



# **Colorado Flood - Student Worksheet**

### Part 1 : Why is it important to study floods?

- What do you know about floods in Colorado? Write at least three things in the What I Know section of the KWL Chart below.
- Watch the news stories <u>1976: Deadly Big Thompson flood</u> <u>devastates Colorado</u> (3:00) and <u>Dramatic images show devastating</u> <u>flooding in Colorado</u> (3:02).



• Write down your observations and questions about floods in the "What I Wonder" section of the KWL Chart.

KWL Chart	
What I <mark>K</mark> now	
What I Wonder	
What I Learned (Part 3)	









# Part 2: Group 1

#### Which scenarios are most likely to cause floods in our community? Science and Engineering Practice: Obtaining, evaluating, and communicating information

Explore the following types of floods to identify the types of scenarios that could cause flooding in your community. Begin by identifying the types of floods that occur in your county using your local Hazard Mitigation Plan, then use the NOAA and National Weather Service pages to learn more about these types of floods. Watch videos to see what these floods look like as they occur.

Create 2-3 slides to present to your classmates that include:

- For each type of flood that occurs in your county (as identified by your local Hazard Mitigation Plan)
  - An image of the flood type
  - The definition of the flood type
  - The cause of the flood type

- Colorado Regional and Local Hazard Mitigation Plans
  - Instructions: Click on your county in the list of counties. This will take you to a list of mitigation plans in your region. Click on the plan that is for your community (city or county). Using the Table of Contents, look for the "Risk Assessment" section, and within that, find the Flood "Hazard Profile" section.
- NOAA Severe Weather 101 Flood Types
- National Weather Service Flood Related Hazards









Based on the past, how could floods impact our community in the future? Science and Engineering Practice: Obtaining, evaluating, and communicating information

Research a historic flood in your area, and identify flood impacts that happened in the past that may happen again. Include any additional impacts to modern infrastructure that may occur if new development has occurred in the area that was flooded.

Create 2-3 slides to present to your classmates that include:

- The type of flood that occurred
- The time of year the flood occurred
- Impacts from the flood, including loss of life (human and/or livestock), buildings or infrastructure damaged, crop damage
- Modern infrastructure in the area that could be damaged if the area were to flood again
- A picture of the historic flood

- Colorado Regional and Local Hazard Mitigation Plans
  - Instructions: Click on your county in the list of counties. This will take you to a list of mitigation plans in your region. Click on the plan that is for your community (city or county). Using the Table of Contents, look for the "Risk Assessment" section, and within that, find the Flood "Past Events" section
- Local newspaper articles









What time of year do floods generally occur in our area? Science and Engineering Practice: Analyzing and interpreting data

Following the data analysis instructions, analyze streamflow data from a river in your area to assess which times of year peak streamflow occurs. Confirm your findings using maps from Western Water Assessment.

Create 2-3 slides to present to your classmates that include:

- The graph you produced from your analysis of peak streamflow data
- A screenshot of the map of the month that your county experiences the most floods and flash floods from Western Water Assessment

- Student Worksheet : Instructions for USGS Data Analysis
- Instructional Video for USGS Data Analysis
- Western Water Assessment Flash Flood Frequency Maps
- Western Water Assessment Flood Frequency Maps









#### What strategies exist to minimize the impacts of floods? Science and Engineering Practice: Constructing explanations and designing solutions

Explore several existing strategies to identify possible flood mitigation solutions for your community. Choose three flood mitigation strategies that could be used in your community, or already exist.

Create 2-3 slides to present to your classmates that include:

- A description and picture of three flood mitigation strategies

- Naturally Resilient Communities Flooding Solutions
  - Moving People Out of Harm's Way: Property Buyouts
  - Waterfront Parks
  - Setback Levees
  - Flood Friendly Culverts
  - Flood Bypasses
  - Green Parking Lots
  - Floodwater Detention and Retention Basins
  - Bioswales









How do scientists expect the size and frequency of Colorado's floods to change in the future?

Science and Engineering Practice: Analyzing and interpreting data

Watch a news story and explore the National Climate Assessment, written by over 300 experts and guided by a 60-member federal advisory committee, to learn what scientists predict for future climate.

Create 2-3 slides to present to your classmates that include:

- An explanation of historic flood frequency in the Southwest
- A description of projections of flood frequency and severity in the Southwest
- Include screenshots of figures/maps

- Extreme weather and clime disasters cost the U.S. billions in 2019, NOAA reports news clip
- National Climate Assessment: Increased Risk of Flooding in Many Parts of the U.S.
  - Read the selection (Key Message 3), and interpret figure 3.5 to see what's expected to happen in Colorado.
- National Climate Assessment: Heavy Downpours Increasing
  - Read the selection and interpret figures, exploring data and projections for the southwest region.









# **All Groups**

What areas in our community have the most risk? Science and Engineering Practice: Analyzing and interpreting data

Watch <u>The 100 Year Flood Is Not What You Think It is (Maybe)</u>, a video that explains what the 100 year floodplain is. <u>STOP the video at 3:22</u>.

Work in your team to identify the infrastructure (commercial buildings, homes, bridges, roads, etc.) using the USA Flood Hazard Area dataset. Create 3 slides. Each slide should include a screenshot of an area at risk of flooding in your community, and a short description of the area (including if it has any resources like schools, hospitals, etc.) and an explanation of why that area is at risk.

- 1. Using the flood layer in <u>ArcGIS</u>, screenshot the area in your community that has (in your opinion) the greatest potential for flood damage.
- 2. What type of flood scenario is unmapped but could occur in any small stream and or dry channel?









# Part 3: Flood Letter to the Editor

Assignment: Write a letter to the editor that explains current flood risk in your community. The letter should be 500-600 words and include:

- Address the letter "Dear Editor,"
- The first sentence should introduce the topic, and explain why readers should be concerned about flooding in your community
- The types of floods your community is vulnerable to
- A summary of historic floods
- How flood frequency and severity is expected to change in the future
- What time of year floods occur
- What areas in your community are most vulnerable to flooding
- Whether adequate technology is in place in the city to mitigate flood risk

Use the following outline to take notes on the topics you and your classmates researched in Part 2 to build your Letter to the Editor. Letters to the editor are typically brief (500-600 words), so write with brevity and clarity.

#### Outline

Group 1: Which scenarios are most likely to cause floods in our community?	Flood Type #1 Definition:
	<u>Cause:</u>









	Flood Type #2 (if more than one flood type exists in your county): Definition:
	<u>Cause:</u>
	Flood Type #3 (if more than one flood type exists in your county): Definition:
	<u>Cause:</u>
Group 2: Based on the past, how could floods impact our community in the future?	Description of historic flood: Type of flood:









	Location/Time of year:
	Impacts of the flood:
Group 3: What time of	Time of year floods occur (include statistics/data):
year do floods	
year do floods generally occur in our area?	
year do floods generally occur in our area?	
year do floods generally occur in our area?	
year do floods generally occur in our area?	
year do floods generally occur in our area?	
year do floods generally occur in our area?	









Group 4: What strategies exist to minimize the impacts of floods?	Flood mitigation strategy #1:
	Flood mitigation strategy #2:
	Flood mitigation strategy #3:









Group 5: How do scientists expect the size and frequency of Colorado's floods to change in the future?	Historic flood frequency in the southwest: Projections of flood frequency and severity in the Southwest:
All: What areas in our community have the most flood risk?	Area at risk #1 (explanation of area and why it's at risk)









Area at risk #2 (explanation of area and why it's at risk)
Area at risk #3 (explanation of area and why it's at risk)



