

Water in Colorado and Around the Globe

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Introduction

With wildfires scorching through Colorado's forests along with many other Western states, water conservation and the future of water usage are in question. This interdisciplinary unit on **Water in Colorado and Around the Globe** strives to challenge our minds to think beyond what water means to us, and how we can communicate our message to a broader audience. There is a long line of scientific discovery, historical significance, and cultural gravity water has been a key part of.



TEAM INQUIRY QUESTIONS

1. How can we look at history to help us create creative solutions to water shortage in usage in our community?
2. Thinking creatively, what are unique ways that water is used on a local and global scale?
3. What could the future of water look like and how can scientists, economists, and other activists do to advocate for water conservation?

Science Unit Overview



Big Ideas & Inquiry Questions

- ✗ Why is the thermodynamics of the Earth and the water cycle essential to sustaining life on Earth? Could we ever run out of water? What about clean water?
- ✗ What are unique properties of water? How can we purify water? Is it sustainable?

Possible Misconceptions

- ✗ Water is an endless resource
- ✗ I will always have access to clean running water water
- ✗ Everyone in different parts of my community and the world have the same access to water that I have

1 Example of a Summative Assessments

- ✗ Choose one key feature of the water cycle and create a short story (1 page) about what would happen to our Earth without that piece of the cycle. Be sure to explain AT LEAST how 2 other parts of the cycle or Earth's thermodynamics would be affected by this change

History Unit Overview

Colorado Standards

- ✕ History prepares students to develop critical thinking skills in an effort to explain the human experience through events of the past. History develops an understanding of perspectives, defines identity and creates insight into how social, political, and economic factors can change, while building inquiry, judgment and decision-making skills. History enhances the ability to read varied sources and develop the skills necessary to analyze, interpret, evaluate, and communicate.

Learning Targets

1. Students will explain the role of historical water rights/usage/challenges played in the Northern Colorado Area.
2. Students will use evidence based information to articulate in a paper their broader understanding of this topic.

Big Ideas

- Historically, water has been a challenge to the region and used in many different ways, 80% of the water is used in farming, 20% for people.
- Residents' colloquial thoughts on water challenges
- How water should be distributed historically
- What immigrants found necessary when traveling to the region

History Formative Assessments

✗ What do we know about the challenges of water in Colorado

- ✗ - Challenges to people
- ✗ - Challenges to the culture
- ✗ - Challenges to the Economics

✗ Historical Significance of Water in Colorado

- ✗ - Students will learn about the key players in Colorado's struggle for water equity
- ✗ - Students will learn the challenges that immigrants to the area faced during the settling of the area

Possible Misconceptions

- ✗ Everyone had enough water historically
- ✗ The problem is solved for everyone in the past, present and future economically

Agriculture Unit Overview

AFNR Standards

- ✕ NRS.01.04.03.b. Analyze how different classifications of ground and surface water affect ecosystem function
- ✕ Evaluate the impact of laws associated with natural resources systems (e.g. ... water regulations).

Learning Targets

1. Students will explain the role that ground and surface water play in Colorado through experiential learning activities
2. Students will interpret and apply water laws to understand various perspectives through examining texts

Big Ideas

Water plays a significant role in the agricultural industry. Agriculturists have to constantly consider water availability which changes rapidly along with laws and regulations. Scientific innovations help crops and livestock be more drought resistant

Agriculture Formative Assessments

Ground and Surface Water Simulation

- ✗ Students will work in groups to **create a physical simulation** of how ground and surface water move in relation with the natural environment and agriculture. Following, they will answer questions to **synthesize applications** of the simulation

Stakeholders and Water Laws

- ✗ After **interpreting water laws** in Colorado and throughout the country, students will **read and compare multiple opinion based texts** from stakeholders in water conservation and use them to **gain perspective** on how water laws impact different groups of people

Possible Misconceptions

- ✗ To reduce water use farmers need to just use less water
- ✗ Agriculture does not care about water conservation because it uses so much

Art Unit Overview

CDE Visual Art Standards

- ✕ Standard 4: Relate and connect to transfer.
 - ✕ Research and analyze the ways visual artists, designers and scholars express personal views and beliefs and how these perspectives have a social context that enlarges the meaning of an artwork beyond the individual maker.
 - ✕ Develop proficiency in visual communication skills that extends learning to new contexts.
 - ✕ Utilize the practice of artmaking, and research historical and cultural contexts, to discern between different viewpoints, critique social problems and effect social change.

Learning Targets

1. Student will portray social/environmental issues through the practice of artmaking
2. Students will understand the elements of design to help them communicate visually

Big Ideas

Art is an effective way to communicate and advocate for social/environmental change. By using the visual language, artists can reach a larger audience and make their message more clear.

Art Formative Assessments

Visual Communication

- ✗ After reviewing the design elements, students will pick a subject they are interested and use at least three of the elements of design to create a clear and strong visual message that has an engaging composition.

Art as Activism

- ✗ Students will look at art over a variety of time periods to understand how artists reach a larger audience with their message.
- ✗ Students will discuss the impact of the artists' work and how it relates to the context of the time period

Possible Misconceptions

- ✗ Art does not relate to the current social/environmental issues in the world around us
- ✗ Artists are not equipped to come up with solutions to problems

Summative Assessment

1. Create a creative and unique solution to reduce the water used within PSD
2. Then create a poster/infographic that is visually engaging to present to the PSD school board about why they should fund your idea. Be sure to include aspects from your art, science, history and AG courses.



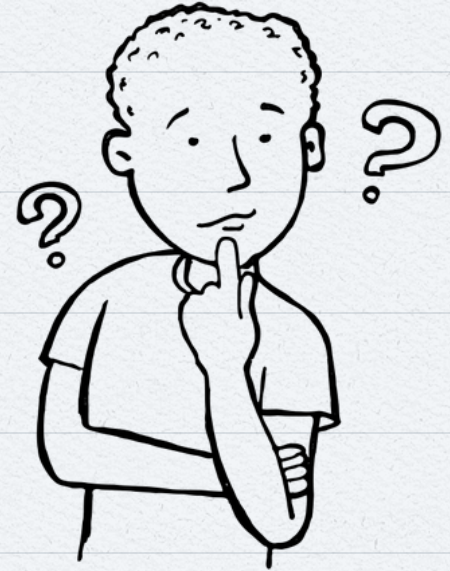
Directions

- ✕ 2020 is the second driest year in Colorado history and water is a significant factor in the future of Colorado. Your team is tasked with the challenge of coming up with a multi-step plan to address water conservation in our school district. Your plan must persuade the school district board of directors to adopt your plan by illustrating the history of water, the science of water usage in Colorado, the local stakeholders like farmers who are impacted, along with your proposed solution and counter arguments on how to improve current conservation efforts. Your proposal should be both visually engaging and innovative.
- ✕ Requirements
 - ✕ Important aspects of the history of water conservation and water rights in relation to the proposed plan
 - ✕ Describe current programs within PSD and how your plan will improve or extend them
 - ✕ Identify at least 2 parts of your topic that are relevant for each of your classes
 - ✕ Use design elements from art to make your poster visually engaging



Students Will be Encouraged to Consider These Aspects

- ✗ Turf grass management
- ✗ Water fountains and toilets
- ✗ Water usage at home
- ✗ Cafeteria usage
- ✗ Water usage in growing agricultural products
- ✗ The cost of new initiatives
- ✗ Utilizing incentives for students faculty, and families



Rubric

	15 Points	10 Points	5 Points	0 Points
Science (15 points)	Uses evidence from the water cycle and the thermodynamics of the Earth to justify the importance of water conservation.	Explains why water conservation is important but does not provide evidence from the water cycle, water conservation and the thermodynamics of the Earth.	Mentions the water cycle, water conservation and the thermodynamics of the Earth but does not provide an explanation for why they are important	No explanation of the water cycle, water conservation OR the thermodynamics of the Earth
History (15 points)	Has a significant answer to the use of evidence to name four of the four big ideas of the historical significance of water and how this affects the economics of the Northern Colorado Area.	Has a good answer to the uses and can articulate three of the big ideas of the historical significance of water and how this affects the economics of the Northern Colorado Area.	Has some answer(s) to and uses one to two big ideas of the historical significance of water and how this affects the economics of the Northern Colorado Area.	Cannot answer one of the big ideas, and does not have an understanding to articulate the historical significance of water and how this affects the economics of the Northern Colorado Area.
Art (15 points)	Uses 2-3 elements of design to create a compositionally engaging poster that calls the viewer to attention and demonstrates innovation	Uses 1-2 elements of design, visually engaging, demonstrates activism and innovation	Poster uses some creative elements, but does not demonstrate activism visually	Poster is not visually engaging and does not demonstrate innovation
Ag (15 points)	Includes at least 2 points about agriculture in the history portion of the poster, explains the impact of water conservation in agriculture	Only includes one implicit point about agriculture in the history portion, explains the impact of water conservation in agriculture	Does not include any implicit points about agriculture in the history portion of the poster, somewhat explains the impact of water conservation in agriculture	Does not mention but vaguely alludes to agriculture somewhere in the poster
	5 Points	4 to 3 Points	2 to 1 Points	0 Points
Create a poster/ infographic that presents a creative solution to reducing water usage within PSD (5 points)	-Presents an unique and creative solution that highlights specific steps involved in their proposed plan	-Presents a solution that is similar in more than 2 ways to a solution already being used within PSD and does not give clear details on how it would improve a current plan	-Presents a solution that is already being used within PSD	-No solution given
Poster/ infographic is presentable (5 points)	-Poster is 24"x36" in size, information on the poster is typed in a non-cursive font and pasted (nothing peeling up), there are at least 4 relevant pictures and at least 3 graphs with relevant data	-Poster is not 24"x36" but the information is typed in a non-cursive font and pasted on the poster, there are either not at least 4 relevant pictures or not at least 3 graphs	-Poster is not 24"x36" and the information is hand written, there are either not at least 4 relevant pictures or not at least 3 graphs	-The poster size is not followed, information is hand written, and there is less than 4 pictures and less than 3 graphs used
Grammar (5 points)	No spelling or grammatical errors	1-3 spelling or grammatical errors	4-7 spelling or grammatical errors	7+ spelling or grammatical errors

JAMBOARD LINK

[CLICK HERE](#)

<p>Standards</p> <p>-The planet's dynamics are greatly influenced by water's unique chemical and physical properties; Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how and why Earth is constantly changing.</p> <p>-ESS2-C The Roles of Water in Earth's Surface Processes: The abundance of liquid water on Earth's surface and its unique combination of physical and chemical properties are central to the planet's dynamics.</p> <p>Learning Targets & Evidence Outcomes</p> <p>-In my own words I can explain the thermodynamics of the Earth and the water cycle and explain the consequences if one part goes "missing."</p> <p>-I can demonstrate that I understand the unique properties of water and how it relates to the thermodynamics of the Earth. I can explain different methods for water purification and provided evidence to justify whether or not it is sustainable.</p> <p>Big Ideas & Inquiry Questions</p> <p>-Why is the thermodynamics of the Earth and the water cycle essential to sustaining life on Earth? Could we ever run out of water? What about clean water?</p> <p>-What are unique properties of water? How can we purify water? Is it sustainable?</p> <p>Possible Misconceptions</p> <p>-Water is an endless resource; I will always have access to clean running water; everyone in different parts of my community and the world have the same access to water that I have</p> <p>Formative Assessment Ideas</p> <p>-Choose one key feature of the water cycle and create a short story (1 page) about what would happen to our Earth without that piece of the cycle. Be sure to explain AT LEAST how 2 other parts of the cycle or Earth's thermodynamics would be affected by this change.</p> <p>-Write a short letter to a 1st grader explaining what is unique about water, be sure to use language that they can understand. Include at least 4 unique properties of water and why these properties are important. Also explain to them how water can be contaminated and purified.</p>	<p>Standards</p> <p>-History prepares students to develop critical thinking skills in an effort to explain the human experience through events of the past. History develops an understanding of perspectives, defines identity and creates insight into how social, political, and economic factors can change, while building inquiry, judgment and decision-making skills. History enhances the ability to read varied sources and develop the skills necessary to analyze, interpret, evaluate, and communicate.</p> <p>Learning Targets & Evidence Outcomes</p> <p>-Students will explain the role of historical water rights/usage/challenges played in the Northern Colorado Area.</p> <p>-Students will use evidence based information to articulate in a paper their broader understanding of this topic.</p> <p>Big Ideas & Inquiry Questions</p> <p>-Historically, water has been a challenge to the region and used in many different ways, 80% of the water is used in farming, 20% for people.</p> <p>Residents colloquial thoughts on water challenges</p> <p>How water should be distributed historically</p> <p>What immigrants found necessary when traveling to the region</p> <p>Possible Misconceptions</p> <p>-Everyone had enough water historically</p> <p>The problem is solved for everyone in the past, present and future economically</p> <p>Formative Assessment Ideas</p> <p>-What do we know about the challenges of water in Colorado: challenges to people, challenges to the culture and challenges to the economies</p> <p>-Historical Significance of Water in Colorado: Students will learn about the key players in Colorado's struggle for water equity. Students will learn the challenges that immigrants to the area face during the setting of the area.</p>
<p>ART</p> <p>Standards</p> <p>-Standard 4: Relate and connect to transfer: Research and analyze the ways visual artists, designers and scholars express personal views and beliefs and how these perspectives have a social context that enlarges the meaning of an artwork beyond the individual maker. Develop proficiency in visual communication skills that extends learning to new contexts. Utilize the practice of art making, and research historical and cultural contexts, to discern between different viewpoints, critique social problems and effect social change.</p> <p>Learning Targets & Evidence Outcomes</p> <p>-Student will portray social/environmental issues through the practice of art making</p> <p>Students will understand the elements of design to help them communicate visually</p> <p>Big Ideas & Inquiry Questions</p> <p>-Art is an effective way to communicate and advocate for social/environmental change. By using the visual language, artists can reach a larger audience and make their message more clear.</p> <p>Possible Misconceptions</p> <p>-Art does not relate to the current social/environmental issues in the world around us</p> <p>Artists are not equipped to come up with solutions to problems</p> <p>Formative Assessment Ideas</p> <p>-Visual Communication: After reviewing the design elements, students will pick a subject they are interested and use at least three of the elements of design to create a clear and strong visual message that has an engaging composition.</p> <p>-Art as Activism: Students will look at art over a variety of time periods to understand how artists reach a larger audience with their message. Students will discuss the impact of the artists' work and how it relates to the context of the time period</p>	<p>AGRICULTURE</p> <p>Standards</p> <p>-NRS.01.04.03.b. Analyze how different classifications of ground and surface water affect ecosystem function</p> <p>-Evaluate the impact of laws associated with natural resources system (e.g. ...water regulations)</p> <p>Learning Targets & Evidence Outcomes</p> <p>-Students will explain the role that ground and surface water play in Colorado through experimental learning activities</p> <p>-Students will interpret and apply water laws to understand various perspectives through examining texts</p> <p>Big Ideas & Inquiry Questions</p> <p>-Water plays a significant role in the agricultural industry. Agriculturists have to constantly consider water availability which changes rapidly along with laws and regulations. Scientific innovations help crops and livestock be more sought resistant.</p> <p>Possible Misconceptions</p> <p>-To reduce water use farmers need to just use less water</p> <p>-Agriculture does not care about water conservation because it uses so much</p> <p>Formative Assessment Ideas</p> <p>-Ground and Surface Water Simulation: Students will work in groups to create a physical simulation to show ground and surface water move in relation with the natural environment and agriculture. Following, they will answer questions to synthesize application of the simulation</p> <p>-Stakeholders and Water Laws: After interpreting water laws in Colorado and throughout the country, students will read and compare multiple opinion based texts from stakeholders in water conservation and use to gain perspective on how water laws impact different groups of people</p>

SUMMATIVE ASSESSMENT

Inquiry Questions

- How can we look at history to help us create creative solutions to water shortage and usage in our community?
- Thinking creatively, what are unique ways that water is used on a local and global scale?
- What could the future of water look like and how can scientists, economists, and other activists do to advocate for water conservation?

Goals

- Create a creative and unique solution to reduce the water used within PSD
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WATER (H₂O)