

# Flooding in the Desert: The Lower Virgin River

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

During this 60-minute classroom lesson, students learn about some solutions that have been attempted to solve problems created by flooding in the Virgin River watershed. They will also evaluate the impact these solutions have on the environment. Using their research, students will propose solutions to flooding that minimize the impacts on the environment.

## Materials

Invitation

- Virgin River Handout for each student

Exploration

- Individual computers for each student

## Essential Questions

- How do solutions that humans create to reduce flood risk affect the environment?

## Objectives (Integrated Content and Practice)

1. Students will propose solutions to flooding that minimize the impacts on the environment.

## NGSS

- MS-ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

## Key Vocabulary

- watershed
- flood

## Introducing the Lesson (5 minutes)

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1. Explain to students that they are going to work as engineers to propose designs that minimize human impact on the environment.
2. Tell the students they will be recording their ideas on a few handouts throughout the lesson (these may be kept in their notebooks).

# Invitation (15 minutes)

## Tips and Tools:

*Optional extensions of this activity may include having students create stories behind the images or explanations of the decision-making process leading up to the situation.*

1. Project or print out copies of the “Water Always Wins: Awareness” image found near the end of the [Virgin River Flooding Story Map](#).



What do you think these images are trying to show? What do you think is meant by, “water always wins”?

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2. Have students individually write responses on their handouts to the prompt, “What do you think these images are trying to show? What do you think is meant by, “water always wins”?”.
3. Have students share their responses with a partner before asking for volunteers to share their responses with the whole class. Record student responses on the whiteboard or on a poster.
4. Tell students these images are from the Clark County Regional Flood Control District’s public outreach campaign to alert residents about the reality of flooding in the area. The realities of flooding can be easy to forget when living in an area that is usually dry and nearby rivers have little to no flow.
5. Tell students they are going to be engineers. Tell them an engineer is someone who designs and builds anything from a code for people to play 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:**

*This discussion may also be structured as a think-pair-share having students discuss who else relies on water from rivers and floods? What is development and who benefits from it? How are they impacted by limiting development?*

*You may choose to have students work in pairs and share responses at their tables. You may print out the text and highlight specific passages as an accommodation for students.*

1. Tell students that engineers will often research solutions that have been attempted in the past and that is how the students are going to begin their work. Have students go to <http://nevadafloods.org/index.php/education-resources/C7> and click on “**Virgin River Flooding**.” Read the directions and questions for the next section of the handout. Read the section, “Flood Risk Reduction” together as a whole class.
2. Complete the first two rows on the handout together as a whole class to model how to complete the table. Discuss the solution used and any land, plants, or animals that are not explicitly stated in the text, but would likely be affected by this solution. Solutions mentioned in the text include building areas to detain flood waters and limiting development in floodplain areas.
3. Have students complete the remaining row on the handout independently using the “Failed Attempt to Dam the Virgin River Gorge” section of the story map.

## Application (15 minutes)

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### **Tips and Tools:**

*Students may choose to recommend bridges, dams, detainment basins, or limiting development in the floodplain. They may also choose to recommend a solution that is not discussed in the text.*

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

1. Tell students it is now time to use the findings from their research to propose flooding solutions that minimize the impact on the environment. Discuss the solutions students found from the story maps and the impacts they had on the environment. Record these solutions on the whiteboard or on a poster.
2. Have students choose one solution that they would recommend in their proposal as an engineer. Emphasize that the solution they recommend should have the least impact on the environment.

## Reflection (10 minutes)

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1. Review the initial recorded responses to the invitation prompt.
2. Does water always win?
3. How would the solutions you proposed impact water always winning?