



# What's in Your Water?

## Ganges River Pollution



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<b>Grade Level</b>	6th – 7th Grade	<b>Time Frame</b>	60 minutes
<b>Subject</b>	ICAP, Social Studies	<b>Duration</b>	1-2 class period(s)
<b>Course</b>	World Geography		

### Essential Question

Does clean water impact more than just personal use?

### Summary

In this lesson on the importance of clean water as a natural resource, students will begin by observing a polluted water source within a United States community. Next, students will explore the significance of the Ganges River and the political and religious issues that impact the ongoing struggle to maintain this important water resource for the people of India. Then, students will watch a video interview to learn how clean water issues relate to state and local communities before extending their learning with a writing activity to connect the importance of clean water to their personal lives. This lesson includes optional modifications for distance learning. Resources for use in Google Classroom are included.

### Snapshot

#### Engage

Students examine a picture of pollution trash surrounding Lake Arcadia in Oklahoma.

#### Explore

Using the It's OPTIC-al and Gallery Walk strategies, students analyze several photos of pollution in and around the Ganges River in India.

#### Explain

Students determine how the Ganges River is used in India and what types of pollution affect the use of the river.

#### Extend

Students write a Two-Minute Paper about their own contributions to water pollution, then watch an interview with the president of the Oklahoma Water Resources Board (OWRB).

#### Evaluate

Students formulate ideas about how they can support water conservation and clean-up efforts.

## Standards

*Oklahoma Academic Standards (Social Studies Practices (7th Grade))*

**6.4.6:** Describe the role of citizens as responsible stewards of natural resources and the environment.

*Oklahoma Academic Standards (Social Studies Practices (7th Grade))*

**7.4.4:** Evaluate the effects of human modification of and adaptation to the natural environment through transformation caused by agriculture, the use of modern irrigation methods, industry, demand for energy, and urbanization.

**7.4.6:** Describe the role of citizens as responsible stewards of natural resources and the environment.

## Attachments

- [Ganges River Facts Reading—What's in Your Water - Spanish.docx](#)
- [Ganges River Facts Reading—What's in Your Water - Spanish.pdf](#)
- [Ganges River Facts Reading—What's in Your Water.docx](#)
- [Ganges River Facts Reading—What's in Your Water.pdf](#)
- [It's Optical Graphic Organizer—What's in Your Water - Spanish.docx](#)
- [It's Optical Graphic Organizer—What's in Your Water - Spanish.pdf](#)
- [It's Optical Graphic Organizer—What's in Your Water.docx](#)
- [It's Optical Graphic Organizer—What's in Your Water.pdf](#)
- [Lesson Slides—What's in Your Water.pptx](#)

## Materials

- It's OPTIC-al Graphic Organizer student handout (attached, one per student)
- Ganges River Reading (attached, one per student)
- Highlighters (one per student)
- Lesson Slides (attached)
- Chart tablet or poster paper
- Six images of Ganges River pollution

# Engage

## Teacher's Note: Photo Preparation

This lesson uses a variety of photos to illustrate the different ways in which the Ganges River is polluted. Prior to beginning the lesson, access [this website](#) (the full URL can also be found in the Resources below). Print the pictures that have the following captions: **1)** *"Though polluted, people use the river for bathing, cooking, and washing. A boy bathes among sewage foam in Uttar Pradesh,"* **2)** *"Further down the river, in Kanpur, layers of foam form among the sewage in the river,"* **3)** *"Beyond sewage, piles of garbage are dumped directly into the river, especially in urban areas where authorities do not regularly collect trash,"* **4)** *"Further South, in Kolkata, brick kilns use the clay and sediment from the river. The kilns pump noxious fumes into the air, which further exacerbates the water quality issues,"* **5)** *"Here, a man pours holy water on the polluted banks of river Ganges beside the idols of Hindu god and goddess that were immersed during the Durga Puja—a holy festival—in Kolkata,"* and **6)** *"Despite local citizens' best efforts, the river remains heavily polluted."* Print these pictures as large as possible.

Use the attached **Lesson Slides** to guide the lesson. Display the title slide and introduce the lesson, then continue to **slide 3**. Read the essential question for the lesson, and tell students they should think about this question as they look at pictures and gather information about specific water sources. Display **slide 4**, showing the picture of pollution and trash in and near a lake. Ask students to observe all the details of this picture and draw a conclusion about what is going on.

## Teacher's Note: Discussion Notes

Have students pay attention to the color of the water, the different pieces of trash they are seeing, other debris, etc. To encourage students to observe the picture details, facilitating questions might include: *"What debris on the shore is man-made? What is natural to the environment? How might all this debris affect the water or water quality? What can you infer about the water or water quality from the picture?"*

Invite students to share their thoughts with an elbow partner for 1–2 minutes, and then ask partners to share what they are seeing with the whole class. Ask students to determine the photo's location. Share with the students that the picture is of Lake Arcadia, just north of Oklahoma City, Oklahoma. Then, ask students to think for about 30 seconds about the importance of clean water and how it might impact them. Have them share their thoughts with their partner, allowing 1–2 minutes, and then ask for volunteers to share ideas with the class. Give students about 6–8 minutes for the entire activity.

## Teacher's Note: Lake Arcadia Discussion

For students who don't know where Lake Arcadia is located, explain that it is an Oklahoma lake north of Oklahoma City, near Edmond. This lake has many functions. It is used for flood control in the Deep Fork River basin, provides habitat to fish and wildlife, is used for recreation by the community, and supplies water to the city of Edmond. The point of this lesson is for students to understand the importance of water resources and how water pollution has far-reaching consequences. This lesson will use the Ganges River, a vital water resource in India, to demonstrate the impact of water resources on people. Guide student conversation toward understanding that water quality does not only impacts us personally, but also affects the environment, economy, and daily life.

Transition to the next activity by inviting students to look at water pollution and its impact elsewhere, specifically the Ganges River. You may wish for students to use their textbook atlas to locate the Ganges River in India as a point of reference.

### **Optional Modification for Distance Learning**

You can substitute this activity with a website such as [VoiceThread](#). With VoiceThread, you can upload pictures to the site beforehand. Then, students can choose whether they would like to make a quick video, a voice memo, or a written note to give feedback. [Download all attachments to use this lesson in Google Classroom.](#)

## Explore

Place the six prepared pictures of pollution of the Ganges River around the room with a large piece of poster paper next to each picture. Number the posters one through six. Number students one through six, or assign them into six working groups. Pass out a copy of the attached **It's Optical Graphic Organizer** to each student. Introduce the [It's OPTIC-AL](#) strategy on **slide 5**. Have each group report to their corresponding numbered poster. Ask groups to observe the assigned picture in detail as they did previously. Display **slide 6**, which explains the group assignment in detail.

### Teacher's Note: Explaining "It's OPTIC-al"

Consider writing out the O-P-T-I-C letters vertically on each piece of poster paper beforehand. This will help the groups work more efficiently. If students haven't completed this strategy before, help them understand what the parts of OPTIC mean and what to look for in the picture. You may want to use the Lake Arcadia picture to explain the strategy. Keep slide 5 displayed as a reference for the student groups as they work.

Allow time for groups to complete their own poster. Then, pass out the attached **It's Optical Graphic Organizer**. Ask each group to write down their OPTIC notes about the pictures as they view them.

Display **slide 7** and introduce the [Gallery Walk/Carousel](#) strategy. Invite student groups to rotate clockwise to another picture and fill out the OPTIC notes for the new picture. They can also add notes to the poster board about anything they observe in the picture that was not addressed.

Once all groups have rotated to every picture and completed their notes, have them return to seats, but remain with their group. Allow time for everyone to review their notes and ask questions or clear up confusion about any of the pictures. Each group should discuss the question in the **"Painting a Picture"** section of their graphic organizer. As a group, have students come to a consensus and draw a conclusion about what these pictures mean for this geographic region (i.e., Northern India), the present-day impact of the water situation there, and the future issues that may arise. Ask a few groups to share out their conclusions with the class.

### Optional Modification for Distance Learning

If conducting this lesson in an online or distance learning environment, you may choose to omit the Gallery Walk activity. You can substitute an activity with a website such as [VoiceThread](#). With VoiceThread, you can upload the images to the site beforehand. Then, students can choose whether they would like to make a quick video, a voice memo, or a written note to give feedback on other students' posters. [Download all attachments to use this lesson in Google Classroom.](#)

# Explain

Display **slide 8**. Distribute the attached **Ganges River Facts Reading** about the river and its uses. As students read, have them use a have them use the [Categorical Highlighting](#) strategy to analyze the reading, looking for information that could help them respond to the following questions: What is contributing to the pollution of the Ganges River? What efforts have been made to clean up the Ganges River? Once students have finished reading and highlighting, have them share what they highlighted with an elbow partner, and then ask a few pairs to share their answers with the class.

## Possible Student Responses to the Categorical Highlighting Activity

Based on the reading, students should highlight information that answers each question. **What is contributing to the pollution of the Ganges River?** *Possible answers: Hindu people bathing in the river, immersing cremated ashes in the river, 400 million people who live close to the river, tourist activities that put people and machines in the water, industrial waste, religious offerings wrapped in plastic, raw sewage, toxic metals and pesticides from industrial pollution, dumping tanning chemicals, people's daily use of bathing, washing clothes, agricultural use, and resulting waste.* **What efforts have been made to clean up the pollution?** *Possible answers include: Setting up programs to reduce industrial waste, and building sewage treatment plants.* Highlight the fact that local and state governments have not been able to handle the magnitude of the work, the lack of accountability and government oversight, as well as corruption by government officials, and the difficulty in garnering local support for conservation. In addition, the Hindu spiritual belief that the Ganges can heal itself also hinders efforts.

If there is any information you feel the students still need to know, or if you feel that they didn't get the necessary information from the pictures and the reading, inform them about the pollution of the Ganges more in-depth. Tell students that what they see happening with the Ganges River isn't unique to India, but that water pollution is an international and national concern. Water pollution, like they saw at Lake Arcadia in Oklahoma, is also a state and local concern.

## Optional Modification for Distance Learning

You may consider distributing the readings digitally and having students highlight in a word editor (such as Google Docs). [Download all attachments to use this lesson in Google Classroom.](#)

## Extend

Display **slide 9**. Ask students to think back to the picture of Lake Arcadia and consider the questions: *"What role do you play in water conservation and water pollution?"* and *"What impact does water conservation and water pollution have on more than just our personal use?"* Have students answer these two questions with a [Two-Minute Paper](#) strategy on notebook paper.

After their two minutes of writing, tell students they will watch an interview with the president of the Oklahoma Water Resources Board (OWRB), Julie Cunningham. Go to **slide 10** to play the video, titled "[ICAP - What's in Your Water?](#)" In the video, Cunningham addresses some of our state's water conservation and pollution issues, and ways the Oklahoma Water Resource Board works to clean up and conserve water.

### Embedded video

<https://youtube.com/watch?v=P4BAvdIznV4>

### Teacher's Note: Connections Globally and Locally

It is important for students to make the connection between the effects of pollution in the Ganges River with our own state's water protection and water conservation efforts. Discuss that water pollution is both a global and a local problem.

### Optional Modifications for Distance Learning

You may consider making this activity a discussion board post that students can respond to directly. [Download all attachments to use this lesson in Google Classroom.](#)

# Evaluate

Display **slide 11**. After showing the video of the OWRB interview, have students add additional information to their Two-Minute Paper discussing how they can support efforts to clean, protect, and conserve water based upon any information they picked up from the video.

## Technology Option

Instead of completing a Two-Minute paper, teachers may opt to have students film a short video of their responses to the questions using [Flipgrid](#) for smartphones or tablets. Flipgrid is a social learning platform that allows educators to ask a question, then the students respond in a video. Students are also able to respond to one another, creating a "web" of discussion.

Possible assessments and products of this lesson include the It's OPTIC-al Graphic Organizer and Painting a Picture activity, along with the Two-Minute Paper (or optional Flipgrid assignment).



## Resources

- Berke, J. (2018, March 3). India's holy Ganges River is devastatingly polluted, yet provides drinking water for over 400 million people — here's what it looks like. Business Insider. <https://www.businessinsider.com/photos-indias-ganges-river-pollution-2018-1>
- City of Edmond. (n.d.). Arcadia Lake. Edmondok.com. <https://edmondok.com/338/Arcadia-Lake>
- Ganges facts for kids. (n.d.). Kids encyclopedia facts. Kiddle. <https://kids.kiddle.co/Ganges>
- K20 center. (n.d.). Strategies. Categorical highlighting. <https://learn.k20center.ou.edu/strategy/fc74060730ea745c8c4f356aa204c85d>
- K20 center. (n.d.). Strategies. Elbow partners. <https://learn.k20center.ou.edu/strategy/ccc07ea2d6099763c2dbc9d05b00c4b4>
- K20 center. (n.d.). Strategies. Gallery walk/carousel. <https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f505a54d>
- K20 center. (n.d.). Strategies. It's OPTIC-al. <https://learn.k20center.ou.edu/strategy/b30762a7557ba0b391f207f4c600eac6>
- K20 center. (n.d.). Strategies. Think, pair, share. <https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f5064b49>
- K20 center. (n.d.). Strategies. Two-minute paper. <https://learn.k20center.ou.edu/strategy/d9908066f654727934df7bf4f506cf73>
- K20 center. (2020, February 13). ICAP - What's in your water [Video]. YouTube. <https://youtu.be/P4BAvdIznV4>
- Scarr, S., Cai, W., Kumar, V. & Pal, A. (2019). The race to save the river Ganges. Reuters. <https://graphics.reuters.com/INDIA-RIVER/010081TW39P/index.html>
- Shlotthauer, K. (2018). Trash piles up at Arcadia Lake--Edmond's main source of drinking water [Photo]. The Oklahoman. <https://oklahoman.com/article/5599714/trash-piles-up-at-arcadia-lake>