Science Sleuths - A SCI-FI Science Adventure

The Marshdale Menace

Episode 6

As the time machine drops you off back in Marshdale, you wonder where the Keys to Atlantis are. Professor Evan sent you on this quest to find the keys, and all you've been doing is learning about science. But maybe that's a mystery for another day. Today you're back in Marshdale to help the Duck Defenders and solve a new mystery. Something is polluting Marshdale's well, can you find where the pollutants are coming from?

By learning about how water moves underground we can figure out the source of pollution. Kind of like how we traced Cholera in Episode 3.

Using the instructions in the attached file **Episode 6: Groundwater Activities**, learn about the flow of groundwater, and learn skills to help the Duck Defenders solve where the pollution is coming from!

There are two versions of this activity: (Grades K-4) and (Grades 5-8). Choose the one that is best for your child's age!

You've used what you're learning about science to help the people (and nature) of Marshdale, and it's time to move on. Maybe you haven't found the key yet, but you're using science to make the world a better place. As the time machine turns on to take you on your next adventure, a message flashes across the screen.

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What could it mean? Find out on next week's episode of Science Sleuths…

Today's activity was adapted from "Seeing Watersheds" Project Wet Foundation, (2016).

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Episode 6: Groundwater Activities (Grades K-4)

Materials:

- Aluminum Foil or wax paper
- Water
- Glass or eyedropper
- Block (Or something to elevate paper, like a book)

Objectives:

- Locate the main stem, headwaters, mouth, and boundaries of watersheds
- Characterize the movement of water in a watershed-based on changes in elevation
- Discover how Watersheds are named

What is a "watershed"?
A watershed is an area of land where all its water drains to a common river! Try and look up what the name of the watershed you live on is called!

Activity:

1. Place a piece of wax paper or aluminum foil flat on a surface. Place a few drops of water on it. Does it run off the paper?

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2. Using your block, elevate one side of the foil/paper. Place a few drops of water on the highest point of the paper/foil. Which way did it flow?

3. Fold your paper/foil in half down the middle, and set it up like it's a tent. Try and place a few drops of water down the peak of the "tent". Which side does it go down? Does it go down both?

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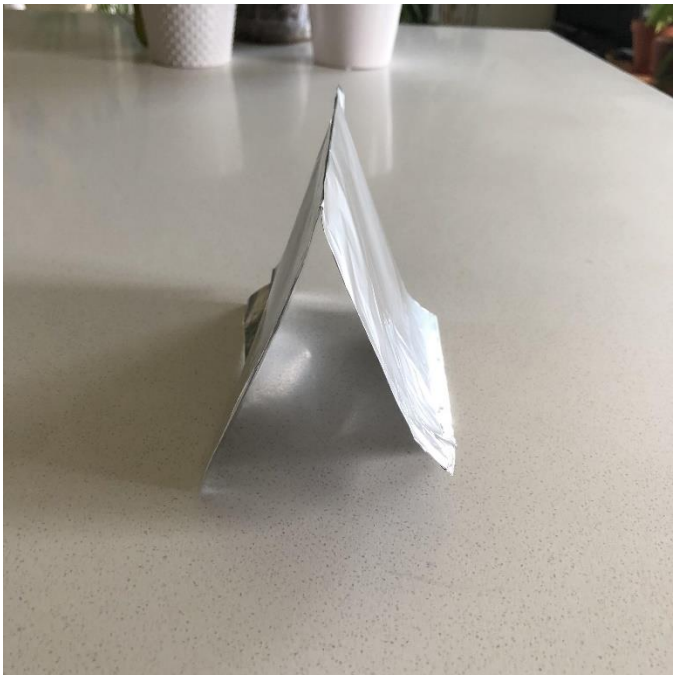

4. Can one large watershed be made up of other watersheds? Loosely crumple up your foil/paper and spread it out again. Place water drops at the peak of the paper again, like in the last activity. Does the water follow a crease or a path? Does it pool in spots? Large watersheds can have smaller watersheds inside them.

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Pollution is carried through watersheds in the water. It's a bad idea to leave garbage in a place where it's pollutants will be carried further along the watershed.

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Episode 6: Groundwater Activities (Grades 5-8)

Materials:

- Aluminum Foil or wax paper
- Water
- Glass or eyedropper
- Block (Or something to elevate paper, like a book)
- 2 different colored pens, pencils, or any other writing instrument

Objectives:

- Locate the main stem, headwaters, mouth, and boundaries of watersheds
- Characterize the movement of water in a watershed-based on changes in elevation
- Discover how Watersheds are named

What is a "watershed"?

A watershed is an area of land where all its water drains to a common river! Try and look up what the name of the watershed you live on is called!

Activity 1:

1. Place a piece of wax paper or aluminum foil flat on a surface. Place a few drops of water on it. Does it run off the paper?

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2. Using your block, elevate one side of the foil/paper. Place a few drops of water on the highest point of the paper/foil. Which way did it flow?

3. Fold your paper/foil in half down the middle, and set it up like it's a tent. Try and place a few drops of water down the peak of the "tent". Which side does it go down? Does it go down both?

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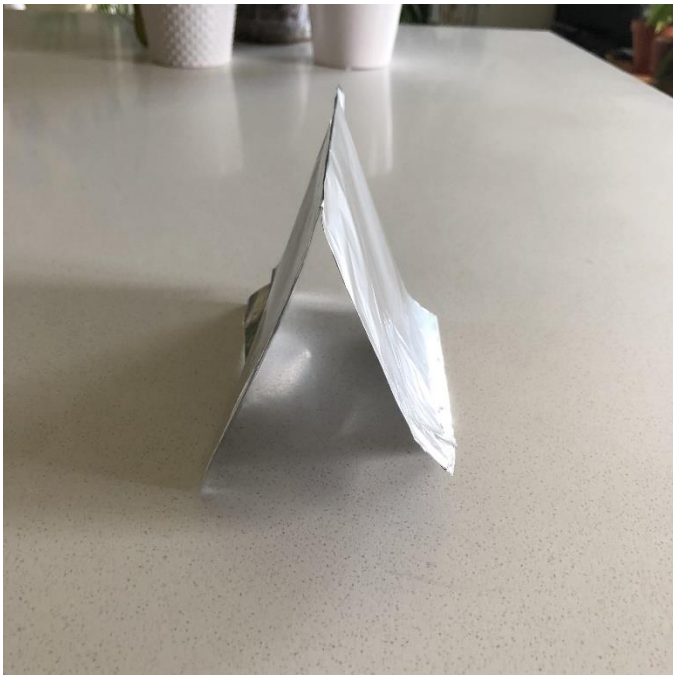

4. Can one large watershed be made up of other watersheds? Loosely crumple up your foil/paper and spread it out again. Place water drops at the peak of the paper again, like in the last activity. Does the water follow a crease or a path? Does it pool in spots? Large watersheds can have smaller watersheds inside them.

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Pollution is carried through watersheds in the water. It's a bad idea to leave garbage in a place where its pollutants will be carried further along the watershed.

Activity 2:

1. Take out the **Blue River** Student Page.

2. Color the main stem of the river blue or a color of your choosing.

3. Locate the **headwaters** of the main stem river and place a dot there. The headwaters are where the river originates, possibly coming out of the land as a spring.

4. Next, locate the four **tributaries** and color them blue as well. In this case, there are both primary and secondary tributaries. Tributaries are parts of the river that contribute to the main stem or main river. Primary tributaries connect to the main stem and secondary tributaries connect to the primary tributaries.

5. Place dots at the beginning of each of these tributaries.

6. Draw a line to connect the dots starting at "Start Here" and moving around the tributaries, including the headwaters.

7. You should now have a defined boundary around your Blue River watershed.

Congratulations! You just defined a watershed!

A watershed is more than just the waterways that flow within it—a watershed is a system that includes all the land, water, and animals within the defined boundary.

8. Now we will look at a larger watershed made up of several smaller watersheds. Take out your **Four Rivers** Student Page. Color each main stem of a river-based on its name: blue for Blue River, red for Red River, etc. If you do not have different colors, then use shapes or dots and lines to code each river.

9. Color the primary and secondary tributaries of each river the same color as the main stem.

10. The headwaters of each stem are labeled with HW. Place a dot in the corresponding color at the headwaters of each river on your Four Rivers copy page.

11. Next place a dot at the beginning of all tributaries in each river. Connect the dots for each river, being careful not to cross over rivers. The red river has been done for you as an example. If you do not have different colors, then use different dotted lines.

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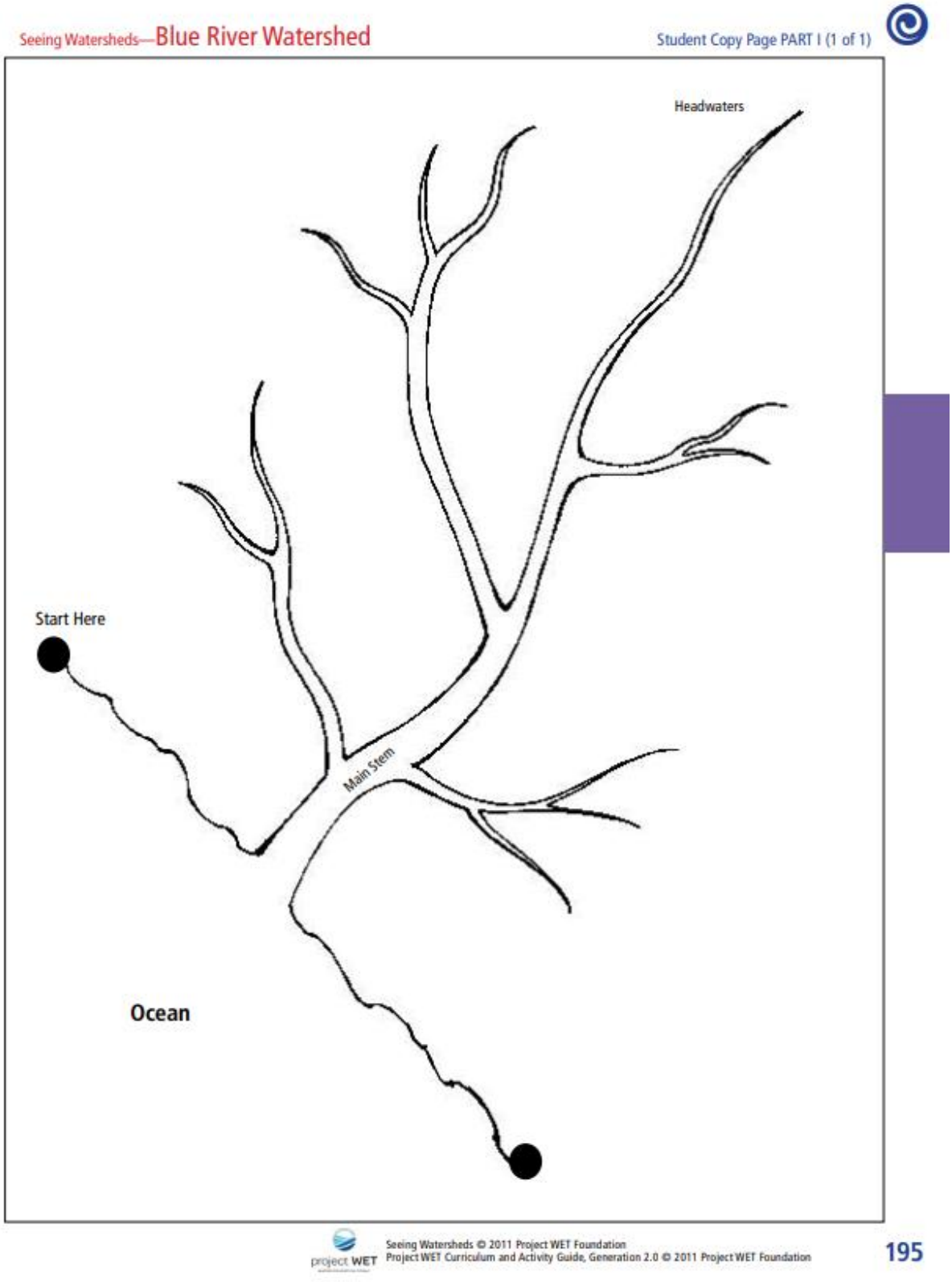
12. How many watersheds do you see? (You should see four distinct watersheds: red, green, blue, and orange.)



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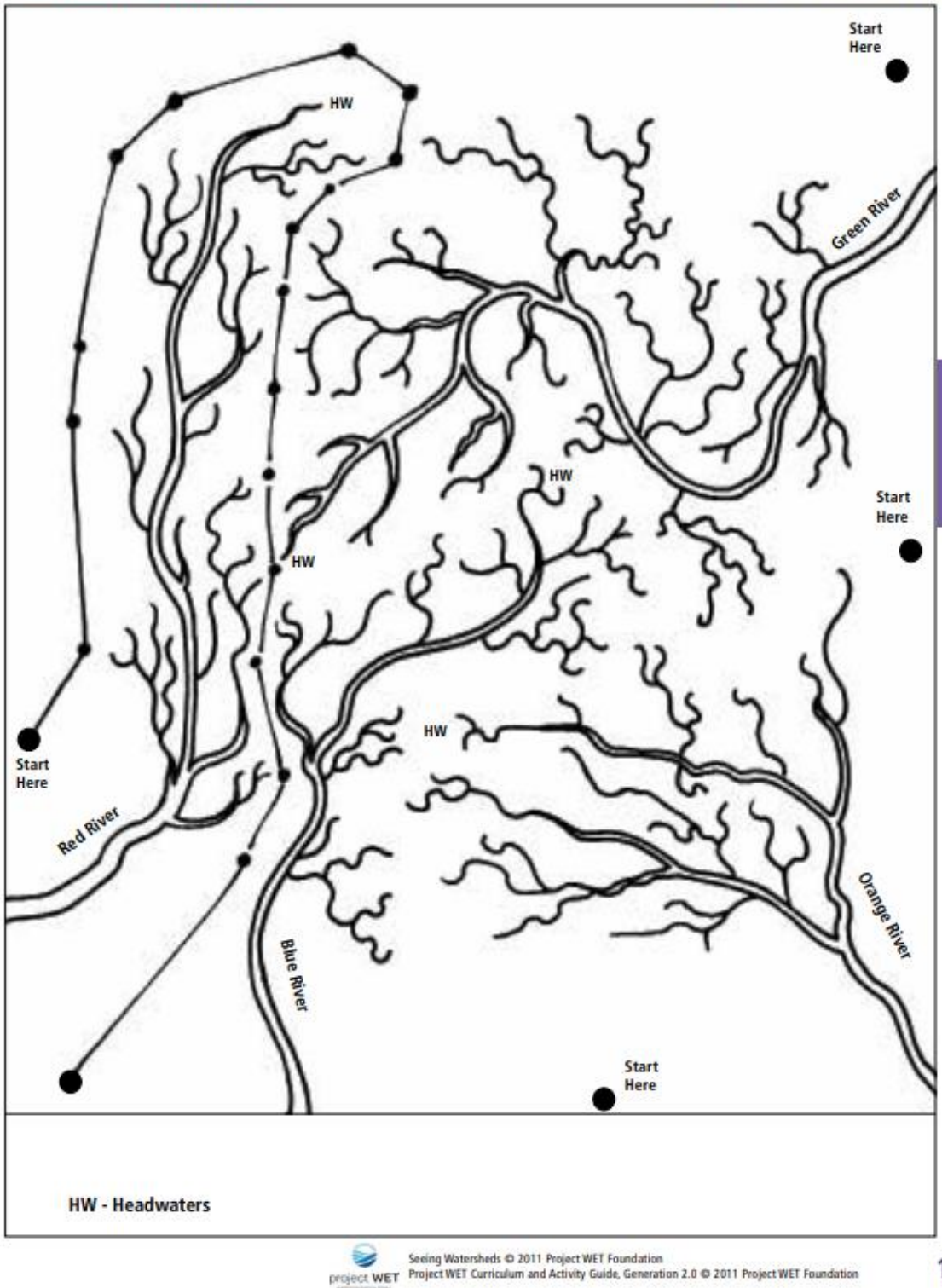

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