



Dry, Drier, Drought in Colorado

Driving Questions:

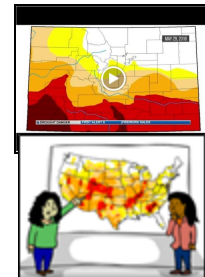
- What causes drought?
- How is drought measured and monitored?
- Which areas in Colorado are more vulnerable to drought impacts?
- In what season are drought impacts most likely to occur?

Word Bank	
Natural Hazards	naturally occurring phenomena such as flood, wildfire, extreme heat, or drought, which may disrupt or damage a community
Drought	a prolonged drier-than-normal period in a natural climate cycle that results in water-related problems
GIS	an abbreviation for <i>Geographic Information System</i> , which is a computer-based process that gathers, manages, analyzes, and visualizes spatial data
Precipitation	any type of water that forms in the Earth's atmosphere and then drops onto the surface of the Earth (e.g., rain, snow, sleet, or hail)
Snow Water Equivalent (SWE)	the amount of water contained in the snowpack at a location (if the entire snowpack were to melt)

Activity 1: Drought, wildfire, and weather: What's the connection in Colorado?

1. What do you know about drought? In one minute, jot down as much information as you know about droughts in the "What I Know" section of the KWL Chart on page 2.

Watch the [drought news clip](#) (2:43) to get a feel for the impacts of drought on people and the environment, and how drought conditions are mapped.



Next, watch [Assessing Drought in the United States](#) to learn how scientists assess the causes and impacts of drought in our country, including Colorado.

2. Write down your observations and questions about drought as a natural hazard in the "What I Wonder" section of the KWL Chart.





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KWL Chart	
1. What I K now	
2. What I W onder	
What I L earned (Activity 3)	

3. List the four categories of drought, in order from least to greatest level of drought, and their color coding.

4. Which organization tracks the level of drought across our country?



These materials were developed by CIRES Education & Outreach at CU Boulder.
<https://cires.colorado.edu/outreach/projects/HEARTForce>





Activity 2: Drought Data Analysis Stations

Station 1: Drought Causes and Impacts

Build your understanding of the causes, effects, and historical impact of drought by watching the National Geographic [Droughts 101](#) clip.



Next, use the [Drought in America: Slow moving, far reaching](#) website to build your knowledge about drought.



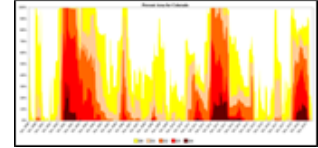
5. What is drought?

6. What are some causes and impacts of drought?



Station 2: Drought History in Colorado

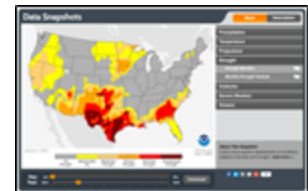
Review the graph of [Drought History in Colorado](#) graph (scroll down the webpage and click the “Percent Area for Colorado” graph). Record your observations about the drought trends and patterns that you notice in Colorado from 2000 to the present.



7. Which years did Colorado experience extreme drought (D3) and exceptional drought (D4)? Which specific time frame had the greatest level of exceptional drought (D4)?
8. When Colorado is experiencing drought (D1-D4), especially intense drought (D3, D4), what percentage of the state is generally affected?

Next, explore the [Drought Data Snapshots](#) interactive to analyze the 2012 drought in Colorado.

Use the adjustable timeline located below the map screen to move the “Year” tab over two marks to the right to select 2012, and slide the “Day” tab from the far left (January) to the far right (December) to observe changes in the map data (spatial data) over the year.



9. During 2012, which month and what general location in Colorado first experienced extreme drought (red)?
10. During 2012, which month and what general location in the state was first affected by exceptional drought (dark red)?



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11. In which month of 2012 was the severity and expanse of drought the greatest in Colorado, and what was the primary level of drought?

12. What was the statewide level of drought in Colorado at the end of December 2012?



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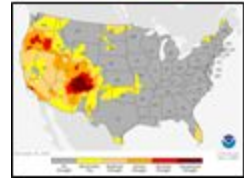


Station 3: 2018 American Southwest Drought

The American Southwest is defined as New Mexico, Colorado, Utah, Nevada, Southern California, and Arizona.

Review the maps of the 2018 southwest drought; first, the map from the start of the year and then at the map at the end of the year:

- [Dry Southwest still waiting on winter in January 2018](#) (start of 2018)
- [Intense drought in the U.S. Southwest persisted throughout 2018, lingers into the new year](#) (end of 2018)



13. What were the drought categories throughout Colorado at the start of 2018? Which areas of the state had the greatest drought level, and which areas had the lowest? *Note: the dates for each map are in the bottom left corner of the animation.*
14. What were the drought categories throughout Colorado at the end of 2018? Which areas of the state had the greatest drought level, and which areas had the lowest?



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Station 4: Impacts of the 2018 Drought in Colorado

Visit the [CoCoRaHS Condition Monitoring Map](#), a resource you can use to explore past drought conditions and read on-the-ground reports made each week by CoCoRaHS volunteer citizen scientist observers.



In the lower right, use the “+” symbol to zoom in on the map, the “-” symbol to zoom out, and the home icon to return to the default map view screen. Use the timescale slider at the bottom of the screen to change the date of the maps that you are viewing. Read volunteer observations by clicking on the upside down triangles.

Zoom into Colorado and use the timescale slider to view maps from June, July, and August 2018.

15. Read some observations from areas experiencing Extreme and Exceptional Drought (dark red areas). What are observers reporting? Include details of the impacts they see, and the date and general location of the observer (e.g., June 2018, SE Colorado).

16. Read some observations from areas experiencing Abnormally Dry conditions or Moderate drought. What are observers reporting? Include details of the impacts they see, and the date and general location of the observer (e.g., June 2018, SE Colorado).





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Station 5: Current Drought Conditions in Colorado

Use the [Drought.gov](https://drought.gov) web portal to find out the current drought conditions in your community and in Colorado.



Enter your zip code into the box in the middle of the screen that says “Enter your city or zip code for current conditions,” and click the yellow “Get Conditions” box.

17. What is the current drought condition in your community? What is the precipitation total and average high temperature for the last 7 days?

Now, click on the brown box that says “Colorado Conditions.” A map of Colorado should appear, with an explanation of what percentage of the state is in each drought category.

18. What percentage of the state is Abnormally Dry? What percentage of the state is in Severe Drought? What percentage of the state is in Exceptional Drought?

19. Based on the time of year, and the recent weather in your community, are you surprised about the current drought conditions in Colorado? Why or why not?



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Station 6: Drought Preparation & Response

Drought is described as a slow-moving and long-term natural hazard, which is a different experience from fast-acting and shorter-duration natural hazards, such as floods, wildfires, earthquakes. How does this difference affect how people are able to prepare for, respond to, and rebound from drought?

Watch the video [To Escape Drought, Slow and Steady Wins the Race](#).

Then, review the [Drought Ready.gov](#) webpage. In your *Drought Diary student handout*, write down key tips for your community to manage drought.



20. What are ways that your family and community can conserve water during a drought?

21. Drought increases the risk of wildfire due to vegetation drying out and dying. What are some fire prevention actions you and your family can take during a drought?



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Activity 3 : How can communities know about and manage their drought risk in Colorado?

Activity 3.1 Drought Expert Interview

First, watch the short film with Dr. Doug Kluck, Regional Climate Services Director at the National Oceanic and Atmospheric Administration. Doug talks about many of the concepts that you learned in the previous activities and that you will present about in this activity:



[Drought Expert Video](#)

Activity 3.2 Local Drought News Story

Prompt: Create a local news story in a format of your choice (see options below), that summarizes important information about for people in your community to be “drought wise” before, during, and after a drought. Use information from the Drought Expert Video and information gathered in your student handout to communicate information about:

- Causes and impacts of drought
- Historic drought: Highlights of the 2012 and 2018 Colorado droughts
- Recent and current drought conditions around Colorado and in your community
- Tips for people in preparing for and responding to drought

The format choices for the Local Drought News Story include (be creative but accurate):

- Newspaper article with one picture and one graph or map (one page)
- Radio story (2-3 minutes in length)
- Video newscast (2-3 minutes in length)

Additional drought resources:

[Colorado Planning for Hazards—Drought](#)
[Drought for Kids](#)



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Local Drought News Story	
1) KWL Chart “What I Learned” (see page 2) <input type="checkbox"/> Check when completed	As a group, reflect on what was learned in Activities 1, 2, and 3. Then independently complete the “What I Learned” section of your KWL Chart (see page 2 of the student handout) to summarize your learning. Use these prompts to reflect on what you learned: <ul style="list-style-type: none"> • What important things do you now know about drought that you didn’t know before? • What should people do to be “drought wise” before, during, and after a drought?
2) Choose a Format <input type="checkbox"/> Check when completed	As a team, choose one of the following formats for your group’s Local Drought News Story: <ul style="list-style-type: none"> • Newspaper article with one picture and one graph or map (one page) • Radio story (2-3 minutes in length) • Video newscast (2-3 minutes in length)
3) Create a Draft <input type="checkbox"/> Check when completed	Referring to notes and responses in your Student Handout, make a quick draft of your group’s product ideas. Your team’s product should summarize and share information about: <ul style="list-style-type: none"> • Causes and impacts of drought • Historic Drought: Highlights of the 2012 and 2018 Colorado droughts • Recent and current drought conditions around Colorado and in your community • Tips for people in preparing and responding to drought
4) Create the Final Product <input type="checkbox"/> Check when completed	Create your team’s Local Drought News Story. Remember to keep your product brief and summarize the key elements for your community audience that you drafted in step 3 (above).
Lesson Rubric	Refer to the rubric to understand expectations for your final product.

