.7) Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate and precipitation patterns in Colorado. (SC.HS.3.7)	https://satelliteliaisonblog.com/wp-content/uploads/2019/03/2018_2019_modis_trend.gif https://www.nrcs.usda.gov/wps/portal/nrcs/detail/co/snow/products/?cid=nrcseprd1432263 Water Education Colorado Citizen's Guideto Where Your Water Comes From Colorado Foundation for Agriculture's Colorado Reader: Where Your Water Comes From
Measuring precipitation (CoCoRahs)	Construct an argument for how the quantity of water available for plants, animals, and humans varies by major river basin in Colorado and within river basins has resulted in similarities and differences seen today. (SS.3.2.2)	https://www.cocorahs.org/ Colorado Foundation for Agriculture's Colorado Reader: Where Your Water Comes From

Images of the Dust Bowl in Colorado	Explain how communities manage and use scarce freshwater resources and certain nonrenewable groundwater sources. (SS.2.2.2) Construct an explanation based on evidence for how the availability of water (e.g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts), and changes in precipitation related to changes in climate have influenced human activity. (SC.HS.3.9)	 Source: Headwaters Magazine, Spring 2019 (Science History Images/Alamy Stock Photo)
Video of the Colorado River and the many demands on this scarce resource. The first half of the video describes how many people and places rely on the Colorado. Storymaps that investigate the Colorado River and the degree to which human populations in the Western United States depend on its limited water supply.	Explain scarcity by giving examples of behaviors related to water and limited water (i.e., water restrictions). (SS.2.3.1) Determine the opportunity cost of different water allocation scenarios in Colorado, including among water users (such as agriculture, municipalities, industry, fish and wildlife, energy production, recreation, etc.). (SS.4.3.2) Identify, evaluate, and communicate strategies to respond to constraints placed on human systems by analyzing the scarcity and variability in available water resources in Colorado. (SS.HS.2.2) Explain the economic way of thinking: the condition of scarcity requires choice and choice has a cost (opportunity cost) by using Colorado's water resources as an example. (SS.HS.3.1)	Video: https://www.youtube.com/watch?v=mqYcC7jEe44 Storymaps, e.g. The Hardest Working River in the West: https://storymaps.arcgis.com/stories/2efeafc8613440dba5b56cb83cd790ba?fbclid=IwAR1QxIjetGs1vdLtPnOdhrEcOMFIJNjxmunptQ9sc1IjhN-hJHZnnM3M9lw)

What can we learn from the people of Mesa Verde? (*and other regional water stories in Colorado*)	Explain, through multiple perspectives, how water use in each region have shaped the settlement of the state by using examples from American Indians, Spanish explorers, trappers/traders, and settlers in the mining, trading, agriculture, and industrial industries. (SS.4.1.1)	Citizen's Guide to Colorado Water Heritage "Harvesting Water" *(and other primary and secondary sources)* *From the same Citizen's Guide see also: "Sin Agua no hay vida" and "Mingled Waters"*
Where are families and communities experiencing water scarcity in Colorado and nearby?	Explain how communities manage and use scarce freshwater resources and certain nonrenewable groundwater sources (SS.2.2.2)	Roxborough Water and Sanitation District here - *it has enough water to supply only another 124 homes* Front Range housing boom sends water prices soaring (Arvada - *Arvada is close to maxing out its water supplies).* Hauling water in La Plata County - *In a La Plata district, 25 percent of residents have had to haul water.* Modern-day communal well in Ignacio: *Freshwater News article* Hauling water in the Navajo Nation.
What are some stories of water reuse that inspire hope?	Explain how communities manage and use scarce freshwater resources and certain nonrenewable groundwater sources.(SS.2.3.1) Explain how the uneven distribution of limited and variable water resources in the world can lead to conflict, competition, or cooperation among nations, regions, and cultural groups. (SS.HS.2.3)	WISE approach - effective way of making water go much further. Innovative use of water Denver developments: Use of greywater in Central Park Neighborhood Examples of water conservation in agriculture

CWC.IV Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people.		
Example Phenomena and Case Studies	Evidence Outcome (with GLE) *[see more Evidence Outcomes in Figures 7 and 8]*	Links or Other Resources
Historical images of different examples of humans modifying their environment in Colorado. Mesa Verde, People's Ditch in San Luis Valley, CO-Big Thompson Project, etc.	1. Explain that people settle in certain areas because of the need to access freshwater. 2. Explain how access to freshwater affects a community's ability to thrive. 3. Identify examples of how water draws people and wildlife to particular areas. (SS.2.2.2)	https://waterknowledge.colostate.edu/water-history/
Grand Valley Ditch, including the story of immigrant/migrant labor (Japanese and Mexican laborers) *Note: Grand Valley Ditch is a good hike for kids, too.* Trans-basin diversion of water from the Dolores River to irrigate the Montezuma Valley: Students can learn how this project provides water security to the Montezuma Valley and explore impacts to the down-river ecology below McPhee dam to understand the true cost to the environment and recreation.	Explain how altering the environment by altering water supplies has brought prosperity to some places and created environmental dilemmas for others by examining differences between tribal nations and nontribal communities, consequences of poverty on access to clean drinking water, rural versus urban access to water, immigration/settlement and its impact on access to water resources, etc.). (SS.HS.2.2) Give examples of professions/jobs in the local community where individuals help plan, build and maintain water infrastructure (e.g. for producing food, cleaning and delivering drinking water, cleaning water after human use, maintaining parks and recreation opportunities, etc.). (SS.1.3.1)	https://publiclands.colostate.edu/digital_projects/dp/poudre-river/moving-storing/ditches-dams-diversions/grand-river-ditch/ High Country News: Water Across the Divide The Dolores Project (U.S. Bureau of Reclamation): https://www.usbr.gov/projects/index.php?id=453

Use a pedal to pump water ("It takes work" - collaborative) and/or students can work together to set irrigation tubes	Design, build, and refine a device that models a watershed or municipal drinking water system to convert one form of energy into another form of energy. (SC.HS.1.9) Develop a model illustrating how energy (e.g. the sun and gravity) is exchanged to power the water cycle and move water from one location to another. (SC.MS.1.6)	https://www.denverwater.org/tap/craftsmen-pedal-journey-of-water-to-schoolkids
Students draw what it takes for drinking water to get to them, then see a real water system map.	Discuss how water contributes to the interaction of a community with their environment. (SS.2.2.2) Use maps to trace the paths of rivers and streams to the oceans and to identify where man made structures (cities, reservoirs, etc.) are located in relation to natural features. (SS.1.2.1)	 Example: Denver Water Education Poster Citizen's Guide to Where Your Water Comes From (HS-level resource)

CWC.V. The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.		
Example Phenomena and Case Studies	Evidence Outcome (with GLE) *[see more Evidence Outcomes in Figures 7 and 8]*	Links or Other Resources
Colorado's variable geology, hydrology and climate have created distinct differences in water availability and crops grown. Students can investigate the maps to find trends between geologic features and how we have utilized the land and water.	Construct an explanation based on evidence for how the availability of water (e.g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts), and changes in precipitation related to changes in climate have influenced human activity. (SC.HS.3.9)	1.Colorado water source distribution 2. Colorado Cropland Map or https://nassgeodata.gmu.edu/CropScape/ 3.https://efotg.sc.egov.usda.gov/references/public/CO/CMZPrecip_1981_2010.pdf or 4. Storymap of the Gunnison River: https://storymaps.arcgis.com/stories/196d3c8b23624530b1d7b3ff9935f258
This video highlights how land cover and management (particularly fire mitigation) impact water quality and quantity. Fire causes rapid land changes and has big consequences for water users. Students can use this as a jumping off point for how natural phenomena (drought,fire,disease) impact each other and who is most vulnerable. Grizzly Creek (Glenwood Canyon), Cameron Peak, and East Troublesome fires with recovery efforts.	Analyze geoscience data to make the claim that one change to Earth's surface (loss of ground vegetation from fire, flood, aridification, etc.) can create feedbacks that cause changes to other Earth systems (increase in water runoff and soil erosion or changes in food production). (SC.HS.3.7 and SC.HS.3.4)	https://vimeo.com/406250886 Freshwater News: Glenwood Canyon fire https://www.youtube.com/watch?v=cJ4FObWWs4U Freshwater News Article: East Troublesome fire https://www.watereducationcolorado.org/fresh-water-news/squeezed-between-two-megafires-the-race-to-save-lake-granby/ Northern Water: 1 year recovery efforts of East Troublesome Fire https://www.youtube.com/watch?v=Pz9Ha203hck

NASA Images of Change as seen from space.	*See example objective above* (SC.HS.3.7 and SC.HS.3.4)	Arapaho Glacier (up to 2003) https://climate.nasa.gov/images-of-change/?id=556#556-arapaho-glacier-melt-colorado Snow drought in the Rockies (2016 vs. 2018) https://climate.nasa.gov/images-of-change/?id=640#640-snow-drought-in-the-southern-rockies San Luis Valley stream change (1987-2011) https://climate.nasa.gov/images-of-change/?id=470#470-san-luis-valley-stream-change-colorado
Picture/video of youth involved in a stream or wetland restoration project.	Discuss how water contributes to the interaction of a community with their environment. (SS.2.2.2)	Fountain Creek Week
Side-by-side images of different farming practices (e.g. regenerative agriculture, agroforestry, traditional agriculture, etc) - connects the food we eat to water	Analyze how people use geographic factors in creating settlements and have adapted to and modified the local physical environment. This includes the development of irrigation ditches/acequias (and return flows of irrigation water to streams), farming and ranching practices, and hardrock mining in order to use, conserve, and protect water resources. (SS.4.2.2)	Activity list provided by CO Ag in the Classroom https://www.agclassroom.org/matrix/search_result/?search=garden

Two Forks Dam case study: a 539-foot reservoir proposed in Cheesman Canyon at the confluence of the north and south forks of the South Platte River. *Note: in 1990, the Environmental Protection Agency vetoed the construction of the Two Forks Dam.*	Analyze how cooperation and conflict influence the division and control of Earth by using examples from the development of Colorado's extensive water infrastructure and management systems. (SS.HS.2.3) Identify physical water features (e.g. transbasin diversions, irrigation canals and mountain snowpack) and the positive and negative impacts on human systems in different regions. (SS.6.2.2) Engage in civil discourse regarding balanced water solutions by discussing how current water issues demonstrate that the sustainability of water in quality and quantity is essential for life and our economy. (SS.HS.4.1)	 Two Forks Retrospective (audio) [Other examples around the state found in Citizen's Guide to the Environmental Era, HEADWATERS Winter 2016 or other source]
Algal growth in a reservoir or nearby lake (cyanobacteria)	Design, evaluate, and refine a solution for reducing the impacts of human activities on (and potentially providing benefits to) water quality/quantity, the environment and biodiversity (including food production, urbanization, dam construction, and dissemination of invasive species). (SC.HS.2.6)	https://www.watereducationcolorado.org/fresh-water-news/in-brief-high-temperatures-toxic-algae-killing-fish-in-denver-metro-area/

CWC.VI. Water is a public resource governed by water law.		
Example Phenomena, Case Studies, and/or Introductory Activities	Evidence Outcome (with GLE) *[see more Evidence Outcomes in Figures 7 and 8]*	Links or Other Resources
Dolores Project (McPhee Reservoir) and the Animas-La Plata Project offer a cross-cultural perspective on water issues. Both projects were strongly tied to the settlement of treaty-based water rights with the Ute Mountain Ute and Southern Ute tribes. Specific environmental justice-related magazine or newspaper articles.	Research and interpret multiple viewpoints on issues that shape policies and programs for water resource use and explain how the management of water supplies has brought prosperity to some places and created environmental dilemmas for others by examining Colorado examples (e.g differences between tribal nations and nontribal communities, consequences of poverty on access to clean drinking water, rural versus urban access to water, immigration/settlement and its impact on access to water resources, etc.). (SS.HS.2.2)	"Ute Water" (HEADWATERS) Animas-La Plata Project Article from Durango Herald "When Water Justice is Absent, Communities Speak Up" (HEADWATERS) "Plumbing Poverty" (HEADWATERS)
Image of "sweeping" the river - a senior water right holder may have the right to divert the entire flow of a stream or river at a specific location.	*See example objective above* (SS.HS.2.2)	 *Burlington Ditch sweeping the South Platte River*

Explore the use of water by miners to obtain products for human use. Consider the pros and cons of mining as a way to bring prosperity that also presents environmental dilemnas.	*See example objective above* (SS.HS.2.2)	The story of John Hamilton Gregory. He searched the creeks, rivers, and streams of the Front Range and eventually found gold in what is now Gilpin County: https://www.coloradohistoricnewspapers.org/?a=d&d=STP19430211.2.106&e=-------en-20--1--img-txIN%7ctxCO%7ctxTA--------0------ This article talks about the sluice method of mining, which is what Gregory used: https://www.unco.edu/hewit/doing-history/pdf/essays/miners.pdf
Early conflict between Greeley and Fort Collins over water. Greeley (downstream) was cut off from water by a new diversion for Fort Collins (upstream). The downstream user advocated for rights that the upstream user had impaired.	Analyze how cooperation and conflict influence the division and control of Earth by using examples of Colorado's water administration and treaties/interstate compacts over water resources as an example. (SS.HS.2.3)	Water War and Law (Cache La Poudre National Heritage Area)
Role-play activity	*See example objective above* (SS.HS.2.3)	Example: H20 Outdoors at Keystone Science School: https://www.watereducationcolorado.org/publications-and-radio/headwaters-magazine/8030-2/nextgen-collaborators/

What does a boat ramp have to do with having enough water for fish? The genesis of instream water rights. Additional introductory activity: "Pass the Jug," Project WET Curriculum and Activity Guide 2.0	*See example objective above* (SS.HS.2.3)	Technical resources: https://www.watereducationcolorado.org/fresh-water-news/bill-to-expand-colorados-innovative-instream-flow-program-advances/ https://cwcb.colorado.gov/focus-areas/ecosystem-health/instream-flow-program https://www.americanrivers.org/2020/04/we-are-rivers-episode-24-understanding-colorados-instream-flow-program/ Activity Idea: "Pass the Jug," Project WET Curriculum and Activity Guide 2.0

ASSESSMENT RECOMMENDATIONS

(Audience: CDE, curriculum facilitators, team leads, organizational program managers)

The Task Force discussed the following recommendations for assessing understanding of Critical Water Concepts and related SWEAP Outcomes:

1. Focus on rigorous, but practical assessments which an interested teacher could implement in the classroom or a non-formal educator could include within program evaluations.
2. Keep PK-12 assessment open-ended so that there is flexibility with teacher knowledge, enthusiasm, etc.
3. Practice project-based learning (PBL) where students present their findings to an authentic audience beyond their classroom and where projects have impact on real world scenarios.

Project-based Learning Example. This student at Joe Shoemaker School shows off her final project in June 2021. The summer school did an integrated unit with 40 students over 3 weeks. Final products were student-made books about Cherry Creek and nearby animals and plants, which they put into a Free Little Library which everyone helped to build. The library is located along a bike path at the school now.

4. Identify which specific grades have obvious and strong alignment with Critical Water Concept(s), noting that complexity may be added to additional learning opportunities as students progress.
5. Additional ideas for PK-12 assessment include:
    a. Teacher/student/family surveys
    b. Rubrics for teachers to assess their own units and incorporation of Critical Water Concepts
    c. High school capstones and Individual Research Projects
    d. Work with content specialists on unit assessments they develop (in larger districts)
6. Collect demographic data (including age) if/when implementing survey to allow for disaggregating data and analyzing equity in outcomes
7. Collaborate with the Collective Outcomes Project
8. Involve people who will be participating in the assessment in the design; some guidance exists for this (e.g. NAAEE values for culturally relevant evaluation).

Possible next steps

- Develop an example rubric for each grade band (2nd, 5th, 8th, HS) to use with an open-ended assessment.

Example Assessment and Rubric

The following is an example assessment and rubric for assessing understanding of Critical Water concepts by grade band.

Prompt

Use three or more Critical Water Concepts to create a *concept map* that explains major water issues in Colorado.

Format: 11x17 piece of paper or other format of your choice

Critical Water Concepts from the Statewide Water Education Action Plan 2020-2025 (SWEAP)

- The physical and chemical properties of water are unique and constant.
- Water is essential for life, our economy, and a key component of healthy ecosystems.
- Water is a scarce resource, limited and variable.
- Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people.
- The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.
- Water is a public resource governed by water law.

Rubric

The following rubric row was used in a larger rubric of teacher participation in study, demonstration, and reflection aspects of a professional development unit. Grade-appropriate criteria and performance levels will need to be added for application to PK-12 student settings.

	Does not meet /Approaching standards	Meets standards
Post-Assessment of Participant Knowledge	Participant **does not** demonstrate growth include a post-assessment of participant's knowledge of Critical Water Concepts and other key water knowledge.	Participant demonstrates growth in a post-assessment of participant's knowledge of Critical Water Concepts and other key water knowledge.

Exemplars

See below for exemplars from three Colorado Public Schools Teachers:

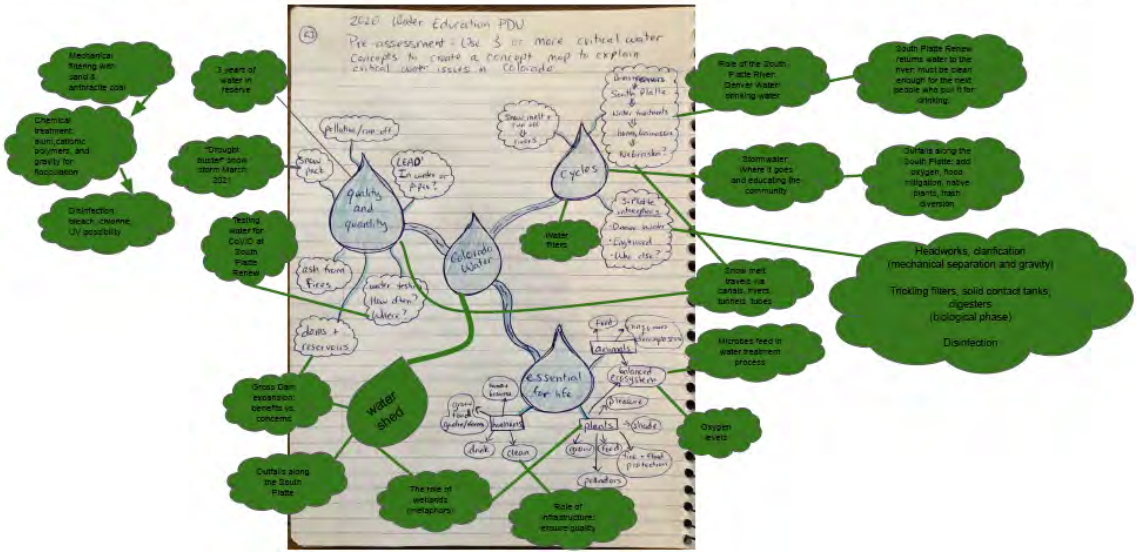
- Michelle Morton, Science Enrichment Teacher, Centennial: A School for Expeditionary Learning
- Brett Cogswell, 4th and 5th grade Math and Science Teacher, Godsman Elementary School
- Chris Madsen, High School Science Teacher, Arvada West High School

Concept Map Exemplar - Michelle Morton (2021)

This is a snapshot. A higher resolution image is available [here](#).

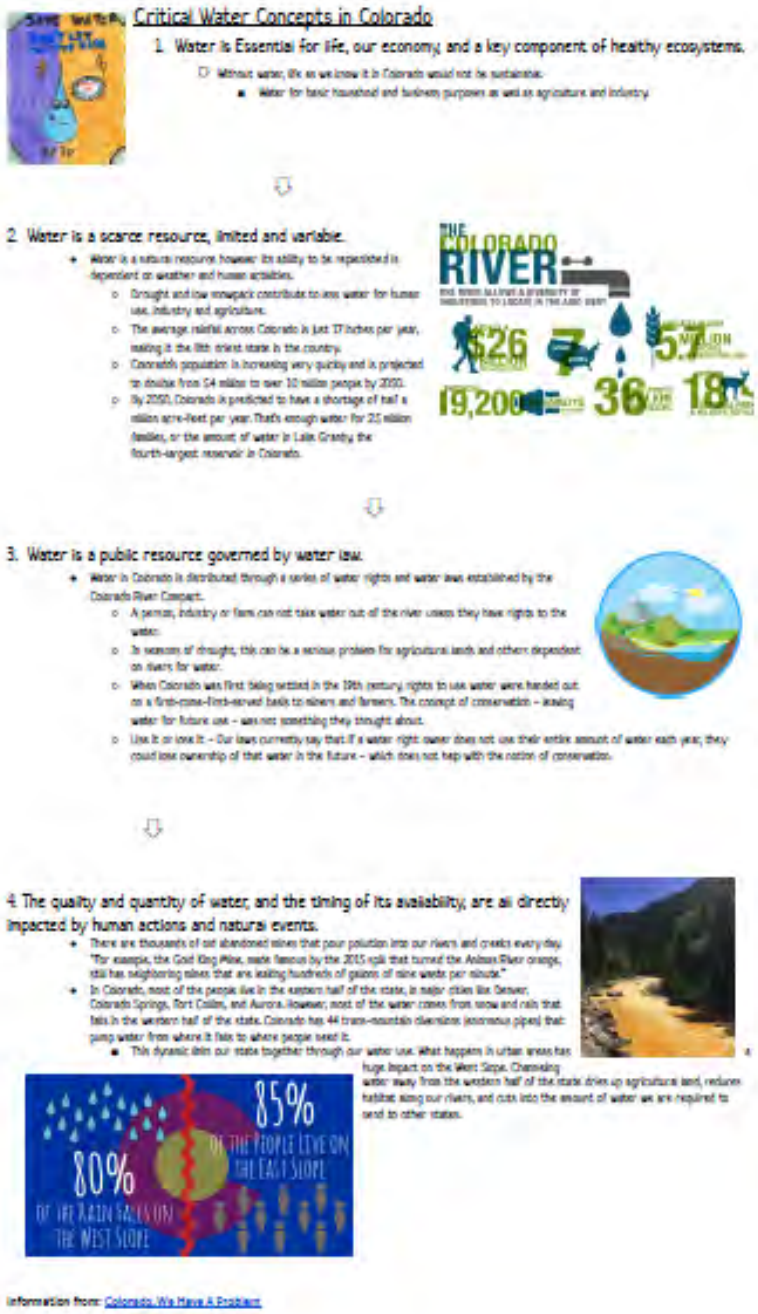
Here is a photo of my pre-assessment. I've added new ideas in **green** to reflect new understandings as a result of this PDU.

- Water is **essential** for life, our economy, and a key component of healthy ecosystems.
- Water **cycles** naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people.
- The **quality and quantity** of water, and the timing of its availability, are all directly impacted by human actions and natural events.
- Water cycles naturally through Colorado's **watersheds**, often intercepted and manipulated through an extensive infrastructure system built by people.



Concept Map Exemplar - Brett Cogswell (2021)

This is a snapshot. A higher resolution image is available here.



Critical Water Concepts in Colorado

1. Water is Essential for life, our economy, and a key component of healthy ecosystems.
   - Without water, life as we know it in Colorado would not be sustainable.
     - Water for basic household and business purposes as well as agriculture and industry.

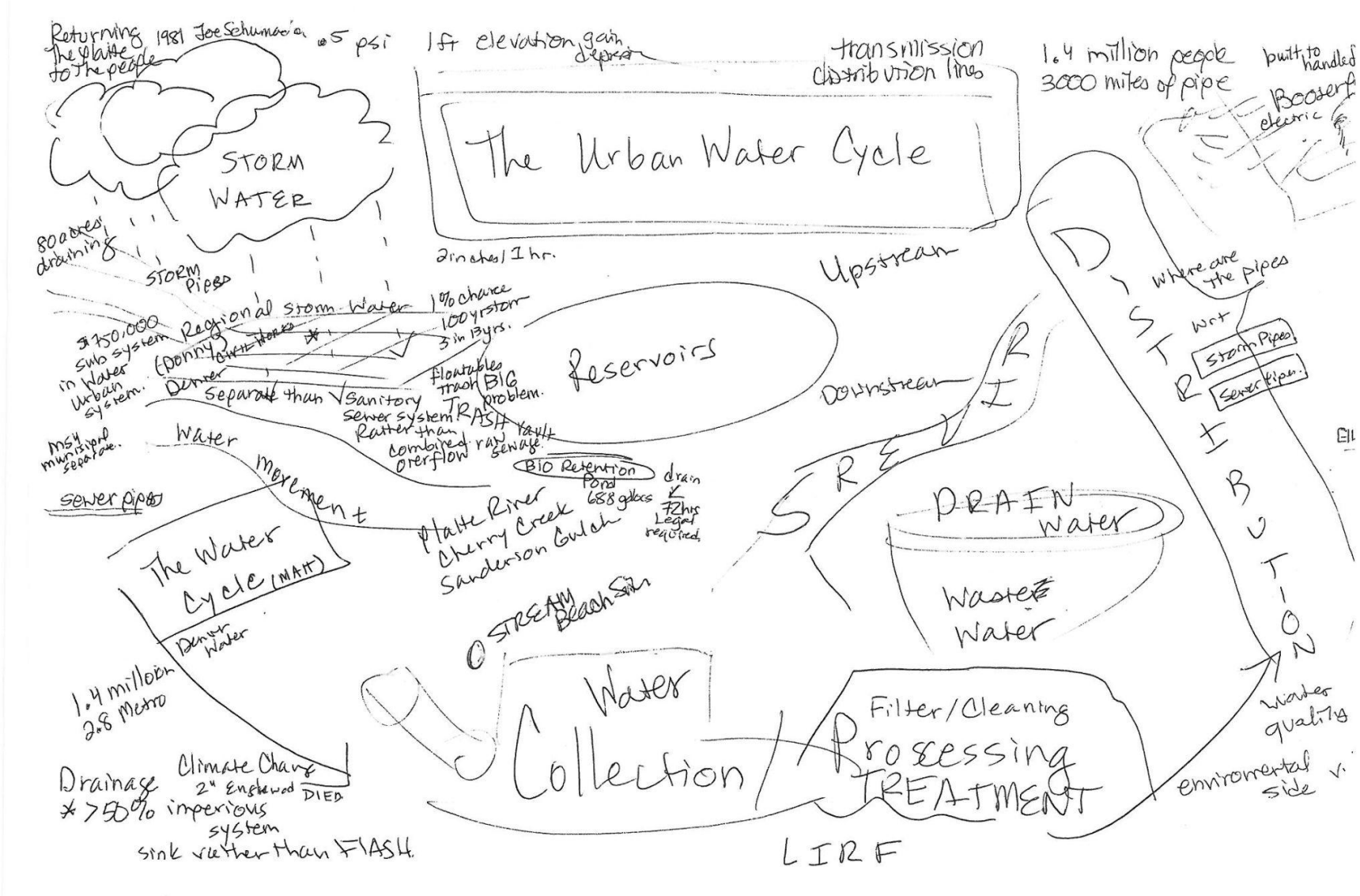
2. Water is a scarce resource, limited and variable.
   - Water is a natural resource however its ability to be replenished is dependent on weather and human activities.
     - Drought and low snowpack contribute to less water for human use, industry and agriculture.
     - The average rainfall across Colorado is just 17 inches per year, making it the 8th driest state in the country.
     - Colorado's population is increasing very quickly and is projected to double from 5.4 million to over 10 million people by 2050.
     - By 2050, Colorado is predicted to have a shortage of half a million acre-feet per year. That's enough water for 2.5 million families, or the amount of water in Lake Granby, the fourth-largest reservoir in Colorado.

3. Water is a public resource governed by water law.
   - Water in Colorado is distributed through a series of water rights and water laws established by the Colorado River Compact.
     - A person, industry or farm can not take water out of the river unless they have rights to the water.
     - In seasons of drought, this can be a serious problem for agricultural lands and others dependent on rivers for water.
     - When Colorado was first being settled in the 19th century, rights to use water were handed out on a first-come-first-served basis to miners and farmers. The concept of conservation – saving water for future use – was not something they thought about.
     - Use it or lose it – Our laws currently say that if a water right owner does not use their entire amount of water each year, they could lose ownership of that water in the future – which does not help with the notion of conservation.

4. The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.
   - There are thousands of old abandoned mines that pour pollution into our rivers and creeks every day. "For example, the Gold King Mine, made famous by the 2015 spill that turned the Animas River orange, still has neighboring mines that are leaking hundreds of gallons of mine waste per minute."
   - In Colorado, most of the people live in the eastern half of the state, in major cities like Denver, Colorado Springs, Fort Collins, and Aurora. However, most of the water comes from snow and rain that falls in the western half of the state. Colorado has 44 trans-mountain diversions (enormous pipes) that pump water from where it falls to where people need it.
     - This dynamic pits our state together through our water use. What happens in urban areas has huge impact on the West Slope. Channeling water away from the western half of the state dries up agricultural land, reduces habitat along our rivers, and cuts into the amount of water we are required to send to other states.

Information from: Colorado: We Have A Problem

Concept Map Exemplar - Chris Madsen (2018)



APPENDICES

FIGURES WITH ALL EXAMPLE WATER OBJECTIVES

Figure 8 (Multiple Tables): Critical Water Concept Focus - Progression of Relevant Grade Level Expectations by Critical Water Concept with Evidence Outcomes Adapted for a Water Focus (All connections)

The following tables are organized by SWEAP Critical Water Concept and provide example water-based objectives for each of the Grade Level Expectations with connections (strong, moderate, or weak) to each of the SWEAP Critical Water Concepts.

CWC.I The physical and chemical properties of water are unique and constant.

Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
High School	Science	SC.HS.1.1	The sub-atomic structural model and interactions between electric charges at the atomic scale can be used to explain the structure and interactions of matter.	Plan and conduct an investigation to gather evidence to compare the structure of water and its hydrogen bonds with other substances at the bulk scale to infer the strength of electrical forces between particles by using melting point, boiling point and surface tension. (HS-PS1-3)
High School	Science	SC.HS.1.7	Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems.	Plan and conduct an investigation to provide evidence that the transfer of thermal energy when mixing bodies of water at different temperatures results in a more uniform energy distribution (e.g. cold mountain glacier runoff meets a reservoir on the front range that is warmer or the change in air temperature near a body of water). (HS-PS3-4)
High School	Science	SC.HS.1.9	Although energy cannot be destroyed, it can be converted to less useful forms as it is captured, stored and transferred.	Plan and conduct an investigation to provide evidence that the transfer of thermal energy when mixing bodies of water at different temperatures results in a more uniform energy distribution (e.g. cold mountain glacier runoff meets a reservoir on the front range that is warmer or the change in air temperature near a body of water). (HS-PS3-1)
High School	Science	SC.HS.1.10	Waves have characteristic properties and behaviors.	Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in water and other media. (HS-PS4-1)
High School	Science	SC.HS.3.4	Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes, and these effects occur on different time scales, from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes to climate, specifically with precipitation patterns. (HS-ESS2-4)
High School	Science	SC.HS.3.6	The planet's dynamics are greatly influenced by water's unique chemical and physical properties.	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. (HS-ESS2-5)
High School	Science	SC.HS.3.7	The role of radiation from the sun and its interactions with the atmosphere, ocean, and land are the foundation for the global climate system. Global climate models are used to predict future changes, including changes influenced by human behavior and natural factors.	Analyze geoscience data to make the claim that one change to Earth's surface (e.g. loss of ground vegetation from fire, flood, etc.) can create feedbacks that cause changes to other Earth systems (e.g. increase in water runoff and soil erosion). (HS-ESS2-2)
Middle School	Science	SC.MS.1.1	The fact that matter is composed of atoms and molecules can be used to explain the properties of substances, diversity of materials, states of matter and phases changes.	Develop models to describe the atomic composition of water molecules and extended structures. (MS PS1-1)
Middle School	Science	SC.MS.1.5	Kinetic energy can be distinguished from the various forms of potential energy.	Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample (e.g. by comparing final water temperatures after different masses of ice melted in the same volume of water with the same initial temperature). (MS-PS3-4)
Middle School	Science	SC.MS.1.6	Energy changes to and from each type can be tracked through physical or chemical interactions. The relationship between the temperature and the total energy of a system depends on the types, states and amounts of matter.	Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample (e.g. by comparing final water temperatures after different masses of ice melted in the same volume of water with the same initial temperature). (MS-PS3-4)
Middle School	Science	SC.MS.2.3	Sustaining life requires substantial energy and matter inputs.	Develop a model to describe how carbon dioxide and water combine to form carbon-based organic molecules and the release of oxygen. (MS-LS1-7)
Middle School	Science	SC.MS.3.6	Water cycles among land, ocean, and atmosphere, and is propelled by sunlight and gravity. Density variations of sea water drive interconnected ocean currents. Water movement causes weathering and erosion, changing landscape features.	Construct an explanation based on evidence for water's role in how geoscience processes have changed Earth's surface at varying time and spatial scales. (MS-ESS2-2)

CWC.I The physical and chemical properties of water are unique and constant.

Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Middle School	Science	SC.MS.3.7	Complex interactions determine local weather patterns and influence climate, including the role of the ocean.	1. Collect data to provide evidence for how the motions and complex interactions of air masses result in the variability of precipitation in Colorado. (MS-ESS2-5) 2. Develop and use a model to describe how unequal heating, rotation of the Earth and geographic land distribution causes patterns of atmospheric and oceanic circulation that determine regional climates and precipitation patterns in regions of Colorado. (MS-ESS2-6)
Fifth Grade	Science	SC.5.1.1	Matter exists as particles that are too small to be seen; measurements of a variety of observable properties can be used to identify particular materials.	Conduct experiments involving water to provide evidence that matter is made of particles too small to be seen (e.g. by dissolving sugar in water and evaporating salt water). (5-PS1-1)
Fifth Grade	Science	SC.5.1.2	Chemical Reactions that occur when substances are mixed can be identified by the emergence of substances with different properties; the total mass remains the same.	Conduct an investigation to determine whether the mixing of two or more substances results in new substances by conducting water quality testing of a local waterway and observing reactions in test tubes. (5-PS1-4)
Fifth Grade	Science	SC.5.3.4	Most of Earth's water is in the ocean and much of Earth's freshwater in glaciers or underground.	Describe and graph the amounts and percentages of freshwater in various local reservoirs including lakes, rivers, and groundwater to provide comparisons about the distribution of freshwater and saltwater water on Earth. (5-ESS2-2)
Fourth Grade	Science	SC.4.1.5	Waves are regular patterns of motion.	Develop a model of waves using water to describe patterns in terms of amplitude and wavelength which can cause erosion issues (e.g. chunk, gully, sheet). (4-PS4-1))
Fourth Grade	Science	SC.4.3.1	Earth has changed over time.	Describe how water can change the land over time by using evidence from patterns in rock formations and fossils in rock layers. (4-ESS1-1)
Fourth Grade	Science	SC.4.3.2	Four major earth systems interact.	Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by analyzing cycles of freezing and thawing of water and volume of water flow. (4-ESS2-1)
Second Grade	Science	SC.2.1.1	Matter exists as different substances that have observable different properties.	Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot by observing the effects of freezing and thawing ice cubes. (2-PS1-4)
Second Grade	Science	SC.2.3.1	Some events on Earth occur quickly; others can occur very slowly.	Describe how the properties of water help shape the landscape quickly or slowly by comparing and contrasting flooding and erosion. (2-ESS1-1)
Second Grade	Science	SC.2.3.2	Wind and water can change the shape of the land; models can show the shape and these changes to the land.	1. Obtain information to identify where water is found on Earth and that it can be solid or liquid. (2-ESS2-3) 2. Develop a model to demonstrate how water can change the shape of land (e.g. through flooding or erosion). (2-ESS2-2)
First Grade	Science	SC.1.1.1	Sound can make matter vibrate and vibrating matter can make sound.	Describe how the movement of waves across the surface of water is caused by vibration. (1-PS4-1)
Pre-K	Science	SC.P.1.1	Recognize that physical properties of objects and/or materials help us understand the world.	Use senses to explore the properties of water by investigating changes in liquid water and solid ice when water is heated, cooled, or combined.
Pre-K	Science	SC.P.1.2	Recognize there are cause - and - effect relationships related to matter and energy.	Observe, describe and discuss properties of water and the transformation of water when it is cooled or heated.

CWC.II Water is essential for life, our economy, and a key component of healthy ecosystems.

Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
High School	Science	SC.HS.2.1	DNA codes for the complex hierarchical organization of systems that enable life's functions.	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis in response to water availability (e.g. by measuring stomate response to moisture and temperature and/or root development in response to water levels). (HS-LS1-3)
High School	Science	SC.HS.2.3	Organisms use matter and energy to live and grow.	Use a model to illustrate the need for water in photosynthesis to transform light energy into stored chemical energy. (HS-LS1-5)
High School	Science	SC.HS.2.4	Organisms interact with the living and nonliving components of the environment to obtain matter and energy.	Use mathematical and/or computational representations gathered from a simulation of a drought or flood to support water as a factor affecting carrying capacity of an ecosystem. (HS-LS2-1)
High School	Science	SC.HS.2.5	Matter and energy necessary for life are conserved as they move through ecosystems.	Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in a wetland under aerobic and anaerobic conditions. (HS-LS2-3)
High School	Science	SC.HS.2.6	A complex set of interactions determine how ecosystems respond to disturbances.	Evaluate claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions (such as seasonal floods and droughts), but changing conditions (such as a catastrophic flood or long-term aridification) may result in a new ecosystem (including changes in what food can be produced for people). (HS-LS2-6)
High School	Science	SC.HS.2.12	The environment influences survival and reproduction of organisms over multiple generations.	Evaluate the evidence supporting claims that changes in environmental conditions may result in (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species by analyzing impacts of drought and flood in different ecosystems, including aquatic environments and wetlands. (HS-LS4-5)
High School	Science	SC.HS.2.13	Humans have complex interactions with ecosystems and have the ability to influence biodiversity on the planet.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity in an aquatic environment or wetland ecosystem. (HS-LS4-6)
High School	Science	SC.HS.3.6	The planet's dynamics are greatly influenced by water's unique chemical and physical properties.	Plan and conduct an investigation of how the properties of water and its effects on Earth materials and surface processes may alter dynamics within an ecosystem. (HS-ESS2-5)
High School	Science	SC.HS.3.7	The role of radiation from the sun and its interactions with the atmosphere, ocean, and land are the foundation for the global climate system. Global climate models are used to predict future changes, including changes influenced by human behavior and natural factors.	Analyze geoscience data to make the claim that one change to Earth's surface (e.g. loss of ground vegetation from fire, flood, etc.) can create feedbacks that cause changes to Colorado's ecosystems (e.g. increase in water runoff and soil erosion). (HS-ESS2-2)
High School	Science	SC.HS.3.9	Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.	Construct an explanation based on evidence for how the availability of water (e.g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts), and changes in precipitation related to changes in climate have influenced human activity (e.g. types of crops and livestock that can be raised). (HS-ESS3-1)
High School	Science	SC.HS.3.10	Natural hazards and other geological events have shaped the course of human history at local, regional, and global scales.	Construct an explanation based on evidence for how the occurrence of water-related natural hazards (e.g. floods, droughts, natural sources of water contamination) have influenced human activity. (HS-ESS3-1)
High School	Science	SC.HS.3.11	Sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources, including the development of technologies.	Create a computational simulation to illustrate the relationships among the management of water with the sustainability of human populations, and biodiversity. (HS-ESS3-3)
High School	Social Studies	SS.HS.2.3	The interconnected nature of the world, its people and places.	Explain that the world's population is increasingly connected to and dependent upon the need and sharing of water resources.
High School	Social Studies	SS.HS.3.1	Productive resources (natural, human, capital) are scarce; therefore, choices are made about how individuals, businesses, governments, and nonprofits allocate these resources.	Explain the economic way of thinking: the condition of scarcity requires choice and choice has a cost (opportunity cost) in relation to Colorado's water resources (e.g. transfer of water from food production for use within cities and towns).

CWC.II Water is essential for life, our economy, and a key component of healthy ecosystems.

Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
High School	Social Studies	SS.HS.4.1	Research and formulate positions on local, state, and national issues or policies to participate in a civil society.	Engage in civil discourse regarding balanced water solutions by discussing how current water issues demonstrate that the sustainability of water in quality and quantity is essential for life and our economy.
Middle School	Science	SC.MS.2.3	Sustaining life requires substantial energy and matter inputs.	Construct a scientific explanation based on evidence for the need of water in the role of photosynthesis for the cycling of matter and flow of energy into and out of organisms. (MS-LS1-6)
Middle School	Science	SC.MS.2.5	Organisms and populations of organisms are dependent on their environmental interactions both with other living things and with nonliving	Analyze and interpret data to provide evidence for what happens to living things in an ecosystem (including food systems) as water availability increases/decreases. (MS-LS2-1)
Middle School	Science	SC.MS.2.6	Ecosystems are sustained by the continuous flow of energy, originating primarily from the sun, and the recycling of matter and nutrients within the system.	Develop a model to describe the cycling of nutrients in water for aquatic environments, including algal growth, consumption, and decomposition. (MS-LS2-3)
Middle School	Science	SC.MS.2.7	Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem	Evaluate competing design solutions for maintaining biodiversity and ecosystem services (such as water purification in a watershed). (MS-LS2-5)
Middle School	Science	SC.MS.3.7	Complex interactions determine local weather patterns and influence climate, including the role of the ocean.	1. Collect data to provide evidence for how the motions and complex interactions of air masses result in the variability of precipitation in Colorado. (MS-ESS2-5) 2. Develop and use a model to describe how unequal heating, rotation of the Earth and geographic land distribution causes patterns of atmospheric and oceanic circulation that determine regional climates and precipitation patterns in regions of Colorado. (MS-ESS2-6)
Middle School	Science	SC.MS.3.8	Humans depend on Earth's land, ocean, atmosphere, and biosphere for different resources, many of which are limited or not renewable. Resources are distributed unevenly around the planet as a result of past geologic processes.	Construct a scientific explanation based on evidence for why water resources are unevenly distributed, limited or not renewable, such as groundwater. (MS-ESS3-1)
Eighth Grade	Social Studies	SS.8.1.2	The historical eras, individuals, groups, ideas and themes from the origins of the American Revolution through Reconstruction.	Evaluate continuity and change over the course of United States history by examining various eras from the perspective of Colorado residents in particular regions by determining when and where access to water resources were a major source of conflict and compromise.
Fifth Grade	Science	SC.5.1.4	The energy released from food was once energy from the sun.	Use models to describe that energy released from food was once energy from the sun captured by plants in the chemical process with air and water that forms plant matter. (5-PS3-1)
Fifth Grade	Science	SC.5.2.1	Plants acquire their material from growth chiefly from air and water.	Support an argument that plants get the materials they need for growth chiefly from air and water by recording observations from a hydroponic garden. (5-LS1-1)
Fifth Grade	Science	SC.5.2.2	Matter cycles between air and soil and among plants, animals and microbes as these organisms live and die.	Develop a model to describe how water and other matter that is not food is changed by plants into food and cycled among plants, animals, decomposers, and the environment. (5-LS2-1)
Fifth Grade	Science	SC.5.3.3	Earth's major systems interact in multiple ways to affect Earth's surface materials and processes.	Develop a model using an example of how the hydrosphere interacts with Earth's major systems to support a variety of ecosystems and organisms in Colorado. (5-ESS2-1)
Fourth Grade	Science	SC.4.3.2	Four major earth systems interact.	Make observations and/or measurements to provide evidence that rainfall helps to shape the land and affects the types of living things found in a region. (ESS2:A)
Fourth Grade	Science	SC.4.3.4	Energy and fuels that humans use are derived from natural sources and their use affects the environment in multiple ways.	Obtain and combine information to describe how energy and fuels that use water affect the environment (e.g. creation/loss of habitat due to dams). (4-ESS3-1)
Fourth Grade	Social Studies	SS.4.2.2	Connections are developed within and across human and physical systems.	Analyze how people use geographic factors in creating settlements and have adapted to and modified the local physical environment in order to use water resources through the development of irrigation ditches/acequias (to support food production) and hardrock mining.

CWC.II Water is essential for life, our economy, and a key component of healthy ecosystems.

Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Fourth Grade	Social Studies	SS.4.4.1	Identify, investigate, and analyze multiple perspectives on civic issues.	Give example of issues faced and multiple perspectives in regards to allocation and availability of water as Colorado's population grows and the state faces uncertainty over future climate and provide possible solutions.
Third Grade	Science	SC.3.2.5	Sometimes differences in characteristics between individuals of the same species provide advantages in survival and reproduction.	Construct an argument with evidence that describes how differences in characteristics between individuals of the same species (including food crops and livestock) provide advantages in survival and reproduction in the event of a drought or flood. (3-LS4-3)
Second Grade	Science	SC.2.2.1	Plants depend on water and light to grow and on animals for pollination or to move their seeds around.	Plan and conduct an investigation to determine if plants need sunlight and water to grow. (2-LS2-1)
Second Grade	Science	SC.2.3.2	Wind and water can change the shape of the land; models can show the shape and these changes to the land.	Develop a model of how water can change the shape of the land and how the resulting landforms, together with the materials on the land, provide homes for living things. (2-ESS2-2; ESS2:A)
Second Grade	Social Studies	SS.2.2.2	People in communities manage, modify, and depend on their environment.	1. Explain that people settle in certain areas because of the need to access freshwater. 2. Explain how access to freshwater affects a community's ability to thrive. 3. Identify examples of how water draws people and wildlife to particular areas.
Second Grade	Social Studies	SS.2.3.1	Resources are scarce, so individuals may not have access to the goods and services they want.	Give examples for how different individuals and even different communities make choices regarding water use.
Second Grade	Social Studies	SS.2.4.2	Identify and compare multiple ways that people understand and resolve conflicts and differences.	Analyze ways that diverse individuals, groups and communities work through conflict and promote equality, justice, and responsibility by using the example of management of water as a scarce public resource.
First Grade	Social Studies	SS.1.2.2	Describe the characteristics of a community and how they are influenced by the environment.	1. Provide examples for how families use water. 2. Analyze how weather (rain and snow), climate (precipitation patterns) and environmental characteristics (proximity to water) influence individuals and the cultural characteristics of a family in Colorado.
Kinder garten	Science	SC.K.2.1	To live and grow, animals obtain food they need from plants or other animals, and plants need water and light [and nutrients].	Use observations of patterns among all living things that describes plants and animals (including humans) need water to survive (and humans and other animals need food that we get from plants and animals). (K-LS1-1)
Kinder garten	Science	SC.K.3.2	Plants and animals meet their needs in their habitats and impact one another; people can prepare for severe weather.	Use a model to represent the relationship between water and the needs of different plants or animals (including humans) and the places they live. (K-ESS3-1)
Kinder garten	Social Studies	SS.K.1.1	Ask questions and discuss ideas about the past.	Ask questions about why people in the past settled in certain places near water access or traveled using rivers.
Kinder garten	Social Studies	SS.K.2.2	People live in different places around the world.	Identify where towns and cities in the West are located and whether that location depends on a river for water.
Kinder garten	Social Studies	SS.K.3.2	Describe choices people make about how to use the money they earn (PFL).	Give examples of difference between spending income on something you want versus something you need (like water).
Pre-K	Science	SC.P.2.1	Recognize that living things have unique characteristics and basic needs that can be observed and studied.	Describe how habitats provide for the basic needs of plants and animals, including water, to grow and survive by observing familiar living things (e.g. a classroom pet or a classroom garden that also produces garden or classroom that can also produce food).
Pre-K	Science	SC.P.2.2	Recognize that living things develop in predictable patterns.	Identify the common need for water of familiar living things (e.g. a classroom pet or classroom garden).
Pre-K	Social Studies	SS.P.1.1	Recognize change and sequence over time.	Understand that people change the way they live over time by examining how people use water to survive and grow plants for food.
Pre-K	Social Studies	SS.P.2.1	Develop spatial understanding, perspectives, and connections to the world	Develop an awareness of where water is located around the school, neighborhood and community.

CWC.III Water is a scarce resource, limited and variable

Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
High School	Science	SC.HS.3.7	The role of radiation from the sun and its interactions with the atmosphere, ocean, and land are the foundation for the global climate system. Global climate models are used to predict future changes, including changes influenced by human behavior and natural factors.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate and precipitation patterns in Colorado. (HS-ESS2-4)
High School	Science	SC.HS.3.9	Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.	Construct an explanation based on evidence for how the availability of water (e.g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts), and changes in precipitation related to changes in climate have influenced human activity. (HS-ESS3-1)
High School	Science	SC.HS.3.10	Natural hazards and other geological events have shaped the course of human history at local, regional, and global scales.	Construct an explanation based on evidence for how the occurrence of water-related natural hazards (e.g. floods, droughts, natural sources of water contamination) have influenced human activity. (HS-ESS3-1)
High School	Science	SC.HS.3.12	Global climate models used to predict future climate change continue to improve our understanding of the impact of human activities on the global climate system.	Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change, specific to precipitation and temperature, and the associated future impacts to Earth's systems and their associated impacts (e.g. aridification). (HS-ESS3-5)
High School	Social Studies	SS.HS.2.2	Geographic variables influence interactions of people, places, and environments.	Identify, evaluate, and communicate strategies to respond to constraints placed on human systems by analyzing the scarcity and variability in available water resources in Colorado.
High School	Social Studies	SS.HS.2.3	The interconnected nature of the world, its people and places.	Explain how the uneven distribution of limited and variable water resources in the world can lead to conflict, competition, or cooperation among nations, regions, and cultural groups.
High School	Social Studies	SS.HS.3.1	Productive resources (natural, human, capital) are scarce; therefore, choices are made about how individuals, businesses, governments, and nonprofits allocate these resources.	Explain the economic way of thinking: the condition of scarcity requires choice and choice has a cost (opportunity cost) by using Colorado's water resources as an example.
High School	Social Studies	SS.HS.3.2	Economic systems, market structures, competition, and government policies affect market outcomes.	1. Use supply and demand analysis to explain how competitive markets efficiently allocate scarce resources such as water (e.g. a farmer's purchase of water to produce food or a town's purchase of water to serve its residents). 2. Compare and contrast market outcomes for water markets in Colorado with different levels of water supply and demand.
Middle School	Science	SC.MS.2.5	Organisms and populations of organisms are dependent on their environmental interactions both with other living things and with nonliving	Analyze and interpret data to provide evidence for what happens to living things in an ecosystem as water availability increases/decreases. (MS-LS2-1)
Middle School	Science	SC.MS.3.8	Humans depend on Earth's land, ocean, atmosphere, and biosphere for different resources, many of which are limited or not renewable. Resources are distributed unevenly around the planet as a result of past geologic processes.	Construct a scientific explanation based on evidence for how the uneven distribution of Colorado and Earth's groundwater resources are the result of past and current geoscience processes. (MS-ESS3-1)
Eighth Grade	Social Studies	SS.8.2.2	Competition for control of space and resources in early American History.	Interpret from a geographic perspective the expansion of the United States by addressing issues of access to water resources, along with land, security, and sovereignty.
Sixth Grade	Social Studies	SS.6.1.2	The historical eras, individuals, groups, ideas, and themes within regions of the Western Hemisphere and their relationships with one another.	Examine, from multiple perspectives, the use of water in agricultural development, and the development of irrigation systems (canals, etc.), particularly within desert regions. (e.g. Ancestral Puebloans civilization expansion, decline and reconfiguration into Puebloan cultures of Rio Grande valley)
Sixth Grade	Social Studies	SS.6.2.2	Regional differences and perspectives in the Western Hemisphere impact human and environmental interactions.	1. Classify and analyze how water affects human interactions with the environment. 2. Identify physical water features (e.g. transbasin diversions, irrigation canals and mountain snowpack) and the positive and negative impacts on human systems in different regions.

CWC.III Water is a scarce resource, limited and variable

Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Fifth Grade	Science	SC.5.3.4	Most of Earth's water is in the ocean and much of Earth's freshwater in glaciers or underground.	Describe and graph the amounts and percentages of saltwater and freshwater in various reservoirs to provide evidence for the statement "water is a scarce resource, limited and variable" by comparing the amount of water available for human use in Colorado (e.g. for a local drinking water supply or food production) from various sources (e.g. surface vs. groundwater). (5-ESS2-2)
Fifth Grade	Social Studies	SS.5.2.1	Use geographic tools and sources to research and answer questions about United States geography.	Identify physical water features on maps and describe the influence of accessible resources and their use on development of local and regional communities.
Fifth Grade	Social Studies	SS.5.2.2	Causes and consequences of movement.	Describe how migration patterns reflect application of technology often involving water quantity for agriculture and manufacturing (e.g. construction of irrigation ditches/acequias allowed for food production in new areas).
Fourth Grade	Science	SC.4.3.4	Energy and fuels that humans use are derived from natural sources and their use affects the environment in multiple ways.	Obtain and combine information to describe that energy and fuels are derived from scarce, limited, and variable natural resources such as water and their uses affect the environment. (4-ESS3-1)
Fourth Grade	Social Studies	SS.4.2.1	Use geographic tools to research and answer questions about Colorado geography.	Describe how the geography of Colorado and western states differ from other regions of the United States, including the role of snowpack as a main source of water, along with more limited average annual rainfall, versus the eastern United States region where average annual rainfall is generally more plentiful.
Fourth Grade	Social Studies	SS.4.2.2	Connections are developed within and across human and physical systems.	Analyze how people use geographic factors in creating settlements and have adapted to and modified the local physical environment in order to use water resources through the development of irrigation ditches/acequias and hardrock mining.
Fourth Grade	Social Studies	SS.4.3.2	Determine the opportunity cost when making a choice (PFL).	Determine the opportunity cost of different water allocation scenarios in Colorado, including among water users (such as agriculture, municipalities, industry, fish and wildlife, energy production, recreation, etc.).
Fourth Grade	Social Studies	SS.4.1.1	Analyze primary and secondary sources from multiple points of view to develop an understanding of the history of Colorado.	Explain, through multiple perspectives, how water use in each region have shaped the settlement of the state by using examples from American Indians, Spanish explorers, trappers/traders, and settlers in the mining, trading, agriculture, and industrial industries.
Third Grade	Social Studies	SS.3.2.1	Use geographic tools to develop spatial thinking.	Identify water related issues (including availability or scarcity of food) and the different strategies used by groups of people that live in arid, desert areas with limited and variable water sources by using examples from local history or the present (i.e. acequias, Native Americans, fur trappers, etc.).
Third Grade	Social Studies	SS.3.2.2	The concept of region is developed through an examination of similarities and differences in places and communities.	Construct an argument for how the quantity of water available for plants, animals, and humans varies by major river basin in Colorado and within river basins has resulted in similarities and differences seen today.
Second Grade	Social Studies	SS.2.2.2	People in communities manage, modify, and depend on their environment.	Explain how communities manage and use scarce freshwater resources and certain nonrenewable groundwater sources.
Second Grade	Social Studies	SS.2.3.1	Resources are scarce, so individuals may not have access to the goods and services they want.	1. Explain scarcity by giving examples of behaviors related to water and limited water (i.e., water restrictions). 2. Investigate how different individuals and communities water use varies.
Kinder garten	Social Studies	SS.K.2.2	People live in different places around the world.	Compare where towns and cities in the West are located to other places in the United States or the world in relation to water (e.g. people may spread out more away from rivers if the precipitation/rainfall is more consistent throughout the year).

CWC.IV Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people.

Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
High School	Science	SC.HS.1.7	Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems.	Create a computational model to calculate the change in energy as water moves through the water cycle (e.g. evaporation of water to form clouds, condensation of atmospheric water vapor to form precipitation). (HS-PS3-1)
High School	Science	SC.HS.1.9	Although energy cannot be destroyed, it can be converted to less useful forms as it is captured, stored and transferred.	1. Create a computational model to calculate the change in energy as water moves through the water cycle (e.g. evaporation of water to form clouds, condensation of atmospheric water vapor to form precipitation). (HS-PS3-1) 2. Design, build, and refine a device that models a watershed or municipal drinking water system to convert one form of energy into another form of energy. (HS-PS3-3)
High School	Science	SC.HS.2.6	A complex set of interactions determine how ecosystems respond to disturbances.	1. Evaluate claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions (such as localized beaver dam construction), but changing conditions (such as major dam construction, land clearing or shift to regenerative agriculture or new crops) may result in a new ecosystem. (HS-LS2-6) 2. Design, evaluate and refine a solution for reducing the impacts of human activities (such as dams) on the environment and biodiversity. (HS-LS2-7)
High School	Science	SC.HS.3.4	Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes, and these effects occur on different time scales, from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles.	Analyze geoscience data to make the claim that one change to Earth's surface (loss of ground vegetation from fire, flood, aridificication, etc.) can create feedbacks that cause changes to other Earth systems (increase in water runoff and soil erosion or changes in food production). (HS-ESS2-2)
High School	Science	SC.HS.3.6	The planet's dynamics are greatly influenced by water's unique chemical and physical properties.	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes by investigating stream transportation and deposition using a stream table. (HS-ESS2-2)
High School	Science	SC.HS.3.7	The role of radiation from the sun and its interactions with the atmosphere, ocean, and land are the foundation for the global climate system. Global climate models are used to predict future changes, including changes influenced by human behavior and natural factors.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate and precipitation patterns in Colorado. (HS-ESS2-4)
High School	Science	SC.HS.3.9	Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.	Construct an explanation based on evidence for how the availability of water (e.g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts, natural sources of water contamination), and changes in precipitation have influenced human activity within a Colorado watershed. (HS-ESS3-1)
High School	Social Studies	SS.HS.2.1	Use geographic tools and resources to analyze Earth's human systems and physical features to investigate and address geographic issues.	Create, analyze and interpret maps to display and explain the affect of water resources on spatial patterns of cultural and environmental characteristics at various scales.
High School	Social Studies	SS.HS.2.2	Geographic variables influence interactions of people, places, and environments.	Identify, evaluate, and communicate strategies to respond to constraints placed on human systems by the physical environment by using the intercepting and manipulating water from the natural water cycle as an example.
High School	Social Studies	SS.HS.2.3	The interconnected nature of the world, its people and places.	Analyze how cooperation and conflict influence the division and control of Earth by using examples from the development of Colorado's extensive water infrastructure and management systems.
High School	Social Studies	SS.HS.3.1	Productive resources (natural, human, capital) are scarce; therefore, choices are made about how individuals, businesses, governments, and nonprofits allocate these resources.	Apply knowledge and skills to analyze how individuals, businesses (including agricultural producers), governments, and nonprofits deal with the challenges of water scarcity by manipulating and intercepting water through an extensive infrastructure system built by people.

CWC.IV Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people.

Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Middle School	Science	SC.MS.1.5	Kinetic energy can be distinguished from the various forms of potential energy.	Develop a model illustrating how energy (e.g. the sun and gravity) is exchanged to power the water cycle and move water from one location to another. (MS-PS1-4)
Middle School	Science	SC.MS.1.6	Energy changes to and from each type can be tracked through physical or chemical interactions. The relationship between the temperature and the total energy of a system depends on the types, states and amounts of matter.	Plan an investigation to determine the relationship of the sun's energy on masses of different snowpack and resulting volumes of liquid water for use downstream. how the sun's energy interacts with different masses of snowpack to provide different volumes of liquid water for use downstream. (MS-PS3-4)
Middle School	Science	SC.MS.3.6	Water cycles among land, ocean, and atmosphere, and is propelled by sunlight and gravity. Density variations of sea water drive interconnected ocean currents. Water movement causes weathering and erosion, changing landscape features.	1. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity by using a Colorado watershed as an example. (MS-ESS2-4) 2. Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions in Colorado. (MS-ESS2-5) 3. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates and precipitation patterns within Colorado. (MS-ESS2-6)
Middle School	Science	SC.MS.3.7	Complex interactions determine local weather patterns and influence climate, including the role of the ocean.	1. Collect data to provide evidence for how the motions and complex interactions of air masses result in the variability of precipitation in Colorado. (MS-ESS2-5) 2. Develop and use a model to describe how unequal heating, rotation of the Earth and geographic land distribution causes patterns of atmospheric and oceanic circulation that determine regional climates and precipitation patterns in regions of Colorado. (MS-ESS2-6)
Middle School	Science	SC.MS.3.8	Humans depend on Earth's land, ocean, atmosphere, and biosphere for different resources, many of which are limited or not renewable. Resources are distributed unevenly around the planet as a result of past geologic processes.	Construct a scientific explanation based on evidence for how the uneven distribution of Colorado's groundwater resources are limited and some are virtually non-renewable. The distribution of groundwater is significantly changing in Colorado as a result of removal with potential impacts on food supply and municipal water supplies. (MS-ESS3-1)
Sixth Grade	Social Studies	SS.6.2.1	Use geographic tools and resources to research and make geographic inferences and predictions about the Western Hemisphere.	Use technology like radar and Snotel site data to extrapolate data regarding snowpack and quanity of water available in different regions.
Sixth Grade	Social Studies	SS.6.2.2	Regional differences and perspectives in the Western Hemisphere impact human and environmental interactions.	1. Classify and analyze how water affects human interactions with the environment. 2. Identify physical water features (e.g. transbasin diversions, irrigation canals and mountain snowpack) and the positive and negative impacts on human systems in different regions.
Fifth Grade	Science	SC.5.3.3	Earth's major systems interact in multiple ways to affect Earth's surface materials and processes.	Develop a model using an example to describe why 85% of Colorado's precipitation falls west of the Continental Divide by modeling the influence of the hydrosphere (e.g. gulfs of Mexico and California, Pacific Ocean, Mississippi Valley), atmosphere (prevailing winds), and the geosphere (e.g. the state's mountain ranges) on precipitation patterns in the state. (5-ESS2-1)
Fifth Grade	Science	SC.5.3.5	Societal activities have had major effects on land, ocean, atmosphere and even outer space	Obtain and combine information about ways human activities have affected the natural water cycle in Colorado. (ESS3:C)
Fifth Grade	Social Studies	SS.5.2.2	Causes and consequences of movement.	Describe how migration patterns reflect application of technology often involving diverting water for agriculture and manufacturing (e.g. construction of irrigation ditches/acequias allowed for food production in new areas).
Fourth Grade	Science	SC.4.3.1	Earth has changed over time.	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation that water has changed a landscape over time. (4-ESS1-1)
Fourth Grade	Science	SC.4.3.2	Four major earth systems interact.	Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by analyzing cycles of freezing and thawing of water and volume of water flow. (4-ESS2-1)

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Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Fourth Grade	Science	SC.4.3.4	Energy and fuels that humans use are derived from natural sources and their use affects the environment in multiple ways.	Obtain and combine information to describe how the use of energy and fuels also uses water and affects the environment by analyzing hydroelectric dams and water used for cooling in Colorado's power plants. (4-ESS3-1)
Fourth Grade	Science	SC.4.3.5	A variety of hazards result from natural process; humans cannot eliminate natural hazards but can reduce their impacts' effect.	Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans, including the use of dams to reduce impacts of flooding and for storing water for times of drought. (4-ESS3-2)
Fourth Grade	Social Studies	SS.4.2.1	Use geographic tools to research and answer questions about Colorado geography.	Describe how the geography of Colorado and western states differ from other regions of the United States, including the role of snowpack as a main source of water, along with more limited average annual rainfall, versus the eastern United States region where average annual rainfall is generally more plentiful.
Fourth Grade	Social Studies	SS.4.2.2	Connections are developed within and across human and physical systems.	Analyze how people use geographic factors in creating settlements and have adapted to and modified the local physical environment. This includes the development of irrigation ditches/acequias (and return flows of irrigation water to streams), farming and ranching practices, and hardrock mining in order to use, conserve, and protect water resources.
Third Grade	Social Studies	SS.3.2.1	Use geographic tools to develop spatial thinking.	Discuss how snow and mountainous geography impacts access to water resources in different regions of the United States, particularly in the West.
Second Grade	Science	SC.2.3.1	Some events on Earth occur quickly; others can occur very slowly.	Use information from several sources to provide evidence that water influences Colorado's geography by comparing and contrasting slow moving water (e.g., flow of a creek or river) and fast moving water (e.g., flooding). (2-ESS1-1)
First Grade	Social Studies	SS.1.2.1	Locate places and spaces using geographic tools.	Use maps to trace the paths of rivers and streams to the oceans and to identify where man made structures (cities, reservoirs, etc.) are located in relation to natural features.
First Grade	Social Studies	SS.1.3.1	Individuals work in different types of jobs to earn an income.	Give examples of professions/jobs in the local community where individuals help plan, build and maintain water infrastructure (e.g. for producing food, cleaning and delivering drinking water, cleaning water after human use, maintaining parks and recreation opportunities, etc.).
Kinder garten	Science	SC.K.3.1	Patterns are observed when measuring the local weather, including how humans and other organisms impact their environment.	Use and share observations of local weather conditions to describe patterns of precipitation over time. (K-ESS2-1)
Kinder garten	Science	SC.K.3.2	Plants and animals meet their needs in their habitats and impact one another; people can prepare for severe weather.	Use a model to represent the relationship between water and the needs of different plants or animals (including humans) and the places they live. (K-ESS3-1)
Pre-K	Social Studies	SS.P.2.1	Develop spatial understanding, perspectives, and connections to the world	Develop an awareness of where water is located (e.g. ditches, reservoirs, or streams) around the school, neighborhood and community.

CWC.V The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.

Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
High School	Science	SC.HS.2.6	A complex set of interactions determine how ecosystems respond to disturbances.	Design, evaluate, and refine a solution for reducing the impacts of human activities on (and potentially providing benefits to) water quality/quantity, the environment and biodiversity (including food production, urbanization, dam construction, and dissemination of invasive species). (HS-LS2-7)
High School	Science	SC.HS.2.13	Humans have complex interactions with ecosystems and have the ability to influence biodiversity on the planet.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity in an aquatic environment or wetland ecosystem. (HS-LS4-6)
High School	Science	SC.HS.3.4	Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes, and these effects occur on different time scales, from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles.	Analyze geoscience data to make the claim that one change to Earth's surface (e.g. loss of ground vegetation from fire, flood, etc.) can create feedbacks that cause changes to other Earth systems (e.g. increase in water runoff and soil erosion). (HS-ESS2-2)
High School	Science	SC.HS.3.6	The planet's dynamics are greatly influenced by water's unique chemical and physical properties.	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes by investigating stream transportation and deposition using a stream table or testing the solubility of different materials as evidence of chemical weathering and recrystallization. (HS-ESS2-2)
High School	Science	SC.HS.3.7	The role of radiation from the sun and its interactions with the atmosphere, ocean, and land are the foundation for the global climate system. Global climate models are used to predict future changes, including changes influenced by human behavior and natural factors.	1. Analyze geoscience data to make the claim that one change to Earth's surface (e.g. loss of ground vegetation from fire, flood, aridification, etc.) can create feedbacks that cause changes to other Earth systems (e.g. increase in water runoff and soil erosion). (HS-ESS2-2) 2. Analyze geoscience data to make the claim that one change to Earth's surface (increase in water vapor or carbon dioxide in the atmosphere, etc.) can create feedbacks that cause changes to other Earth systems (increase in variability and severity of weather patterns, increasing surface temperatures, etc.) (HS-ESS2-2)
High School	Science	SC.HS.3.9	Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.	Construct an explanation based on evidence for how the availability of water (e.g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts), and changes in precipitation related to changes in climate have influenced human activity. (HS-ESS3-1)
High School	Science	SC.HS.3.10	Natural hazards and other geological events have shaped the course of human history at local, regional, and global scales.	Construct an explanation based on evidence for how the occurrence of water-related natural hazards (e.g. floods, droughts, natural sources of water contamination) have influenced human activity. (HS-ESS3-1)
High School	Science	SC.HS.3.11	Sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources, including the development of technologies.	Evaluate or refine a technological solution that reduces impacts of human activities on natural systems and increases the sustainability of water in Colorado. (HS-ESS3-4)
High School	Science	SC.HS.3.12	Global climate models used to predict future climate change continue to improve our understanding of the impact of human activities on the global climate system.	Use a computational representation to illustrate the relationships among the hydrosphere (water) and Earth's other systems and how those relationships are being modified due to human activity. (HS-ESS3-6)
High School	Social Studies	SS.HS.1.2	Key concepts of continuity and change, cause and effect, complexity, unity and diversity, and significant ideas in the United States from Reconstruction to the present.	Examine and evaluate the systemic impact of racism and nativism and major scientific and technological innovations on access to clean, safe drinking water in Colorado over time.
High School	Social Studies	SS.HS.2.2	Geographic variables influence interactions of people, places, and environments.	Explain how altering the environment by altering water supplies has brought prosperity to some places and created environmental dilemmas for others by examining differences between tribal nations and nontribal communities, consequences of poverty on access to clean drinking water, rural versus urban access to water, immigration/settlement and its impact on access to water resources, etc.).

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Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
High School	Social Studies	SS.HS.2.3	The interconnected nature of the world, its people and places.	Explain that the world's population is increasingly connected to and dependent upon other people for sharing water resources.
High School	Social Studies	SS.HS.3.1	Productive resources (natural, human, capital) are scarce; therefore, choices are made about how individuals, businesses, governments, and nonprofits allocate these resources.	Apply knowledge and skills to analyze how individuals, businesses, governments, and nonprofits deal with the challenges of water scarcity by using examples such as water trusts, construction of water storage and other water infrastructure, market systems for water rights, water courts, mitigating impacts of water rights transfers from agricultural land, and development of the Colorado Water Plan.
Middle School	Science	SC.MS.1.1	The fact that matter is composed of atoms and molecules can be used to explain the properties of substances, diversity of materials, states of matter and phases changes.	1. Analyze and interpret data on the properties of water and other substances before and after the substances interact to determine if a chemical reaction has occurred. (MS-PS1-2) 2. Develop a model that predicts and describes changes in particle motion, temperature, and state of water when thermal energy is added or removed. (MS-PS1-4)
Middle School	Science	SC.MS.3.6	Water cycles among land, ocean, and atmosphere, and is propelled by sunlight and gravity. Density variations of sea water drive interconnected ocean currents. Water movement causes weathering and erosion, changing landscape features.	1. Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions in Colorado. (MS-ESS2-4) 2. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates within Colorado. (MS-ESS2-6)
Middle School	Science	SC.MS.3.7	Complex interactions determine local weather patterns and influence climate, including the role of the ocean.	1. Collect data to provide evidence for how the motions and complex interactions of air masses result in the variability of precipitation in Colorado. (MS-ESS2-5) 2. Develop and use a model to describe how unequal heating, rotation of the Earth and geographic land distribution causes patterns of atmospheric and oceanic circulation that determine regional climates and precipitation patterns in regions of Colorado. (MS-ESS2-6)
Middle School	Science	SC.MS.3.8	Humans depend on Earth's land, ocean, atmosphere, and biosphere for different resources, many of which are limited or not renewable. Resources are distributed unevenly around the planet as a result of past geologic processes.	Construct a scientific explanation based on evidence for how the uneven distribution of Colorado and Earth's groundwater resources are the result of past and current geoscience processes and how their distributions are significantly changing in Colorado and on Earth as a result of removal by humans. (MS-ESS3-1)
Eighth Grade	Social Studies	SS.8.2.1	Use geographic tools to research and analyze patterns in human and physical systems in the United States.	Use geographic tools to research and analyze the use of waterways for different demographics such as settlers, traders, and miners,
Eighth Grade	Social Studies	SS.8.2.2	Competition for control of space and resources in early American History.	Interpret from a geographic perspective the expansion of the United States by addressing issues of access to water resources, along with land, security, and sovereignty.
Sixth Grade	Social Studies	SS.6.2.1	Use geographic tools and resources to research and make geographic inferences and predictions about the Western Hemisphere.	Identify uses of technology in agriculture for maximum water efficiency such as automated headgates and sprinkler systems.
Sixth Grade	Social Studies	SS.6.2.2	Regional differences and perspectives in the Western Hemisphere impact human and environmental interactions.	1. Classify and analyze how water affects human interactions with the environment. 2. Identify physical water features (e.g. transbasin diversions, irrigation canals and mountain snowpack) and the positive and negative impacts on human systems in different regions.
Fifth Grade	Science	SC.5.1.2	Chemical Reactions that occur when substances are mixed can be identified by the emergence of substances with different properties; the total mass remains the same.	Conduct an investigation to determine whether the mixing of two or more substances results in new substances by conducting water quality testing of a local waterway and observing reactions in test tubes. (5-PS1-4)

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Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Fifth Grade	Science	SC.5.3.3	Earth's major systems interact in multiple ways to affect Earth's surface materials and processes.	Develop a model using an example to describe why 85% of Colorado's precipitation falls west of the Continental Divide by modeling the influence of the hydrosphere (e.g. gulfs of Mexico and California, Pacific Ocean, Mississippi Valley), atmosphere (prevailing winds), and the geosphere (e.g. the state's mountain ranges) on precipitation patterns in the state. (5-ESS2-1)
Fifth Grade	Science	SC.5.3.4	Most of Earth's water is in the ocean and much of Earth's freshwater in glaciers or underground.	1. Describe and graph the amounts and percentages of saltwater and freshwater in various local reservoirs including lakes, rivers, and ground water to provide comparisons about the distribution of freshwater and saltwater on Earth and in Colorado. (5-ESS2-2) 2. Provide evidence for the statement "water is a scarce resource, limited and variable" by comparing the amount of water available for human use in Colorado (or a local drinking water supply) from various sources (e.g. surface vs. groundwater). (5-ESS2-2)
Fifth Grade	Science	SC.5.3.5	Societal activities have had major effects on land, ocean, atmosphere and even outer space	1. Describe how human activities have had major effects on the quality and quantity of water and the timing of its availability. (ESS3:C) 2. Obtain and combine information about ways individual communities use science ideas to protect the water resources and water's role in the environment. (5-ESS3-1)
Fifth Grade	Social Studies	SS.5.2.2	Causes and consequences of movement.	1. Discuss allocation of water resources amongst different user groups. 2. Describe how migration patterns reflect application of technology often involving water quantity for agriculture and manufacturing (e.g. construction of irrigation ditches/acequias allowed for food production in new areas).
Fourth Grade	Science	SC.4.3.4	Energy and fuels that humans use are derived from natural sources and their use affects the environment in multiple ways.	Obtain and combine information to describe how the use of energy and fuels also uses water and affects the environment by analyzing hydroelectric dams and water used for cooling in Colorado's power plants. (4-ESS3-1)
Fourth Grade	Science	SC.4.3.5	A variety of hazards result from natural process; humans cannot eliminate natural hazards but can reduce their impacts' effect.	Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans, including the use of dams to reduce impacts of flooding and for storing water, a shift to regenerative agriculture or new food crops in response a changing climate, and the management of watersheds and water supplies to reduce the potential for pollution-related hazards. (4-ESS3-2)
Fourth Grade	Social Studies	SS.4.2.1	Use geographic tools to research and answer questions about Colorado geography.	Describe how the geography of Colorado and western states differ from other regions of the United States, including the role of snowpack as a main source of water, along with more limited average annual rainfall, versus the eastern United States region where average annual rainfall is generally more plentiful.
Fourth Grade	Social Studies	SS.4.2.2	Connections are developed within and across human and physical systems.	Analyze how people use geographic factors in creating settlements and have adapted to and modified the local physical environment. This includes the development of irrigation ditches/acequias (and return flows of irrigation water to streams), farming and ranching practices, and hardrock mining in order to use, conserve, and protect water resources.
Third Grade	Social Studies	SS.3.2.1	Use geographic tools to develop spatial thinking.	1. Discuss how snow and mountainous geography impacts access to water resources in different regions of the United States. 2. Identify the different strategies used by groups of people that live in arid, desert areas with limited and variable water sources by using examples from local history or the present (i.e. acequias, Native Americans, fur trappers, etc.).
Third Grade	Social Studies	SS.3.2.2	The concept of region is developed through an examination of similarities and differences in places and communities.	Discuss the differences in each region's (e.g. river basin's) use of water (groundwater/aquifers, surface water, reservoirs) and identify regional culture's relationship with water.

CWC.V The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.

Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Second Grade	Science	SC.2.3.2	Wind and water can change the shape of the land; models can show the shape and these changes to the land.	1. Obtain information to identify where water is found in Colorado (i.e., the Earth) and that it can be solid or liquid. (ESS2-3) 2. Compare multiple solutions designed to slow or prevent water from changing the shape of the land. (2-ESS2-1)
Second Grade	Social Studies	SS.2.2.2	People in communities manage, modify, and depend on their environment.	1. Discuss how communities allocate water resources so that all members have access. 2. Discuss how water contributes to the interaction of a community with their environment.
First Grade	Social Studies	SS.1.2.2	Describe the characteristics of a community and how they are influenced by the environment.	Identify how the community interacts with water and weather (e.g. when growing food, watering gardens, etc.) and discuss impacts/consequences.
Kinder garten	Science	SC.K.3.1	Patterns are observed when measuring the local weather, including how humans and other organisms impact their environment.	Construct an argument supported by evidence for how plants and animals (including humans) can manipulate water in the environment to meet their needs (e.g. use of dams, watering landscapes).
Kinder garten	Science	SC.K.3.2	Plants and animals meet their needs in their habitats and impact one another; people can prepare for severe weather.	1. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather, such as drought and floods events. (K-ESS3-2) 2. Communicate solutions that will reduce the impact of humans on the water. (K-ESS3-3)

CWC.VI Water is a public resource governed by water law

Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
High School	Science	SC.HS.3.9	Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.	Construct an explanation based on evidence for how the availability of water (e.g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts), and changes in precipitation related to changes in climate have guided the development of human society in Colorado and how social regulations can change the balance of factors. (HS-ESS3-1)
High School	Science	SC.HS.3.11	Sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources, including the development of technologies.	Create a computational simulation to illustrate the relationships among the management of water with the sustainability of human populations and biodiversity. (HS-ESS3-3)
High School	Social Studies	SS.HS.2.2	Geographic variables influence interactions of people, places, and environments.	Research and interpret multiple viewpoints on issues that shape policies and programs for water resource use and explain how the management of water supplies has brought prosperity to some places and created environmental dilemmas for others by examining Colorado examples (e.g differences between tribal nations and nontribal communities, consequences of poverty on access to clean drinking water, rural versus urban access to water, immigration/settlement and its impact on access to water resources, etc.).
High School	Social Studies	SS.HS.2.3	3. The interconnected nature of the world, its people and places.	Analyze how cooperation and conflict influence the division and control of Earth by using examples of Colorado's water administration and treaties/interstate compacts over water resources as an example.
High School	Social Studies	SS.HS.3.2	Economic systems, market structures, competition, and government policies affect market outcomes.	1. Explore the role of government in addressing market failures by using examples from the allocation and appropriation of water in Colorado as a public resource for beneficial use by public agencies and private persons through a water right (the right to use a portion of the public's water resources). 2. Analyze negative/positive externalities of water markets in Colorado such as the impact of agricultural water rights purchases on the dry-up of agricultural land and the role of the Colorado government in anti-speculation policies. 3. Compare and contrast the market outcomes created by various water market structures with different levels and types of government or public control.
High School	Social Studies	SS.HS.4.1	Research and formulate positions on local, state, and national issues or policies to participate in a civil society.	1. Identify which level of government is appropriate for various water-related policies and demonstrate an ability to appropriately engage individually and/or in groups with that level of government. 2. Engage in civil discourse regarding balanced water solutions, by discussing how current water issues demonstrate that the sustainability of water in quality and quantity is essential for life and our economy, advocating for individual or group rights related to water, demonstrating civic duty in ensuring sustainability of water resources, and demonstrating civic participation in decision-making processes regarding sustainable water resources.
High School	Social Studies	SS.HS.4.2	Purposes, roles and limitations of the structures and functions of government.	1. Understand the role of the judicial system surrounding water law and evaluate the effectiveness of the justice system surrounding water in protecting life, liberty, and property for all persons in the United States and in Colorado. 2. Analyze and explain the possibilities and limitations of water governance in Colorado's communities and the inherent competition among values.
High School	Social Studies	SS.HS.4.3	Evaluate the impact of the political institutions that link the people to the government.	Analyze the legal system around water in Colorado and the evolution of water law in Colorado over time in response to changing social wants (e.g. the inclusion of instream flows as a beneficial use).

CWC.VI Water is a public resource governed by water law

Grade	Subject	GLE Code	Grade Level Expectation (GLE)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Eighth Grade	Social Studies	SS.8.1.1	Investigate and evaluate primary and secondary sources about United States history from the American Revolution through Reconstruction to formulate and defend a point of view with textual evidence.	Analyze evidence from multiple sources including those with conflicting accounts to evaluate the shift of much of Colorado's government from Spanish to Mexican to American, and explain attendant water disputes and settlement issues by using place=based regional documents (Particularly the issues of Mexican land grants being nullified by the American government after the power shift in 1848 and the influx of Anglo settlers to Colorado in 1862).
Eighth Grade	Social Studies	SS.8.1.2	The historical eras, individuals, groups, ideas and themes from the origins of the American Revolution through Reconstruction.	Evaluate continuity and change over the course of United States history by examining various eras from the perspective of Colorado residents in particular regions by determining when and where access to water resources were a major source of conflict and compromise.
Eighth Grade	Social Studies	SS.8.2.1	Use geographic tools to research and analyze patterns in human and physical systems in the United States.	Use geographic tools to research and analyze the use of waterways for different demographics such as settlers, traders, and miners,
Eighth Grade	Social Studies	SS.8.2.2	Competition for control of space and resources in early American History.	Analyze how economic, political, cultural, and social processes interact to shape patterns of human population, interdependence, cooperation and conflict by using the administration and appropriation of water resources in Colorado as an example.
Fifth Grade	Science	SC.5.3.5	Societal activities have had major effects on land, ocean, atmosphere and even outer space	Obtain and combine information about ways individual communities use science ideas to protect the water resources and water's role in the environment. (5-ESS3-1)
Fourth Grade	Social Studies	SS.4.1.1	Analyze primary and secondary sources from multiple points of view to develop an understanding of the history of Colorado.	Discuss how mining, trading, agriculture, and industrial industries have each shaped Colorado history through their use of natural resources, including water.
Fourth Grade	Social Studies	SS.4.1.2	The historical eras, individuals, groups, ideas, and themes in Colorado history and their relationship to key events in the United States within the same historical period.	Describe how historical events impact how natural resources, including water, are allocated today (e.g. War of 1848, Homestead Act of 1862).
Fourth Grade	Social Studies	SS.4.4.2	The origins, structures, and functions of the Colorado government.	Explain the unique origins of the judicial system surrounding water in Colorado.
Third Grade	Social Studies	SS.3.4.2	The origins, structures, and functions of local government.	Identify the origins, structures, and functions of local government related to management of local water resources (e.g. water law, water courts, water quality permitting). Describe how local government provides opportunities for people to exercise their rights and initiate change by examining a local water issue.
Second Grade	Social Studies	SS.2.4.2	Identify and compare multiple ways that people understand and resolve conflicts and differences.	Analyze ways that diverse individuals, groups and communities work through conflict and promote equality, justice, and responsibility by using the example of management of water as a scarce public resource.
Kinder garten	Social Studies	SS.K.4.1	Understand that civic participation takes place in multiple groups and in various forms.	Differentiate among examples of civic participation by using the example of a citizen who is engaged and informed in water issues as a public resource (e.g. participating in a stream cleanup and participating in a ditch company).
Kinder garten	Social Studies	SS.K.4.2	Participate in making fair and reasoned decisions using democratic traditions.	Explain that rules around sharing water in class in can be used as a means of resolving conflict and recognize that such democratic traditions exist in how Coloradans share water.
Pre-K	Social Studies	SS.P.4.2	Rules allow groups to work effectively.	Recognize that rules allow groups to work effectively by sharing water or lining up to fill water bottles in a classroom.

Figure 9 (Multiple Tables): Grade-level Focus - Progression of Relevant Grade Level Expectations and Critical Water Concepts by Grade Level with Evidence Outcomes Adapted for a Water Focus (All Connections)

The following tables are organized by grade level and provide example water-based objectives for each of the Grade Level Expectations with connections (strong, moderate, or weak) to each of the SWEAP Critical Water Concepts.

HIGH SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Science	SC.HS.1.1	The sub-atomic structural model and interactions between electric charges at the atomic scale can be used to explain the structure and interactions of matter.	CWC.I	The physical and chemical properties of water are unique and constant.	Plan and conduct an investigation to gather evidence to compare the structure of water and its hydrogen bonds with other substances at the bulk scale to infer the strength of electrical forces between particles by using melting point, boiling point and surface tension. (HS-PS1-3)
Science	SC.HS.1.7	Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems.	CWC.I	The physical and chemical properties of water are unique and constant.	Plan and conduct an investigation to provide evidence that the transfer of thermal energy when mixing bodies of water at different temperatures results in a more uniform energy distribution (e.g. cold mountain glacier runoff meets a reservoir on the front range that is warmer or the change in air temperature near a body of water). (HS-PS3-4)
Science	SC.HS.1.7	Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Create a computational model to calculate the change in energy as water moves through the water cycle (e.g. evaporation of water to form clouds, condensation of atmospheric water vapor to form precipitation). (HS-PS3-1)
Science	SC.HS.1.9	Although energy cannot be destroyed, it can be converted to less useful forms as it is captured, stored and transferred.	CWC.I	The physical and chemical properties of water are unique and constant.	Plan and conduct an investigation to provide evidence that the transfer of thermal energy when mixing bodies of water at different temperatures results in a more uniform energy distribution (e.g. cold mountain glacier runoff meets a reservoir on the front range that is warmer or the change in air temperature near a body of water). (HS-PS3-1)
Science	SC.HS.1.9	Although energy cannot be destroyed, it can be converted to less useful forms as it is captured, stored and transferred.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	1. Create a computational model to calculate the change in energy as water moves through the water cycle (e.g. evaporation of water to form clouds, condensation of atmospheric water vapor to form precipitation). (HS-PS3-1) 2. Design, build, and refine a device that models a watershed or municipal drinking water system to convert one form of energy into another form of energy. (HS-PS3-3)
Science	SC.HS.1.10	Waves have characteristic properties and behaviors.	CWC.I	The physical and chemical properties of water are unique and constant.	Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in water and other media. (HS-PS4-1)
Science	SC.HS.2.1	DNA codes for the complex hierarchical organization of systems that enable life's functions.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis in response to water availability (e.g. by measuring stomate response to moisture and temperature and/or root development in response to water levels). (HS-LS1-3)

HIGH SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Science	SC.HS.2.3	Organisms use matter and energy to live and grow.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Use a model to illustrate the need for water in photosynthesis to transform light energy into stored chemical energy. (HS-LS1-5)
Science	SC.HS.2.4	Organisms interact with the living and nonliving components of the environment to obtain matter and energy.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Use mathematical and/or computational representations gathered from a simulation of a drought or flood to support water as a factor affecting carrying capacity of an ecosystem. (HS-LS2-1)
Science	SC.HS.2.5	Matter and energy necessary for life are conserved as they move through ecosystems.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in a wetland under aerobic and anaerobic conditions. (HS-LS2-3)
Science	SC.HS.2.6	A complex set of interactions determine how ecosystems respond to disturbances.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Evaluate claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions (such as seasonal floods and droughts), but changing conditions (such as a catastrophic flood or long-term aridification) may result in a new ecosystem (including changes in what food can be produced for people). (HS-LS2-6)
Science	SC.HS.2.6	A complex set of interactions determine how ecosystems respond to disturbances.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	1. Evaluate claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions (such as localized beaver dam construction), but changing conditions (such as major dam construction, land clearing or shift to regenerative agriculture or new crops) may result in a new ecosystem. (HS-LS2-6) 2. Design, evaluate and refine a solution for reducing the impacts of human activities (such as dams) on the environment and biodiversity. (HS-LS2-7)
Science	SC.HS.2.6	A complex set of interactions determine how ecosystems respond to disturbances.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Design, evaluate, and refine a solution for reducing the impacts of human activities on (and potentially providing benefits to) water quality/quantity, the environment and biodiversity (including food production, urbanization, dam construction, and dissemination of invasive species). (HS-LS2-7)
Science	SC.HS.2.12	The environment influences survival and reproduction of organisms over multiple generations.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Evaluate the evidence supporting claims that changes in environmental conditions may result in (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species by analyzing impacts of drought and flood in different ecosystems, including aquatic environments and wetlands. (HS-LS4-5)

HIGH SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Science	SC.HS.2.13	Humans have complex interactions with ecosystems and have the ability to influence biodiversity on the planet.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity in an aquatic environment or wetland ecosystem. (HS-LS4-6)
Science	SC.HS.2.13	Humans have complex interactions with ecosystems and have the ability to influence biodiversity on the planet.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity in an aquatic environment or wetland ecosystem. (HS-LS4-6)
Science	SC.HS.3.4	Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes, and these effects occur on different time scales, from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles.	CWC.I	The physical and chemical properties of water are unique and constant.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes to climate, specifically with precipitation patterns. (HS-ESS2-4)
Science	SC.HS.3.4	Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes, and these effects occur on different time scales, from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Analyze geoscience data to make the claim that one change to Earth's surface (loss of ground vegetation from fire, flood, aridification, etc.) can create feedbacks that cause changes to other Earth systems (increase in water runoff and soil erosion or changes in food production). (HS-ESS2-2)
Science	SC.HS.3.4	Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes, and these effects occur on different time scales, from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Analyze geoscience data to make the claim that one change to Earth's surface (e.g. loss of ground vegetation from fire, flood, etc.) can create feedbacks that cause changes to other Earth systems (e.g. increase in water runoff and soil erosion or changes in food production). (HS-ESS2-2)
Science	SC.HS.3.6	The planet's dynamics are greatly influenced by water's unique chemical and physical properties.	CWC.I	The physical and chemical properties of water are unique and constant.	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. (HS-ESS2-5)
Science	SC.HS.3.6	The planet's dynamics are greatly influenced by water's unique chemical and physical properties.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Plan and conduct an investigation of how the properties of water and its effects on Earth materials and surface processes may alter dynamics within an ecosystem. (HS-ESS2-2)
Science	SC.HS.3.6	The planet's dynamics are greatly influenced by water's unique chemical and physical properties.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes by investigating stream transportation and deposition using a stream table. (HS-ESS2-2)

HIGH SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Science	SC.HS.3.6	The planet's dynamics are greatly influenced by water's unique chemical and physical properties.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes by investigating stream transportation and deposition using a stream table or testing the solubility of different materials as evidence of chemical weathering and recrystallization. (HS-ESS2-2)
Science	SC.HS.3.7	The role of radiation from the sun and its interactions with the atmosphere, ocean, and land are the foundation for the global climate system. Global climate models are used to predict future changes, including changes influenced by human behavior and natural factors.	CWC.I	The physical and chemical properties of water are unique and constant.	Analyze geoscience data to make the claim that one change to Earth's surface (e.g. loss of ground vegetation from fire, flood, etc.) can create feedbacks that cause changes to other Earth systems (e.g. increase in water runoff and soil erosion). (HS-ESS2-2)
Science	SC.HS.3.7	The role of radiation from the sun and its interactions with the atmosphere, ocean, and land are the foundation for the global climate system. Global climate models are used to predict future changes, including changes influenced by human behavior and natural factors.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Analyze geoscience data to make the claim that one change to Earth's surface (e.g. loss of ground vegetation from fire, flood, etc.) can create feedbacks that cause changes to Colorado's ecosystems (e.g. increase in water runoff and soil erosion or changes in food production). (HS-ESS2-2)
Science	SC.HS.3.7	The role of radiation from the sun and its interactions with the atmosphere, ocean, and land are the foundation for the global climate system. Global climate models are used to predict future changes, including changes influenced by human behavior and natural factors.	CWC.III	Water is a scarce resource, limited and variable.	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate and precipitation patterns in Colorado. (HS-ESS2-4)
Science	SC.HS.3.7	The role of radiation from the sun and its interactions with the atmosphere, ocean, and land are the foundation for the global climate system. Global climate models are used to predict future changes, including changes influenced by human behavior and natural factors.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate and precipitation patterns in Colorado. (HS-ESS2-4)
Science	SC.HS.3.7	The role of radiation from the sun and its interactions with the atmosphere, ocean, and land are the foundation for the global climate system. Global climate models are used to predict future changes, including changes influenced by human behavior and natural factors.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	1. Analyze geoscience data to make the claim that one change to Earth's surface (e.g. loss of ground vegetation from fire, flood, aridification, etc.) can create feedbacks that cause changes to other Earth systems (e.g. increase in water runoff and soil erosion). (HS-ESS2-2) 2. Analyze geoscience data to make the claim that one change to Earth's surface (increase in water vapor or carbon dioxide in the atmosphere, etc.) can create feedbacks that cause changes to other Earth systems (increase in variability and severity of weather patterns, increasing surface temperatures, etc.) (HS-ESS2-2)

HIGH SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Science	SC.HS.3.9	Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Construct an explanation based on evidence for how the availability of water (e.g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts), and changes in precipitation related to changes in climate have influenced human activity (e.g. types of crops and livestock that can be raised). (HS-ESS3-1)
Science	SC.HS.3.9	Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.	CWC.III	Water is a scarce resource, limited and variable.	Construct an explanation based on evidence for how the availability of water (e..g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts), and changes in precipitation related to changes in climate have influenced human activity. (HS-ESS3-1)
Science	SC.HS.3.9	Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Construct an explanation based on evidence for how the availability of water (e.g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts, natural sources of water contamination), and changes in precipitation have influenced human activity within a Colorado watershed. (HS-ESS3-1)
Science	SC.HS.3.9	Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Construct an explanation based on evidence for how the availability of water (e.g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts), and changes in precipitation related to changes in climate have influenced human activity. (HS-ESS3-1)
Science	SC.HS.3.9	Resource availability has guided the development of human society and use of natural resources has associated costs, risks, and benefits.	CWC.VI	Water is a public resource, governed by water law.	Construct an explanation based on evidence for how the availability of water (e.g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts), and changes in precipitation related to changes in climate have guided the development of human society in Colorado and how social regulations can change the balance of factors. (HS-ESS3-1)
Science	SC.HS.3.10	Natural hazards and other geological events have shaped the course of human history at local, regional, and global scales.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Construct an explanation based on evidence for how the occurrence of water-related natural hazards (e.g. floods, droughts, natural sources of water contamination) have influenced human activity (e.g. types of crops and livestock that can be raised). (HS-ESS3-1)

HIGH SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Science	SC.HS.3.10	Natural hazards and other geological events have shaped the course of human history at local, regional, and global scales.	CWC.III	Water is a scarce resource, limited and variable.	Construct an explanation based on evidence for how the occurrence of water-related natural hazards (e.g. floods, droughts, natural sources of water contamination) have influenced human activity. (HS-ESS3-1)
Science	SC.HS.3.10	Natural hazards and other geological events have shaped the course of human history at local, regional, and global scales.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Construct an explanation based on evidence for how the occurrence of water-related natural hazards (e.g. floods, droughts, natural sources of water contamination) have influenced human activity. (HS-ESS3-1)
Science	SC.HS.3.11	Sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources, including the development of technologies.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Create a computational simulation to illustrate the relationships among the management of water with the sustainability of human populations, and biodiversity. (HS-ESS3-3)
Science	SC.HS.3.11	Sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources, including the development of technologies.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Evaluate or refine a technological solution that reduces impacts of human activities on natural systems and increases the sustainability of water in Colorado. (HS-ESS3-4)
Science	SC.HS.3.11	Sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources, including the development of technologies.	CWC.VI	Water is a public resource, governed by water law.	Create a computational simulation to illustrate the relationships among the management of water with the sustainability of human populations and biodiversity. (HS-ESS3-3)
Science	SC.HS.3.12	Global climate models used to predict future climate change continue to improve our understanding of the impact of human activities on the global climate system.	CWC.III	Water is a scarce resource, limited and variable.	Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change, specific to precipitation and temperature, and the associated future impacts to Earth's systems and their associated impacts (e.g. aridification). (HS-ESS3-5)
Science	SC.HS.3.12	Global climate models used to predict future climate change continue to improve our understanding of the impact of human activities on the global climate system.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Use a computational representation to illustrate the relationships among the hydrosphere (water) and Earth's other systems and how those relationships are being modified due to human activity. (HS-ESS3-6)
Social Studies	SS.HS.1.2	Key concepts of continuity and change, cause and effect, complexity, unity and diversity, and significant ideas in the United States from Reconstruction to the present.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Examine and evaluate the systemic impact of racism and nativism and major scientific and technological innovations on access to clean, safe drinking water in Colorado over time.

HIGH SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Social Studies	SS.HS.2.1	Use geographic tools and resources to analyze Earth's human systems and physical features to investigate and address geographic issues.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Create, analyze and interpret maps to display and explain the affect of water resources on spatial patterns of cultural and environmental characteristics at various scales.
Social Studies	SS.HS.2.2	Geographic variables influence interactions of people, places, and environments.	CWC.III	Water is a scarce resource, limited and variable.	Identify, evaluate, and communicate strategies to respond to constraints placed on human systems by analyzing the scarcity and variability in available water resources in Colorado.
Social Studies	SS.HS.2.2	Geographic variables influence interactions of people, places, and environments.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Identify, evaluate, and communicate strategies to respond to constraints placed on human systems by the physical environment by using the intercepting and manipulating water from the natural water cycle as an example.
Social Studies	SS.HS.2.2	Geographic variables influence interactions of people, places, and environments.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Explain how altering the environment by altering water supplies has brought prosperity to some places and created environmental dilemmas for others by examining differences between tribal nations and nontribal communities, consequences of poverty on access to clean drinking water, rural versus urban access to water, immigration/settlement and its impact on access to water resources, etc.).
Social Studies	SS.HS.2.2	Geographic variables influence interactions of people, places, and environments.	CWC.VI	Water is a public resource, governed by water law.	Research and interpret multiple viewpoints on issues that shape policies and programs for water resource use and explain how the management of water supplies has brought prosperity to some places and created environmental dilemmas for others by examining Colorado examples (e.g differences between tribal nations and nontribal communities, consequences of poverty on access to clean drinking water, rural versus urban access to water, immigration/settlement and its impact on access to water resources, etc.).
Social Studies	SS.HS.2.3	The interconnected nature of the world, its people and places.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Explain that the world's population is increasingly connected to and dependent upon the need and sharing of water resources.
Social Studies	SS.HS.2.3	The interconnected nature of the world, its people and places.	CWC.III	Water is a scarce resource, limited and variable.	Explain how the uneven distribution of limited and variable water resources in the world can lead to conflict, competition, or cooperation among nations, regions, and cultural groups.

HIGH SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Social Studies	SS.HS.2.3	The interconnected nature of the world, its people and places.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people.	Analyze how cooperation and conflict influence the division and control of Earth by using examples from the development of Colorado's extensive water infrastructure and management systems.
Social Studies	SS.HS.2.3	The interconnected nature of the world, its people and places.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Explain that the world's population is increasingly connected to and dependent upon other people for sharing water resources.
Social Studies	SS.HS.2.3	3. The interconnected nature of the world, its people and places.	CWC.VI	Water is a public resource, governed by water law.	Analyze how cooperation and conflict influence the division and control of Earth by using examples of Colorado's water administration and treaties/interstate compacts over water resources as an example.
Social Studies	SS.HS.3.1	Productive resources (natural, human, capital) are scarce; therefore, choices are made about how individuals, businesses, governments, and nonprofits allocate these resources.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Explain the economic way of thinking: the condition of scarcity requires choice and choice has a cost (opportunity cost) in relation to Colorado's water resources (e.g. transfer of water from food production for use within cities and towns).
Social Studies	SS.HS.3.1	Productive resources (natural, human, capital) are scarce; therefore, choices are made about how individuals, businesses, governments, and nonprofits allocate these resources.	CWC.III	Water is a scarce resource, limited and variable.	Explain the economic way of thinking: the condition of scarcity requires choice and choice has a cost (opportunity cost) by using Colorado's water resources as an example.
Social Studies	SS.HS.3.1	Productive resources (natural, human, capital) are scarce; therefore, choices are made about how individuals, businesses, governments, and nonprofits allocate these resources.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Apply knowledge and skills to analyze how individuals, businesses (including agricultural producers), governments, and nonprofits deal with the challenges of water scarcity by manipulating and intercepting water through an extensive infrastructure system built by people.
Social Studies	SS.HS.3.1	Productive resources (natural, human, capital) are scarce; therefore, choices are made about how individuals, businesses, governments, and nonprofits allocate these resources.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Apply knowledge and skills to analyze how individuals, businesses, governments, and nonprofits deal with the challenges of water scarcity by using examples such as water trusts, construction of water storage and other water infrastructure, market systems for water rights, water courts, mitigating impacts of water rights transfers from agricultural land, and development of the Colorado Water Plan.

HIGH SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Social Studies	SS.HS.3.2	Economic systems, market structures, competition, and government policies affect market outcomes.	CWC.III	Water is a scarce resource, limited and variable.	1. Use supply and demand analysis to explain how competitive markets efficiently allocate scarce resources such as water (e.g. a farmer's purchase of water to produce food or a town's purchase of water to serve its residents). 2. Compare and contrast market outcomes for water markets in Colorado with different levels of water supply and demand.
Social Studies	SS.HS.3.2	Economic systems, market structures, competition, and government policies affect market outcomes.	CWC.VI	Water is a public resource, governed by water law.	1. Explore the role of government in addressing market failures by using examples from the allocation and appropriation of water in Colorado as a public resource for beneficial use by public agencies and private persons through a water right (the right to use a portion of the public's water resources). 2. Analyze negative/positive externalities of water markets in Colorado such as the impact of agricultural water rights purchases on the dry-up of agricultural land and the role of the Colorado government in anti-speculation policies. 3. Compare and contrast the market outcomes created by various water market structures with different levels and types of government or public control.
Social Studies	SS.HS.4.1	Research and formulate positions on local, state, and national issues or policies to participate in a civil society.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Engage in civil discourse regarding balanced water solutions by discussing how current water issues demonstrate that the sustainability of water in quality and quantity is essential for life and our economy.
Social Studies	SS.HS.4.1	Research and formulate positions on local, state, and national issues or policies to participate in a civil society.	CWC.VI	Water is a public resource, governed by water law.	1. Identify which level of government is appropriate for various water-related policies and demonstrate an ability to appropriately engage individually and/or in groups with that level of government. 2. Engage in civil discourse regarding balanced water solutions, by discussing how current water issues demonstrate that the sustainability of water in quality and quantity is essential for life and our economy, advocating for individual or group rights related to water, demonstrating civic duty in ensuring sustainability of water resources, and demonstrating civic participation in decision-making processes regarding sustainable water resources.

HIGH SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Social Studies	SS.HS.4.2	Purposes, roles and limitations of the structures and functions of government.	CWC.VI	Water is a public resource, governed by water law.	1. Understand the role of the judicial system surrounding water law and evaluate the effectiveness of the justice system surrounding water in protecting life, liberty, and property for all persons in the United States and in Colorado. 2. Analyze and explain the possibilities and limitations of water governance in Colorado's communities and the inherent competition among values.
Social Studies	SS.HS.4.3	Evaluate the impact of the political institutions that link the people to the government.	CWC.VI	Water is a public resource, governed by water law.	Analyze the legal system around water in Colorado and the evolution of water law in Colorado over time in response to changing social wants (e.g. the inclusion of instream flows as a beneficial use).

MIDDLE SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Science	SC.MS.1.1	The fact that matter is composed of atoms and molecules can be used to explain the properties of substances, diversity of materials, states of matter and phases changes.	CWC.I	The physical and chemical properties of water are unique and constant.	Develop models to describe the atomic composition of water molecules and extended structures. (MS-PS1-1)
Science	SC.MS.1.1	The fact that matter is composed of atoms and molecules can be used to explain the properties of substances, diversity of materials, states of matter and phases changes.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	1. Analyze and interpret data on the properties of water and other substances before and after the substances interact to determine if a chemical reaction has occurred. (MS-PS1-2) 2. Develop a model that predicts and describes changes in particle motion, temperature, and state of water when thermal energy is added or removed. (MS-PS1-4)
Science	SC.MS.1.5	Kinetic energy can be distinguished from the various forms of potential energy.	CWC.I	The physical and chemical properties of water are unique and constant.	Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample (e.g. by comparing final water temperatures after different masses of ice melted in the same volume of water with the same initial temperature). (MS-PS3-4)
Science	SC.MS.1.5	Kinetic energy can be distinguished from the various forms of potential energy.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people.	Develop a model illustrating how energy (e.g. the sun and gravity) is exchanged to power the water cycle and move water from one location to another. (MS-PS1-4)
Science	SC.MS.1.6	Energy changes to and from each type can be tracked through physical or chemical interactions. The relationship between the temperature and the total energy of a system depends on the types, states and amounts of matter.	CWC.I	The physical and chemical properties of water are unique and constant.	Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample (e.g. by comparing final water temperatures after different masses of ice melted in the same volume of water with the same initial temperature). (MS-PS3-4)

MIDDLE SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Science	SC.MS.1.6	Energy changes to and from each type can be tracked through physical or chemical interactions. The relationship between the temperature and the total energy of a system depends on the types, states and amounts of matter.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Plan an investigation to determine the relationship of the sun's energy on masses of different snowpack and resulting volumes of liquid water for use downstream. how the sun's energy interacts with different masses of snowpack to provide different volumes of liquid water for use downstream. (MS-PS3-4)
Science	SC.MS.2.3	Sustaining life requires substantial energy and matter inputs.	CWC.I	The physical and chemical properties of water are unique and constant.	Develop a model to describe how carbon dioxide and water combine to form carbon-based organic molecules and the release of oxygen. (MS-LS1-7)
Science	SC.MS.2.3	Sustaining life requires substantial energy and matter inputs.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Construct a scientific explanation based on evidence for the need of water in the role of photosynthesis for the cycling of matter and flow of energy into and out of organisms. (MS-LS1-6)
Science	SC.MS.2.5	Organisms and populations of organisms are dependent on their environmental interactions both with other living things and with nonliving	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Analyze and interpret data to provide evidence for what happens to living things in an ecosystem (including food systems) as water availability increases/decreases. (MS-LS2-1)
Science	SC.MS.2.5	Organisms and populations of organisms are dependent on their environmental interactions both with other living things and with nonliving	CWC.III	Water is a scarce resource, limited and variable.	Analyze and interpret data to provide evidence for what happens to living things in an ecosystem as water availability increases/decreases. (MS-LS2-1)
Science	SC.MS.2.6	Ecosystems are sustained by the continuous flow of energy, originating primarily from the sun, and the recycling of matter and nutrients within the system.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Develop a model to describe the cycling of nutrients in water for aquatic environments, including algal growth, consumption, and decomposition. (MS-LS2-3)
Science	SC.MS.2.7	Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Evaluate competing design solutions for maintaining biodiversity and ecosystem services (such as water purification in a watershed). (MS-LS2-5)
Science	SC.MS.3.6	Water cycles among land, ocean, and atmosphere, and is propelled by sunlight and gravity. Density variations of sea water drive interconnected ocean currents. Water movement causes weathering and erosion, changing landscape features.	CWC.I	The physical and chemical properties of water are unique and constant.	Construct an explanation based on evidence for water's role in how geoscience processes have changed Earth's surface at varying time and spatial scales. (MS-ESS2-2)

MIDDLE SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Science	SC.MS.3.6	Water cycles among land, ocean, and atmosphere, and is propelled by sunlight and gravity. Density variations of sea water drive interconnected ocean currents. Water movement causes weathering and erosion, changing landscape features.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	1. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity by using a Colorado watershed as an example. (MS-ESS2-4) 2. Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions in Colorado. (MS-ESS2-5) 3. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates and precipitation patterns within Colorado. (MS-ESS2-6)
Science	SC.MS.3.6	Water cycles among land, ocean, and atmosphere, and is propelled by sunlight and gravity. Density variations of sea water drive interconnected ocean currents. Water movement causes weathering and erosion, changing landscape features.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	1. Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions in Colorado. (MS-ESS2-4) 2. Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates within Colorado. (MS-ESS2-6)
Science	SC.MS.3.7	Complex interactions determine local weather patterns and influence climate, including the role of the ocean.	CWC.I	The physical and chemical properties of water are unique and constant.	1. Collect data to provide evidence for how the motions and complex interactions of air masses result in the variability of precipitation in Colorado. (MS-ESS2-5) 2. Develop and use a model to describe how unequal heating, rotation of the Earth and geographic land distribution causes patterns of atmospheric and oceanic circulation that determine regional climates and precipitation patterns in regions of Colorado. (MS-ESS2-6)
Science	SC.MS.3.7	Complex interactions determine local weather patterns and influence climate, including the role of the ocean.	CWC.II	Water is a scarce resource, limited and variable.	1. Collect data to provide evidence for how the motions and complex interactions of air masses result in the variability of precipitation in Colorado. (MS-ESS2-5) 2. Develop and use a model to describe how unequal heating, rotation of the Earth and geographic land distribution causes patterns of atmospheric and oceanic circulation that determine regional climates and precipitation patterns in regions of Colorado. (MS-ESS2-6)

MIDDLE SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Science	SC.MS.3.7	Complex interactions determine local weather patterns and influence climate, including the role of the ocean.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	1. Collect data to provide evidence for how the motions and complex interactions of air masses result in the variability of precipitation in Colorado. (MS-ESS2-5) 2. Develop and use a model to describe how unequal heating, rotation of the Earth and geographic land distribution causes patterns of atmospheric and oceanic circulation that determine regional climates and precipitation patterns in regions of Colorado. (MS-ESS2-6)
Science	SC.MS.3.7	Complex interactions determine local weather patterns and influence climate, including the role of the ocean.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	1. Collect data to provide evidence for how the motions and complex interactions of air masses result in the variability of precipitation in Colorado. (MS-ESS2-5) 2. Develop and use a model to describe how unequal heating, rotation of the Earth and geographic land distribution causes patterns of atmospheric and oceanic circulation that determine regional climates and precipitation patterns in regions of Colorado. (MS-ESS2-6)
Science	SC.MS.3.8	Humans depend on Earth's land, ocean, atmosphere, and biosphere for different resources, many of which are limited or not renewable. Resources are distributed unevenly around the planet as a result of past geologic processes.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Construct a scientific explanation based on evidence for why water resources are unevenly distributed, limited or not renewable, such as groundwater. (MS-ESS3-1)
Science	SC.MS.3.8	Humans depend on Earth's land, ocean, atmosphere, and biosphere for different resources, many of which are limited or not renewable. Resources are distributed unevenly around the planet as a result of past geologic processes.	CWC.III	Water is a scarce resource, limited and variable.	Construct a scientific explanation based on evidence for how the uneven distribution of Colorado and Earth's groundwater resources are the result of past and current geoscience processes. (MS-ESS3-1)
Science	SC.MS.3.8	Humans depend on Earth's land, ocean, atmosphere, and biosphere for different resources, many of which are limited or not renewable. Resources are distributed unevenly around the planet as a result of past geologic processes.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Construct a scientific explanation based on evidence for how the uneven distribution of Colorado's groundwater resources are limited and some are virtually non-renewable. The distribution of groundwater is significantly changing in Colorado as a result of removal with potential impacts on food supply and municipal water supplies. (MS-ESS3-1)

MIDDLE SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Science	SC.MS.3.8	Humans depend on Earth's land, ocean, atmosphere, and biosphere for different resources, many of which are limited or not renewable. Resources are distributed unevenly around the planet as a result of past geologic processes.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Construct a scientific explanation based on evidence for how the uneven distribution of Colorado and Earth's groundwater resources are the result of past and current geoscience processes and how their distributions are significantly changing in Colorado and on Earth as a result of removal by humans. (MS-ESS3-1)
Social Studies	SS.8.1.1	Investigate and evaluate primary and secondary sources about United States history from the American Revolution through Reconstruction to formulate and defend a point of view with textual evidence.	CWC.VI	Water is a public resource, governed by water law.	Analyze evidence from multiple sources including those with conflicting accounts to evaluate the shift of much of Colorado's government from Spanish to Mexican to American, and explain attendant water disputes and settlement issues by using place=based regional documents (Particularly the issues of Mexican land grants being nullified by the American government after the power shift in 1848 and the influx of Anglo settlers to Colorado in 1862).
Social Studies	SS.8.1.2	The historical eras, individuals, groups, ideas and themes from the origins of the American Revolution through Reconstruction.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Evaluate continuity and change over the course of United States history by examining various eras from the perspective of Colorado residents in particular regions by determining when and where access to water resources were a major source of conflict and compromise.
Social Studies	SS.8.1.2	The historical eras, individuals, groups, ideas and themes from the origins of the American Revolution through Reconstruction.	CWC.VI	Water is a public resource, governed by water law.	Evaluate continuity and change over the course of United States history by examining various eras from the perspective of Colorado residents in particular regions by determining when and where access to water resources were a major source of conflict and compromise.
Social Studies	SS.8.2.1	Use geographic tools to research and analyze patterns in human and physical systems in the United States.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Use geographic tools to research and analyze the use of waterways for different demographics such as settlers, traders, and miners,
Social Studies	SS.8.2.1	Use geographic tools to research and analyze patterns in human and physical systems in the United States.	CWC.VI	Water is a public resource, governed by water law.	Use geographic tools to research and analyze the use of waterways for different demographics such as settlers, traders, and miners,

MIDDLE SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Social Studies	SS.8.2.2	Competition for control of space and resources in early American History.	CWC.III	Water is a scarce resource, limited and variable.	Interpret from a geographic perspective the expansion of the United States by addressing issues of access to water resources, along with land, security, and sovereignty.
Social Studies	SS.8.2.2	Competition for control of space and resources in early American History.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Interpret from a geographic perspective the expansion of the United States by addressing issues of access to water resources, along with land, security, and sovereignty.
Social Studies	SS.8.2.2	Competition for control of space and resources in early American History.	CWC.VI	Water is a public resource, governed by water law.	Analyze how economic, political, cultural, and social processes interact to shape patterns of human population, interdependence, cooperation and conflict by using the administration and appropriation of water resources in Colorado as an example.
Social Studies	SS.6.1.2	The historical eras, individuals, groups, ideas, and themes within regions of the Western Hemisphere and their relationships with one another.	CWC.III	Water is a scarce resource, limited and variable.	Examine, from multiple perspectives, the use of water in agricultural development, and the development of irrigation systems (canals, etc.), particularly within desert regions. (e.g. Ancestral Puebloans civilization expansion, decline and reconfiguration into Puebloan cultures of Rio Grande valley).
Social Studies	SS.6.2.1	Use geographic tools and resources to research and make geographic inferences and predictions about the Western Hemisphere.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Use technology like radar and Snotel site data to extrapolate data regarding snowpack and quanity of water available in different regions.
Social Studies	SS.6.2.1	Use geographic tools and resources to research and make geographic inferences and predictions about the Western Hemisphere.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Identify uses of technology in agriculture for maximum water efficiency such as automated headgates and sprinkler systems.
Social Studies	SS.6.2.2	Regional differences and perspectives in the Western Hemisphere impact human and environmental interactions.	CWC.III	Water is a scarce resource, limited and variable.	1. Classify and analyze how water affects human interactions with the environment. 2. Identify physical water features (e.g. transbasin diversions, irrigation canals and mountain snowpack) and the positive and negative impacts on human systems in different regions.

MIDDLE SCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected NGSS Performance Expectation)
Social Studies	SS.6.2.2	Regional differences and perspectives in the Western Hemisphere impact human and environmental interactions.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	1. Classify and analyze how water affects human interactions with the environment. 2. Identify physical water features (e.g. transbasin diversions, irrigation canals and mountain snowpack) and the positive and negative impacts on human systems in different regions.
Social Studies	SS.6.2.2	Regional differences and perspectives in the Western Hemisphere impact human and environmental interactions.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	1. Classify and analyze how water affects human interactions with the environment. 2. Identify physical water features (e.g. transbasin diversions, irrigation canals and mountain snowpack) and the positive and negative impacts on human systems in different regions.

FIFTH GRADE

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected *NGSS Performance Expectation*)
Science	SC.5.1.1	Matter exists as particles that are too small to be seen; measurements of a variety of observable properties can be used to identify particular materials.	CWC.I	The physical and chemical properties of water are unique and constant.	Conduct experiments involving water to provide evidence that matter is made of particles too small to be seen (e.g. by dissolving sugar in water and evaporating salt water). (5-PS1-1)
Science	SC.5.1.2	Chemical Reactions that occur when substances are mixed can be identified by the emergence of substances with different properties; the total mass remains the same.	CWC.I	The physical and chemical properties of water are unique and constant.	Conduct an investigation to determine whether the mixing of two or more substances results in new substances by conducting water quality testing of a local waterway and observing reactions in test tubes. (5-PS1-4)
Science	SC.5.1.2	Chemical Reactions that occur when substances are mixed can be identified by the emergence of substances with different properties; the total mass remains the same.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Conduct an investigation to determine whether the mixing of two or more substances results in new substances by conducting water quality testing of a local waterway and observing reactions in test tubes. (5-PS1-4)
Science	SC.5.1.4	The energy released from food was once energy from the sun.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Use models to describe that energy released from food was once energy from the sun captured by plants in the chemical process with air and water that forms plant matter. (5-PS3-1)
Science	SC.5.2.1	Plants acquire their material from growth chiefly from air and water.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Support an argument that plants get the materials they need for growth chiefly from air and water by recording observations from a hydroponic garden. (5-LS1-1)
Science	SC.5.2.2	Matter cycles between air and soil and among plants, animals and microbes as these organisms live and die.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Develop a model to describe how water and other matter that is not food is changed by plants into food and cycled among plants, animals, decomposers, and the environment. (5-LS2-1)
Science	SC.5.3.3	Earth's major systems interact in multiple ways to affect Earth's surface materials and processes.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Develop a model using an example of how the hydrosphere interacts with Earth's major systems to support a variety of ecosystems and organisms in Colorado. (5-ESS2-1)
Science	SC.5.3.3	Earth's major systems interact in multiple ways to affect Earth's surface materials and processes.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Develop a model using an example to describe why 85% of Colorado's precipitation falls west of the Continental Divide by modeling the influence of the hydrosphere (e.g. gulfs of Mexico and California, Pacific Ocean, Mississippi Valley), atmosphere (prevailing winds), and the geosphere (e.g. the state's mountain ranges) on precipitation patterns in the state. (5-ESS2-1)

FIFTH GRADE

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected *NGSS Performance Expectation*)
Science	SC.5.3.3	Earth's major systems interact in multiple ways to affect Earth's surface materials and processes.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Develop a model using an example to describe why 85% of Colorado's precipitation falls west of the Continental Divide by modeling the influence of the hydrosphere (e.g. gulfs of Mexico and California, Pacific Ocean, Mississippi Valley), atmosphere (prevailing winds), and the geosphere (e.g. the state's mountain ranges) on precipitation patterns in the state. (5-ESS2-1)
Science	SC.5.3.4	Most of Earth's water is in the ocean and much of Earth's freshwater in glaciers or underground.	CWC.I	The physical and chemical properties of water are unique and constant.	Describe and graph the amounts and percentages of freshwater in various local reservoirs including lakes, rivers, and groundwater to provide comparisons about the distribution of freshwater and saltwater water on Earth. (5-ESS2-2)
Science	SC.5.3.4	Most of Earth's water is in the ocean and much of Earth's freshwater in glaciers or underground.	CWC.III	Water is a scarce resource, limited and variable.	Describe and graph the amounts and percentages of saltwater and freshwater in various reservoirs to provide evidence for the statement "water is a scarce resource, limited and variable" by comparing the amount of water available for human use in Colorado (e.g. for a local drinking water supply or food production) from various sources (e.g. surface vs. groundwater). (5-ESS2-2)
Science	SC.5.3.4	Most of Earth's water is in the ocean and much of Earth's freshwater in glaciers or underground.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	1. Describe and graph the amounts and percentages of saltwater and freshwater in various local reservoirs including lakes, rivers, and ground water to provide comparisons about the distribution of freshwater and saltwater on Earth and in Colorado. (5-ESS2-2) 2. Provide evidence for the statement "water is a scarce resource, limited and variable" by comparing the amount of water available for human use in Colorado (or a local drinking water supply) from various sources (e.g. surface vs. groundwater). (5-ESS2-2)
Science	SC.5.3.5	Societal activities have had major effects on land, ocean, atmosphere and even outer space	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Obtain and combine information about ways human activities have affected the natural water cycle in Colorado. (ESS3:C)
Science	SC.5.3.5	Societal activities have had major effects on land, ocean, atmosphere and even outer space	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	1. Describe how human activities have had major effects on the quality and quantity of water and the timing of its availability. (ESS3:C) 2. Obtain and combine information about ways individual communities use science ideas to protect the water resources and water's role in the environment. (5-ESS3-1)

FIFTH GRADE

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected *NGSS Performance Expectation*)
Science	SC.5.3.5	Societal activities have had major effects on land, ocean, atmosphere and even outer space	CWC.VI	Water is a public resource, governed by water law.	Obtain and combine information about ways individual communities use science ideas to protect the water resources and water's role in the environment. (5-ESS3-1)
Social Studies	SS.5.2.1	Use geographic tools and sources to research and answer questions about United States geography.	CWC.III	Water is a scarce resource, limited and variable.	Identify physical water features on maps and describe the influence of accessible resources and their use on development of local and regional communities.
Social Studies	SS.5.2.2	Causes and consequences of movement.	CWC.III	Water is a scarce resource, limited and variable.	Describe how migration patterns reflect application of technology often involving water quantity for agriculture and manufacturing.
Social Studies	SS.5.2.2	Causes and consequences of movement.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Describe how migration patterns reflect application of technology often involving diverting water for agriculture and manufacturing (e.g. construction of irrigation ditches/acequias allowed for food production in new areas).
Social Studies	SS.5.2.2	Causes and consequences of movement.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	1. Discuss allocation of water resources amongst different user groups. 2. Describe how migration patterns reflect application of technology often involving water quantity for agriculture and manufacturing (e.g. construction of irrigation ditches/acequias allowed for food production in new areas).

FOURTH GRADE

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected *NGSS Performance Expectation*)
Science	SC.4.1.5	Waves are regular patterns of motion.	CWC.I	The physical and chemical properties of water are unique and constant.	Develop a model of waves using water to describe patterns in terms of amplitude and wavelength which can cause erosion issues (e.g. chunk, gully, sheet). (4-PS4-1))
Science	SC.4.3.1	Earth has changed over time.	CWC.I	The physical and chemical properties of water are unique and constant.	Describe how water can change the land over time by using evidence from patterns in rock formations and fossils in rock layers. (4-ESS1-1)
Science	SC.4.3.1	Earth has changed over time.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation that water has changed a landscape over time. (4-ESS1-1)
Science	SC.4.3.2	Four major earth systems interact.	CWC.I	The physical and chemical properties of water are unique and constant.	Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by analyzing cycles of freezing and thawing of water and volume of water flow. (4-ESS2-1)
Science	SC.4.3.2	Four major earth systems interact.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Make observations and/or measurements to provide evidence that rainfall helps to shape the land and affects the types of living things found in a region. (ESS2:A)
Science	SC.4.3.2	Four major earth systems interact.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by analyzing cycles of freezing and thawing of water and volume of water flow. (4-ESS2-1)
Science	SC.4.3.4	Energy and fuels that humans use are derived from natural sources and their use affects the environment in multiple ways.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Obtain and combine information to describe how energy and fuels that use water affect the environment (e.g. creation/loss of habitat due to dams). (4-ESS3-1)
Science	SC.4.3.4	Energy and fuels that humans use are derived from natural sources and their use affects the environment in multiple ways.	CWC.III	Water is a scarce resource, limited and variable.	Obtain and combine information to describe that energy and fuels are derived from scarce, limited, and variable natural resources such as water and their uses affect the environment. (4-ESS3-1)
Science	SC.4.3.4	Energy and fuels that humans use are derived from natural sources and their use affects the environment in multiple ways.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Obtain and combine information to describe how the use of energy and fuels also uses water and affects the environment by analyzing hydroelectric dams and water used for cooling in Colorado's power plants. (4-ESS3-1)

FOURTH GRADE

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected *NGSS Performance Expectation*)
Science	SC.4.3.4	Energy and fuels that humans use are derived from natural sources and their use affects the environment in multiple ways.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Obtain and combine information to describe how the use of energy and fuels also uses water and affects the environment by analyzing hydroelectric dams and water used for cooling in Colorado's power plants. (4-ESS3-1)
Science	SC.4.3.5	A variety of hazards result from natural process; humans cannot eliminate natural hazards but can reduce their impacts' effect.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans, including the use of dams to reduce impacts of flooding and for storing water for times of drought. (4-ESS3-2)
Science	SC.4.3.5	A variety of hazards result from natural process; humans cannot eliminate natural hazards but can reduce their impacts' effect.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans, including the use of dams to reduce impacts of flooding and for storing water, a shift to regenerative agriculture or new food crops in response a changing climate, and the management of watersheds and water supplies to reduce the potential for pollution-related hazards. (4-ESS3-2)
Social Studies	SS.4.1.1	Analyze primary and secondary sources from multiple points of view to develop an understanding of the history of Colorado.	CWC.VI	Water is a public resource, governed by water law.	Discuss how mining, trading, agriculture, and industrial industries have each shaped Colorado history through their use of natural resources, including water.
Social Studies	SS.4.1.2	The historical eras, individuals, groups, ideas, and themes in Colorado history and their relationship to key events in the United States within the same historical period.	CWC.VI	Water is a public resource, governed by water law.	Describe how historical events impact how natural resources, including water, are allocated today (e.g. War of 1848, Homestead Act of 1862).
Social Studies	SS.4.2.1	Use geographic tools to research and answer questions about Colorado geography.	CWC.III	Water is a scarce resource, limited and variable.	Describe how the geography of Colorado and western states differ from other regions of the United States, including the role of snowpack as a main source of water, along with more limited average annual rainfall, versus the eastern United States region where average annual rainfall is generally more plentiful.
Social Studies	SS.4.2.1	Use geographic tools to research and answer questions about Colorado geography.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Describe how the geography of Colorado and western states differ from other regions of the United States, including the role of snowpack as a main source of water, along with more limited average annual rainfall, versus the eastern United States region where average annual rainfall is generally more plentiful.

FOURTH GRADE

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected *NGSS Performance Expectation*)
Social Studies	SS.4.2.1	Use geographic tools to research and answer questions about Colorado geography.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Describe how the geography of Colorado and western states differ from other regions of the United States, including the role of snowpack as a main source of water, along with more limited average annual rainfall, versus the eastern United States region where average annual rainfall is generally more plentiful.
Social Studies	SS.4.2.2	Connections are developed within and across human and physical systems.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Analyze how people use geographic factors in creating settlements and have adapted to and modified the local physical environment in order to use water resources through the development of irrigation ditches/acequias (to support food production) and hardrock mining.
Social Studies	SS.4.2.2	Connections are developed within and across human and physical systems.	CWC.III	Water is a scarce resource, limited and variable.	Analyze how people use geographic factors in creating settlements and have adapted to and modified the local physical environment in order to use water resources through the development of irrigation ditches/acequias and hardrock mining.
Social Studies	SS.4.2.2	Connections are developed within and across human and physical systems.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Analyze how people use geographic factors in creating settlements and have adapted to and modified the local physical environment. This includes the development of irrigation ditches/acequias (and return flows of irrigation water to streams), farming and ranching practices, and hardrock mining in order to use, conserve, and protect water resources.
Social Studies	SS.4.2.2	Connections are developed within and across human and physical systems.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Analyze how people use geographic factors in creating settlements and have adapted to and modified the local physical environment. This includes the development of irrigation ditches/acequias (and return flows of irrigation water to streams), farming and ranching practices, and hardrock mining in order to use, conserve, and protect water resources.
Social Studies	SS.4.3.2	Determine the opportunity cost when making a choice (PFL).	CWC.III	Water is a scarce resource, limited and variable.	Determine the opportunity cost of different water allocation scenarios in Colorado, including among water users (such as agriculture, municipalities, industry, fish and wildlife, energy production, recreation, etc.).
Social Studies	SS.4.4.1	Identify, investigate, and analyze multiple perspectives on civic issues.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Give example of issues faced and multiple perspectives in regards to allocation and availability of water as Colorado's population grows and the state faces uncertainty over future climate and provide possible solutions.

FOURTH GRADE

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected *NGSS Performance Expectation*)
Social Studies	SS.4.1.1	Analyze primary and secondary sources from multiple points of view to develop an understanding of the history of Colorado.	CWC.III	Water is a scarce resource, limited and variable.	Explain, through multiple perspectives, how water use in each region have shaped the settlement of the state by using examples from American Indians, Spanish explorers, trappers/traders, and settlers in the mining, trading, agriculture, and industrial industries.
Social Studies	SS.4.4.2	The origins, structures, and functions of the Colorado government.	CWC.VI	Water is a public resource, governed by water law.	Explain the unique origins of the judicial system surrounding water in Colorado.

THIRD GRADE

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected *NGSS Performance Expectation*)
Science	SC.3.2.5	Sometimes differences in characteristics between individuals of the same species provide advantages in survival and reproduction.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Construct an argument with evidence that describes how differences in characteristics between individuals of the same species (including food crops and livestock) provide advantages in survival and reproduction in the event of a drought or flood. (3-LS4-3)
Social Studies	SS.3.2.1	Use geographic tools to develop spatial thinking.	CWC.III	Water is a scarce resource, limited and variable.	Identify water related issues (including availability or scarcity of food) and the different strategies used by groups of people that live in arid, desert areas with limited and variable water sources by using examples from local history or the present (i.e. acequias, Native Americans, fur trappers, etc.).
Social Studies	SS.3.2.1	Use geographic tools to develop spatial thinking.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Discuss how snow and mountainous geography impacts access to water resources in different regions of the United States, particularly in the West.
Social Studies	SS.3.2.1	Use geographic tools to develop spatial thinking.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	1. Discuss how snow and mountainous geography impacts access to water resources in different regions of the United States. 2. Identify the different strategies used by groups of people that live in arid, desert areas with limited and variable water sources by using examples from local history or the present (i.e. acequias, Native Americans, fur trappers, etc.).
Social Studies	SS.3.2.2	The concept of region is developed through an examination of similarities and differences in places and communities.	CWC.III	Water is a scarce resource, limited and variable.	Construct an argument for how the quantity of water available for plants, animals, and humans varies by major river basin in Colorado and within river basins has resulted in similarities and differences seen today.
Social Studies	SS.3.2.2	The concept of region is developed through an examination of similarities and differences in places and communities.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Discuss the differences in each region's (e.g. river basin's) use of water (groundwater/aquifers, surface water, reservoirs) and identify regional culture's relationship with water.
Social Studies	SS.3.4.2	The origins, structures, and functions of local government.	CWC.VI	Water is a public resource, governed by water law.	Identify the origins, structures, and functions of local government related to management of local water resources (e.g. water law, water courts, water quality permitting). Describe how local government provides opportunities for people to exercise their rights and initiate change by examining a local water issue.

SECOND GRADE

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected *NGSS Performance Expectation*)
Science	SC.2.1.1	Matter exists as different substances that have observable different properties.	CWC.I	The physical and chemical properties of water are unique and constant.	Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot by observing the effects of freezing and thawing ice cubes. (2-PS1-4)
Science	SC.2.2.1	Plants depend on water and light to grow and on animals for pollination or to move their seeds around.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Plan and conduct an investigation to determine if plants need sunlight and water to grow. (2-LS2-1)
Science	SC.2.3.1	Some events on Earth occur quickly; others can occur very slowly.	CWC.I	The physical and chemical properties of water are unique and constant.	Describe how the properties of water help shape the landscape quickly or slowly by comparing and contrasting flooding and erosion. (2-ESS1-1)
Science	SC.2.3.1	Some events on Earth occur quickly; others can occur very slowly.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Use information from several sources to provide evidence that water influences Colorado's geography by comparing and contrasting slow moving water (e.g., flow of a creek or river) and fast moving water (e.g., flooding). (2-ESS1-1)
Science	SC.2.3.2	Wind and water can change the shape of the land; models can show the shape and these changes to the land.	CWC.I	The physical and chemical properties of water are unique and constant.	1. Obtain information to identify where water is found on Earth and that it can be solid or liquid. (2-ESS2-3) 2. Develop a model to demonstrate how water can change the shape of land (e.g. through flooding or erosion). (2-ESS2-2)
Science	SC.2.3.2	Wind and water can change the shape of the land; models can show the shape and these changes to the land.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Develop a model of how water can change the shape of the land and how the resulting landforms, together with the materials on the land, provide homes for living things. (2-ESS2-2; ESS2:A)

SECOND GRADE

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected *NGSS Performance Expectation*)
Science	SC.2.3.2	Wind and water can change the shape of the land; models can show the shape and these changes to the land.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	1. Obtain information to identify where water is found in Colorado (i.e., the Earth) and that it can be solid or liquid. (ESS2-3) 2. Compare multiple solutions designed to slow or prevent water from changing the shape of the land. (2-ESS2-1)
Social Studies	SS.2.2.2	People in communities manage, modify, and depend on their environment.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	1. Explain that people settle in certain areas because of the need to access freshwater. 2. Explain how access to freshwater affects a community's ability to thrive. 3. Identify examples of how water draws people and wildlife to particular areas.
Social Studies	SS.2.2.2	People in communities manage, modify, and depend on their environment.	CWC.III	Water is a scarce resource, limited and variable.	Explain how communities manage and use scarce freshwater resources and certain nonrenewable groundwater sources.
Social Studies	SS.2.2.2	People in communities manage, modify, and depend on their environment.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	1. Discuss how communities allocate water resources so that all members have access. 2. Discuss how water contributes to the interaction of a community with their environment.
Social Studies	SS.2.3.1	Resources are scarce, so individuals may not have access to the goods and services they want.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Give examples for how different individuals and even different communities make choices regarding water use.
Social Studies	SS.2.3.1	Resources are scarce, so individuals may not have access to the goods and services they want.	CWC.III	Water is a scarce resource, limited and variable.	1. Explain scarcity by giving examples of behaviors related to water and limited water (i.e., water restrictions). 2. Investigate how different individuals and communities water use varies.
Social Studies	SS.2.4.2	Identify and compare multiple ways that people understand and resolve conflicts and differences.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Analyze ways that diverse individuals, groups and communities work through conflict and promote equality, justice, and responsibility by using the example of management of water as a scarce public resource.
Social Studies	SS.2.4.2	Identify and compare multiple ways that people understand and resolve conflicts and differences.	CWC.VI	Water is a public resource, governed by water law.	Analyze ways that diverse individuals, groups and communities work through conflict and promote equality, justice, and responsibility by using the example of management of water as a scarce public resource.

FIRST GRADE

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected *NGSS Performance Expectation*)
Science	SC.1.1.1	Sound can make matter vibrate and vibrating matter can make sound.	CWC.I	The physical and chemical properties of water are unique and constant.	Describe how the movement of waves across the surface of water is caused by vibration. (1-PS4-1)
Social Studies	SS.1.2.1	Locate places and spaces using geographic tools.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people.	Use maps to trace the paths of rivers and streams to the oceans and to identify where man made structures (cities, reservoirs, etc.) are located in relation to natural features.
Social Studies	SS.1.2.2	Describe the characteristics of a community and how they are influenced by the environment.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	1. Provide examples for how families use water. 2. Analyze how weather (rain and snow), climate (precipitation patterns) and environmental characteristics (proximity to water) influence individuals and the cultural characteristics of a family in Colorado.
Social Studies	SS.1.2.2	Describe the characteristics of a community and how they are influenced by the environment.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Identify how the community interacts with water and weather (e.g. when growing food, watering gardens, etc.) and discuss impacts/consequences.
Social Studies	SS.1.3.1	Individuals work in different types of jobs to earn an income.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people.	Give examples of professions/jobs in the local community where individuals help plan, build and maintain water infrastructure (e.g. for producing food, cleaning and delivering drinking water, cleaning water after human use, maintaining parks and recreation opportunities, etc.).

KINDERGARTEN

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected *NGSS Performance Expectation*)
Science	SC.K.2.1	To live and grow, animals obtain food they need from plants or other animals, and plants need water and light [and nutrients].	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Use observations of patterns among all living things that describes plants and animals (including humans) need water to survive (and humans and other animals need food that we get from plants and animals). (K-LS1-1)
Science	SC.K.3.1	Patterns are observed when measuring the local weather, including how humans and other organisms impact their environment.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Use and share observations of local weather conditions to describe patterns of precipitation over time. (K-ESS2-1)
Science	SC.K.3.1	Patterns are observed when measuring the local weather, including how humans and other organisms impact their environment.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	Construct an argument supported by evidence for how plants and animals (including humans) can manipulate water in the environment to meet their needs (e.g. use of dams, watering landscapes).
Science	SC.K.3.2	Plants and animals meet their needs in their habitats and impact one another; people can prepare for severe weather.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Use a model to represent the relationship between water and the needs of different plants or animals (including humans) and the places they live. (K-ESS3-1)
Science	SC.K.3.2	Plants and animals meet their needs in their habitats and impact one another; people can prepare for severe weather.	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Use a model to represent the relationship between water and the needs of different plants or animals (including humans) and the places they live. (K-ESS3-1)
Science	SC.K.3.2	Plants and animals meet their needs in their habitats and impact one another; people can prepare for severe weather.	CWC.V	The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.	1. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather, such as drought and floods events. (K-ESS3-2) 2. Communicate solutions that will reduce the impact of humans on the water. (K-ESS3-3)
Social Studies	SS.K.1.1	Ask questions and discuss ideas about the past.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Ask questions about why people in the past settled in certain places near water access or traveled using rivers.
Social Studies	SS.K.2.2	People live in different places around the world.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Identify where towns and cities in the West are located and whether that location depends on a river for water.

KINDERGARTEN

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus (Connected *NGSS Performance Expectation*)
Social Studies	SS.K.2.2	People live in different places around the world.	CWC.III	Water is a scarce resource, limited and variable.	Compare where towns and cities in the West are located to other places in the United States or the world in relation to water (e.g. people may spread out more away from rivers if the precipitation/rainfall is more consistent throughout the year).
Social Studies	SS.K.3.2	Describe choices people make about how to use the money they earn (PFL).	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Give examples of difference between spending income on something you want versus something you need (like water).
Social Studies	SS.K.4.1	Understand that civic participation takes place in multiple groups and in various forms.	CWC.VI	Water is a public resource, governed by water law.	Differentiate among examples of civic participation by using the example of a citizen who is engaged and informed in water issues as a public resource (e.g. participating in a stream cleanup and participating in a ditch company).
Social Studies	SS.K.4.2	Participate in making fair and reasoned decisions using democratic traditions.	CWC.VI	Water is a public resource, governed by water law.	Explain that rules around sharing water in class in can be used as a means of resolving conflict and recognize that such democratic traditions exist in how Coloradans share water.

PRESCHOOL

Subject	GLE Code	Grade Level Expectation (GLE)	CWC Code	SWEAP Critical Water Concept (CWC)	Evidence Outcome - adapted for water focus
Science	SC.P.1.1	Recognize that physical properties of objects and/or materials help us understand the world.	CWC.I	The physical and chemical properties of water are unique and constant.	Use senses to explore the properties of water by investigating changes in liquid water and solid ice when water is heated, cooled, or combined.
Science	SC.P.1.2	Recognize there are cause - and - effect relationships related to matter and energy.	CWC.I	The physical and chemical properties of water are unique and constant.	Observe, describe and discuss properties of water and the transformation of water when it is cooled or heated.
Science	SC.P.2.1	Recognize that living things have unique characteristics and basic needs that can be observed and studied.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Describe how habitats provide for the basic needs of plants and animals, including water, to grow and survive by observing familiar living things (e.g. a classroom pet or a classroom garden that can also produce food).
Science	SC.P.2.2	Recognize that living things develop in predictable patterns.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Identify the common need for water of familiar living things (e.g. a classroom pet or classroom garden).
Social Studies	SS.P.1.1	Recognize change and sequence over time.	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Understand that people change the way they live over time by examining how people use water to survive and grow plants for food.
Social Studies	SS.P.2.1	Develop spatial understanding, perspectives, and connections to the world	CWC.II	Water is essential for life, our economy, and a key component of healthy ecosystems.	Develop an awareness of where water is located around the school, neighborhood and community.
Social Studies	SS.P.2.1	Develop spatial understanding, perspectives, and connections to the world	CWC.IV	Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people	Develop an awareness of where water is located (e.g. ditches, reservoirs, or streams) around the school, neighborhood and community.
Social Studies	SS.P.4.2	Rules allow groups to work effectively.	CWC.VI	Water is a public resource, governed by water law.	Recognize that rules allow groups to work effectively by sharing water or lining up to fill water bottles in a classroom.

CRITICAL WATER CONCEPTS

The following concepts represent foundational understandings for water education throughout Colorado. These concepts were reviewed by a Coalition of more than 40 water educators and other stakeholders during the development of the Statewide Water Education Action Plan (SWEAP).

Additional supporting detail and informational resources for each Critical Water Concept can be found on the SWEAP website or in the standalone Critical Water Concepts document (PDF).

Statewide Water Education Action Plan (SWEAP) for Colorado

CRITICAL WATER CONCEPTS

I. The physical and chemical properties of water are unique and constant.

II. Water is essential for life, our economy, and a key component of healthy ecosystems.

III. Water is a scarce resource, limited and variable.

IV. Water cycles naturally through Colorado's watersheds, often intercepted and manipulated through an extensive infrastructure system built by people.

V. The quality and quantity of water, and the timing of its availability, are all directly impacted by human actions and natural events.

VI. Water is a public resource governed by water law.

COLORADO ACADEMIC STANDARDS

The following information is derived from the Colorado Department of Education's Standards website, accessed March 21, 2021.

Colorado Academic Standards Overview

What are educational standards?

Educational standards help teachers ensure their students have the skills and knowledge they need to be on course toward college or career readiness by providing clear goals for student learning at each grade level. Standards establish what students need to learn, but they do not dictate how teachers should teach. Instead, schools and teachers decide how best to help students reach the standards. Put another way, standards are not considered a curriculum (lesson plans); instead, it's up to school districts to design curricula that aligns to the standards.

What are the Colorado Academic Standards?

The Colorado Academic Standards are the expectations of what students need to know and are able to demonstrate competencies at the end of each grade and by the time students graduate. Per federal requirement, students in Colorado participate in standards-aligned state assessments. Standards also represent the values and act as content organizers of the future skills and essential knowledge necessary for our next generation to be more successful. All Colorado districts are required to adopt local standards that meet or exceed the Colorado Academic Standards. The Colorado Academic Standards are also the basis of the annual state assessment.

What content areas are included in the Colorado Academic Standards?

Colorado has academic standards in 10 content areas for preschool through 12th grade: music; visual arts; drama and theatre arts; dance; comprehensive health; physical education; mathematics; reading, writing, and communicating; science; social studies; and world languages.

In addition, the state has developed Extended Evidence Outcomes aligned to the standards for students with significant cognitive disabilities. Colorado also adopted Colorado English Language Proficiency (CELP) standards to support English language learners.

Science Academic Standards

The science standards reflect a new vision for science education that connects scientific knowledge in authentic ways to solve real-world problems and innovate. The standards' forefront scientific practices go beyond the inquiry process to arrive at reasoned and justifiable rationales for interpretations of phenomena/events.

Science content areas include:

1. Physical Science
2. Life Science
3. Earth and Space Science.

Social Studies Academic Standards

The social studies standards guide students to develop the knowledge and skills to make sound judgments, understand historical and contemporary experiences/events, analyze interpersonal and global tensions and actively participate in the complex world in which they live. The standards support the use of reasoned and reflective thinking to engage and collaborate with others in an increasingly diverse and interdependent world. These standards include expectations for personal financial literacy.

Social Studies content areas include:

1. History
2. Geography
3. Economics
4. Civics

ADDITIONAL PHENOMENA RESOURCES

Links to Phenomena Resources

Some additional examples of water-related phenomena can be found here:

- Here is the link to the TN district science library: https://ngs.wested.org/tennessee-district-science-network/#library
- Here is the link for the NGSS set of phenomena: https://www.ngssphenomena.com/
- Colorado Water Resources Archive
- #ProjectPhenomena Database
- Some additional resources presented by CDE staff at the 2020 CAEE Conference in September:
    - http://stemteachingtools.org/news/2018/new-tool-why-it-is-crucial-to-make-cultural-diversity-visible-in-stem-education
    - http://stemteachingtools.org/brief/58
    - https://drive.google.com/file/d/1ncxluosqwCIU7YhTiqPvM-m5qnZ_fjUE/view
    - http://stemteachingtools.org/brief/67
    - Classes of Anchor Phenomena: Culturally Significant, Contemporary Scientific, Societally Relevant, Everyday Phenomena

Instructional Connections: Example Inquiry Questions

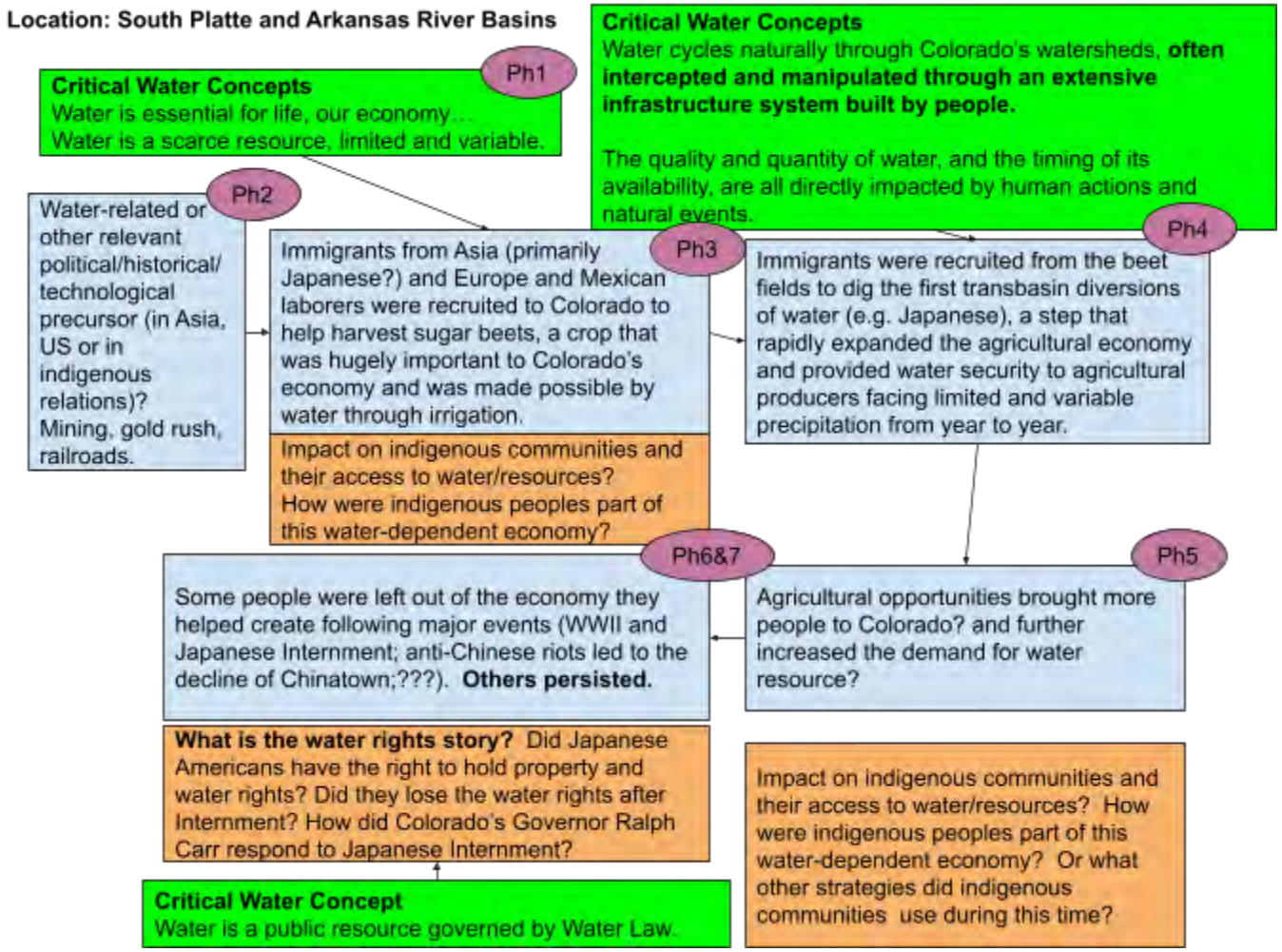
Below is a list of inquiry questions that address universal concepts used in interpretation. These questions are also an opportunity to highlight the intersection of water with social and emotional well-being.

- **Family**: what would it look like for your family to share only 20 gallons of water each day?
- **Cleanliness**: what would happen if we don't have enough water to keep clean?
- **Food**: what would happen if we didn't have enough water to grow food or cook food with?
- **Recreation/free time**: what if we don't have enough water to go fishing, ski, play in the snow in the backyard, raft, etc.?

Example Systems-level Brainstorm with Multiple Phenomena used to tell a Water-Related Story

Immigration and the Rise of Colorado's Agricultural Economy: A Water Story

DRAFT Prompt: Everyone needs water. This is one Colorado water story. How does your family use and manage water? How did past people groups use and manage water?



#	Phenomena Description	Relevant Grades
Ph1	Graph of precipitation or river flows in Colorado's history	Grades 2-HS
Ph2	*TBD* - Water-related technological or political development that set the stage for sugar beets?	4th-HS
Ph3	Photo of a diversity of farm workers, including immigrants. Graph or map of growth of sugar beet industry and impact on economy. Or photo of all major sugar beet factories and when and where they were built. https://www.historycolorado.org/story/preservation/2017/05/09/recognizing-historic-colorado-farm-during-national-asian-pacific	K (where do people live/farm?) thru HS (getting more advanced with data/maps/graphs over grades)
Ph4	Image of a diversity of workers digging transbasin diversion.	1st (people have different jobs) - HS
Ph5	Graph of Colorado population or map of settlement patterns with images of new diversions or other uses of water.	K (where do people live/farm?) and thru HS (getting more advanced with data/maps/graphs)
Ph6	Historical images from the anti-Chinese riots and Japanese Internment https://education.blogs.archives.gov/2016/06/24/due-process-japanese-relocation/ https://www.historycolorado.org/story/colorado-voices/2019/04/11/rise-and-fall-denvers-chinatown	MS (8th?)-HS
Ph7	Anchor stories focused on specific farms or families https://www.farmflavor.com/colorado/colorado-farm-to-table/sakata-family-farm-prevails-odds/ https://www.historycolorado.org/story/preservation/2017/05/09/recognizing-historic-colorado-farm-during-national-asian-pacific	1st Grade-HS?

Consider: What is a similar, locally-relevant story across regions through the lens of different groups and their development of/connection to water resources? This could be simultaneous or during another period in CO's history (Indigenous people, Mexican settlers, African Americans, European Immigrants, etc.)? How did they benefit from development of water resources, or how were they harmed or left out (e.g. entitlement to water rights, water quality - drinking/cooking/recreation)? What is a hopeful story about the future or recent past?

Example Template for Water Educators to use when brainstorming phenomena:

Critical Water Concept *(2 of 6 included here)*	What students may be expected to do *[see more objectives in Figures 7 and 8]*	Example Phenomena [*What is something that could be observable by students? Observable can include first-hand with senses or through the aid of photos, videos, graphs/tools to see patterns in data), etc.*]	Links or Other Resources [*What links or resources would support this phenomenon?]*
III. Water is a scarce resource, limited and variable. *[How do we present the scarcity or variability of water in Colorado in a relatively simple way that sparks complex thinking about WHY this is important in Colorado?] [This can include visualizing weather patterns as they produce 85% of precipitation west of the divide OR resulting graphs/images of the scarcity/variability]*	High School: Construct an explanation based on evidence for how the availability of water (e.g. access to fresh water in rivers, lakes, and groundwater), occurrence of water-related natural hazards (e.g. floods, droughts), and changes in precipitation related to changes in climate have influenced human activity. Middle School: Construct a scientific explanation based on evidence for how the uneven distribution of Colorado and Earth's groundwater resources are the result of past and current geoscience processes. Fifth Grade: Describe and graph the amounts and percentages of saltwater and freshwater in various reservoirs to provide evidence for the statement "water is a scarce resource, limited and variable" by comparing the amount of water available for human use in Colorado (or a local drinking water supply) from various sources (e.g. surface vs. groundwater). Second Grade: 1. Explain scarcity by giving examples of behaviors related to water and limited water (i.e., water restrictions). 2. Investigate how different individuals and communities water use varies.		

VI. Water is a public resource, governed by Water Law. [*How do we illuminate this in a way that is relevant to students? What images/ videos/stories come to mind?]* *[High schoolers may have a more advanced discussion (see objectives below), while in Pre-K, students could think about examples of sharing*]	High School: Research and interpret multiple viewpoints on issues that shape policies and programs for water resource use and explain how the management of water supplies has brought prosperity to some places and created environmental dilemmas for others by examining Colorado examples (e.g differences between tribal nations and nontribal communities, consequences of poverty on access to clean drinking water, rural versus urban access to water, immigration/settlement and its impact on access to water resources, etc.). Analyze how cooperation and conflict influence the division and control of Earth by using examples of Colorado's water administration and treaties/interstate compacts over water resources as an example.		

PROJECT WET ACTIVITIES

Project WET (Water Education Today) is a nationally-recognized water education curriculum with standards-aligned activities. We anticipate additional work to identify the most relevant connections between Project WET activities (and other water-related curriculum) to SWEAP Critical Water Connects and Colorado Academic Standards. This additional work, when available, will be posted on the SWEAP website at cowateredplan.org.

For established correlations of Project WET activities to national standards, visit https://www.projectwet.org/standards.

TASK FORCE PROCESS

To spur implementation of the Statewide Water Education Action Plan (SWEAP), Water Education Colorado convened a task force of eight water educators from around the state experienced in standards-based education for PK-12 audiences, including:

Initial Task Force Participants
Bethany Howell, Executive Director, Rio Grande Water Conservation and Education Initiative
Heather Hubbard, Statewide Education Coordinator, Colorado Parks and Wildlife
Lauren Hughes, Water Education Coordinator, Yampatika
Katie Navin, Executive Director, Colorado Alliance for Environmental Education
Ellen Olson, Youth Education Program, Denver Water
Donny Roush, Stormwater Education and Outreach. City and County of Denver Department of Transportation and Infrastructure
Hannah Thill, Program Coordinator, Rio Grande Water Conservation and Education Initiative
Scott Williamson, Education Programs Manager, Water Education Colorado

Additional Advisors
Maya Garcia, Science Content Specialist, Colorado Department of Education

Goals

The goal of this group was to significantly advance progress on at least two SWEAP Outcomes:

- *The proportion of Coloradans in each river basin who can articulate at least three "Critical Water Concepts" increases.*
- *Where relevant, local and state policies and practices are supportive of advancing statewide water literacy.*

Needs Assessment

Affiliates of the Water Educator Network consistently identify a need to better understand connections between water education and Colorado Academic Standards. In addition, in a survey of organizations about SWEAP, 77% of respondents indicated a need for "educational materials to distribute to your audiences." To ensure that water education materials are aligned to standards, a first step is to identify connections between SWEAP and state standards and establish protocols for assessing baseline knowledge of Critical Water Concepts.

Task Force Tasks

The task force met between October 2020 and March 2021.

During this time, the task force had three main tasks:

- Review and help revise an alignment document of SWEAP to Colorado Academic Standards for Science and Social Studies
- Advise on protocols for establishing baselines and measuring progress on relevant SWEAP metrics and analyzing these metrics for equity in outcomes
- Brainstorm and advise on curation of water-related phenomena and associated resource bank to support standards implementation

Meetings were held with specific objectives, including:

- October 15, 2020 - Kick-off the task force and introduce alignment review
- October 29, 2020 - Begin synthesizing alignment reviews
- November 9, 2020 - Initiate peer review of alignment; Introduce protocols task
- December 7, 2020 - Finalize the alignment review; Finalize protocol recommendations; Review draft outline for toolkit
- January 11, 2021- Phenomena kick-off and brainstorm
- February 4, 2021 - Finalize example phenomena; Initiate development of joint communication/final toolkit
- March 22, 2021 - Finalize toolkit and joint communication; Decide task force next steps

Alignment Task

The task of identifying alignment between Critical Water Concepts and Colorado Academic Standards for Science and Social Studies was an iterative process.

To begin, reviewers were assigned a subset of grade level expectations based on Content Area (e.g. Civics, History, etc.). Reviewers considered each Grade Level Expectation (GLE) for potential connections to Critical Water Concepts.

Reviewers were asked to note:

- How strong is the alignment of Critical Water Concepts to the standard?
- Which portion of the Critical Water Concept is most aligned here? How do you know? Is there a portion of the Critical Water Concept that is not covered?
- Thinking through how learning will build across grade levels, how does learning about that portion set the stage for future learning that will help round out the concept?

After a first round of review, individuals were then assigned to do a peer review of each other's alignment analysis. Prior to the peer review, one overall reviewer (Scott Williamson) did a check of all connections identified, and then added comments for the peer reviewer to consider when assessing the strength of the connection.

Following a complete initial review and peer check, an additional step of standardization began. All connections were added into a spreadsheet from which visuals were created to illustrate content progression across grade levels. This allowed reviewers to review potential outliers in connections identified. Following this, example water-related objectives were developed from the Evidence Outcomes. This allowed yet another opportunity to review the strength of connections and adjust alignments as needed.

Evaluation Protocols Task

The second main task of the SWEAP Task Force on Critical Water Concepts and Colorado Academic Standards was to advise on protocols for establishing baselines and measuring progress on relevant SWEAP metrics and analyzing these metrics for equity in outcomes.

The task force had three sub-tasks in advising on protocols:

- For PK-12 learners: Make recommendations for formative and summative PK-12 assessments for Science and Social Studies PK-12 classrooms aligned to specific Grade Level Expectations and used to evaluate progress on SWEAP Outcomes.
- For Adult learners: Make recommendations for modifications to statewide survey questions to assess with adult audiences.
- For Equity: Ensure that we are approaching these assessments in a way that can track progress for all demographics and geographies and includes opportunities for learner and community input.

After an initial discussion, task force members exchanged comments on an electronic document and then reviewed conclusions and recommendations in a follow-up meeting. It was noted that work remains to be done on Evaluation Protocols in many ways, but in particular the evaluation of equity considerations. The task force recognized that learning and school-based education look different across the state, with particular challenges and barriers specific to rural and urban stakeholders. Recommendations can be found later in this document.

Phenomena Task

The identification of example phenomena was a learning process as the task force discussed the most effective way to define, brainstorm and show results from the task of identifying example phenomena. Individual task force members contributed phenomena with the following guidance:

- Using the vertical progression chart (*Figure 8*), find a selection of Grade Level Expectations that interest you and that can be explored through a specific water phenomenon.

- Make sure the phenomenon will be relevant and engaging to Colorado students. If the phenomena is very locally specific, include some ideas about where resources on similar local phenomena could be found.
- In the chart, list the GLEs, their related Critical Water Concepts, a description of the phenomenon, and resources related to that phenomenon.

Water Education Colorado also conducted two, 30-minute brainstorming sessions in regular staff meetings and their input is included within the example phenomena. Final formatting of the example phenomena was done by Water Education Colorado staff. These examples should be considered a first step with more work to build out this resource with support from the Water Educator Network and water educators from around the state.

Toolkit Review Process

To ensure a high-quality and balanced final product, the task force identified potential reviewers. Water Education Colorado staff reached out to 11 experts in standards-based education from around the state to provide input on the toolkit.

We invited feedback on areas of strength and areas of improvement for the toolkit to make it a more usable set of resources for PreK-12 educators, both formal and non-formal. Specifically, we sought input on:

- Additional example water-related phenomena to include (including additional examples from agricultural water use)
- Standards-aligned exemplars that would be worth including, and that we would have permission to include (this could be water-related assessments, rubrics, or lessons/units)
- Ideas for how best to distribute this toolkit of resources to get resources in the hands of educators
- Any questions or proposed revisions to the conclusions and recommendations of the task force

During this timeframe, four experts in standards-based education reviewed the toolkit contents:

<u>Toolkit Reviewers</u>
Natalie Brower-Kirton, Environmental Education & Outreach Program Manager, Aurora Water
Maya Garcia, Science Content Specialist, Colorado Department of Education
Sherry Meschko, Environmental Education & Outreach Program Specialist, Aurora Water
Jennifer Scharpe, Executive Director, Colorado Foundation for Agriculture

Based on feedback received from these reviewers, Water Education Colorado updated the toolkit and presented it at the 2021 Colorado Science Conference on November 6, 2021.

Potential Next Steps

We imagine work may continue for the task force. The following tasks may be relevant moving forward:

- Identify and support specific actions to facilitate incorporation of Critical Water Concepts in educational programming
- Foster connections to ongoing formative and summative assessment work and opportunities to measure progress on water literacy
- Develop an example rubric for each grade band (2nd, 5th, 8th, HS) to use with an open-ended assessment
- Further develop example phenomena that can be readily used by teachers; Consider progressions of phenomena across grade bands for large-scale stories (access to water, water quality, etc)
- Identify the most relevant connections between Project WET activities (and other water-related curriculum) to SWEAP Critical Water Connects and Colorado Academic Standards
- Support connections with relevant local and statewide education groups, such as CSEN, Colorado Association of Science Teachers, Colorado Center for Civic Learning and Engagement, and Career and Technical Education