



# The Humboldt: A River of Extremes

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**Grade Level:** 6<sup>th</sup> - 8<sup>th</sup>

During this 60 - 85 minute classroom lesson, students analyze images, texts and videos from past flooding events in the Humboldt River Watershed. Students then write letters addressed to the Nevada Division of Water Resources (NDWR) informing them of their findings and where they think further research is needed to improve the current dam infrastructure.

## Materials

Invitation

- Humboldt River Handout

Concept Invention

- Individual computers and headphones for each student

## Essential Questions

- What damage does flooding cause?
- What are dams and what is their purpose?
- What improvements does our current dam infrastructure need?

## Objectives (Integrated Content and Practice)

1. Students will analyze images, texts and videos to inform future research on dam infrastructure.

## NGSS

- MS-ESS3-2: Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

## Key Vocabulary

- Flash flooding
- Watershed
- Infrastructure

## Introducing the Lesson (5 minutes)

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1. Explain to the students that they are going to work as engineers by analyzing photos, text and videos about past flooding events and then using their research to inform the development of future technologies.
2. Tell the students they will be recording their ideas on a handout throughout the lesson (these may be kept in their notebooks).

# Invitation (10 minutes)

1. Share the [photo](#) of the ruins of the Mazuma Hotel.



2. Ask students what they notice about the picture. Take a few hands.
3. Give students 5 minutes of independent time to write down what they notice and what they think may have caused this to happen on the “Mazuma Hotel Ruins” section of the Humboldt River Handout.

**Mazuma Hotel Ruins**

What do you notice about the picture? What do you think may have caused this to happen?

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*Students may notice that only some buildings have fallen while others are still standing. The remains are also intact, as opposed to burned down to the ground.*

4. Take a few hands and ask the class if they had similar ideas. Tell students these ruins were caused by floods and discuss any observations the students may use as evidence of a flood instead of another natural disaster. They will be engineers working to prevent disasters like these from happening.
5. Tell them an engineer is someone who designs and builds anything from video games to an entire building. Ask the students if they have any examples of projects that engineers might do.
6. Tell students engineers help to design solutions to the problems created by floods. Engineers are good at evaluating and improving designs.

## Exploration (15 minutes)

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### **Tips and Tools:**

*You may choose to organize this activity according to the needs of your students. If it is too distracting to have them get up and move then you may choose to have them pass the photos instead. Some classes may benefit from the opportunity to get up and walk around.*

*Having a visible timer running will help students with managing their time on each photo.*

*You may adjust the time according to how quickly or slowly your students are finishing with each photo.*

1. Tell students they will be going on a gallery walk and making inferences about a series of photos to collect evidence for their recommendations as engineers.
2. Tell students to answer the questions with each photo on the “Gallery Walk” section of their handout.

### **Gallery Walk**

Answer the questions with each photo.

<b>A</b>	
<b>B</b>	

3. Have students spend 2-3 minutes on each photo in groups. You may have students rotate in groups and move to each new photo or have students pass the photos to the next group.
4. Have a few students volunteer to share their responses and record their responses on a poster or the white board.

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## Concept Invention (15-30 minutes)

**Tips and Tools:**

*Some students may require additional support to take notes and you may provide them with sentence starters or cloze notes. Additional supports may also include working in pairs or reducing some of the required sections.*

1. Tell students they will collect evidence to support their recommendations on dam improvements by reading sections of the [The Humboldt River: A River of Extremes](#) story map and taking notes (Humboldt story map can also be found at <http://nevadafloods.org/index.php/education-resources/C7> and click “HUMBOLDT RIVER FLOODING”). Remind students to watch any videos included in each section. They may recognize the photos from the gallery walk and find answers to questions they answered.
2. Have students read the sections listed on the “Note-Taking Guide” and take notes as they read that address the questions listed for each section.
3. Ask for volunteers to share their responses to the questions on the note-taking guide. Record the responses onto the handout using a document camera or onto a whiteboard.

## Application (15 minutes)

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**Tips and Tools:**

*Some students may need additional support to write the letter. You may provide sentence starters, have students write a shorter letter, assign them a specific problem to address or have them work in pairs.*

1. Tell students they will use the evidence they have collected to inform where further research is needed to make improvements to the current dam infrastructure in the Humboldt River Watershed.
2. Explain to students that they will be writing to the Nevada Division of Water Resources (NDWR). The NDWR assists with providing solutions to flooding problems to help residents in Elko County while protecting the environment.
3. Have students discuss possible solutions at their tables. Tell them to be prepared to share at least one idea with the whole class. After students have discussed at their tables, ask for a representative from each table to share one of their solutions. Record these ideas on the board.
4. Have students share their findings on the “Nevada Division of Water Resources (NDWR)” section of the handout.

**Letter to Nevada Division of Water Resources (NDWR)**

Write a letter to the NDWR informing them of your findings on where further research is needed to make improvements to the current dam infrastructure in the Humboldt River Watershed. Include information on the purpose of dams and potential damage they prevent.

Dear Floodplain Management Program at NDWR,

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5. After 10 minutes of independent writing, take a few hands to have students share their ideas.

## Reflection (10 minutes)

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1. Review the images from the gallery walk and the student responses to the questions.
2. Which questions can we answer?
3. Do we have any new questions or observations?