Expedition Days Online

WATERSHEDS

Study Guide

Student name: _____

EXPEDITION DAYS

MCDOWELL SONORAN CONSERVANCY

Exploring Water Movement

Goals: Investigate how water moves on different surfaces and record what you observe.

Materials (if you don't have one of these materials, go ahead and use something else!):

- Paper towel
- Tin foil
- Wax paper
- Something to drop water with (spray bottle, eyedropper, a straw, even your fingers and a cup of water!)

Instructions

- Gather your materials and find a place outside to experiment.
- Look at your three different materials (paper towel, tin foil, and wax paper—or whatever three materials you are using). Write down anything you notice about their surface textures.

Material	Description

Continue to the next page

Start experimenting! Perform the four following tests and record your observations:

When I do this…	**I observe this…**
Put water on (material) _____ when it is flat	
Put water on the (same material) _____, but make the material into a hill	
Drip water onto (material)_____ slowly	
Drip water onto (material) _____ fast	

Now try it yourself! Put water on the different materials, create your own experiments, and write down what you observe. Ask yourself why this might have happened and write out an explanation (a hypothesis).

When I do this…	**I observe this…**	**My hypothesis/Why**

Continue to the next page

When I do this…	I observe this…	My hypothesis/Why

4.RI.7, 4.W.1, 4.W.2, 4.SP3.6

Water Movement in Nature

Goals: Investigate how water moves on different surfaces in the natural world and record what you observe.

Materials:

- A spray bottle or water bottle filled with water

Instructions

- Gather your materials and head outside.
- Choose 3 or 4 natural surfaces (grass, dirt, a rock, tree bark, etc.).
- Spray, pour, or drop water on these natural surfaces, record what you see happening, and create a hypothesis.

When I do this…	I observe this…	My hypothesis/Why

Continue to the next page

4.RI.7, 4.W.1, 4.W.2, 4.SP3.6

When I do this…	I observe this…	My hypothesis/Why

If you didn't do so already in the chart above, find a natural surface that is not flat (something that is slanted like a ramp) and pour water over it.

Questions

1. What do you observe happening as the water moves over this uneven surface?

2. Is the water moving up or down?

Bonus: What force causes water to move down (when it rains, a waterfall, even water on a waterpark slide)?

Urban Surfaces

Goals: Come up with different permeable and/or impermeable human-made surfaces you see around your home and city.

Instructions

- Pick 2 of the natural surfaces you learned about (hard granite rock, moist soil, dry desert dirt, or sandy washes) and write them in the Natural Surface column below.
- Think about the different human-made surfaces around your home and city (these are surfaces that do not naturally occur in nature).
- Write down human-made surfaces that are similar to each of the natural surfaces you chose in the Human-Made Surfaces column below.

  Hints:
  - Think about how water moves over both surfaces.
  - Think about whether the surfaces are permeable or impermeable.

Natural Surface		Human-Made Surfaces
	Is Similar to	
	Is Similar to	

Continue to the next page

Now that you have thought about the different human-made surfaces around your city, answer the following questions:

1. Do you see more permeable or impermeable surfaces in the city you live in?

2. How do you think these surfaces affect how water moves in the city?

Where is There Water?

Goals: Write down places around your home and in nature where you see water. Determine whether these locations are naturally created or human-made.

Instructions

- Think about where you have seen water.
- List 5 or more places you see water around your home and in the natural world.
- Determine whether these places are natural (occur in nature) or urban (are made by humans). Mark your choice with an X.

Places I See Water	Natural	Urban

Do You Live in a Watershed?

Goals: Use the map to determine if you live in a watershed.

Instructions

Open the map by clicking on the link on the presentation slide.
You will see different red flags on the map that show different cities in Arizona.
First, find the city you live in on the map by clicking the flags. Answer the following questions:

1. Do you live in a watershed?

2. If you live in a watershed, which watershed do you live in?

Next, explore the other flags on the map. Pick a place in Arizona you have visited or would like to visit. Using this location, answer the following questions:

3. Is the second place in the same watershed as your home or is it in a different watershed?

4. If the second place is in a different watershed, which watershed is it in?

4.RI.1, 4.RI.3, 4.RI.7, 4.W.1, 4.W.2, 4.SP4.1, 4.SP3.6,4.G2.1,4.G3.1

What Affects a Watershed?

Goals: Use the map to investigate how different events can affect the quality and quantity of water in the watershed.

Instructions

- Open the map by clicking on the link on the presentation slide.
- You will see 5 different flags. Click on one flag to explore.
- In the table below, write the flag's location and name of the event.
- Read the description of the event. How would this event affect the water in a watershed?
- In the table below, write how you think the event would affect water quality (how clean is it?) and water quantity (how much water is available?) in the watershed.
- Fill out the table for all 5 flags.

Location	Name of Event	Effects on Quality	Effects on Quantity

How Do We Use Water?

Goals: List the different ways people and businesses use water every day.

Instructions

- Check out the Word Bank of different people and businesses below.
- Select 5 and write them in the People/Business column below.
- Think about how each would use water. Write your ideas in the Water Use column below.

Farmer	Restaurant owner	Golf course
Gas station owner	Car wash owner	Construction business
Yourself	Swimming pool	Baseball stadium
Fireman	School custodian	Clothing Store

People/Business	Water Use

People/Business	Ways to Use Less Water

Inquiry Elements 3, 4,5, 4.RI.7, 4.W.1, 4.W.2, 4.SP4.1, 4.SP3.6,4.E1U2.10,4.G2.1, 4.G3.1

Making a Watershed

Goals: Make a watershed model and identify the features of the watershed. Explain how different parts of a watershed (cities, farms, etc.) can affect the quality and quantity of water in the watershed.

Materials:

- Spray bottle
- Scrap paper
- Water-soluble markers

Instructions

- Crumple the piece of paper.
- Un-crumple the paper until you can find all four corners, it shouldn't be perfectly flat. It should now look like mountains.
- Using water-soluble markers, color your model:
    - Green marker to color along all the ridges (the up folded areas).
    - Blue marker to color along all the valleys (the down folded areas).
    - Black marker to make cities.
    - Brown marker to make farms.
- You have made a model of the land surface!
- Spray your model with water (keep the spray bottle about 12 inches away from the paper) until the colors start to run and water begins to pool. You are making it rain!

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As you watch your watershed model, answer the following questions:

1. What color are the high points on your watershed?

2. What color are the low points on your watershed model?

3. Did the water move from high points down to low points or from low points up to high points?

4. How can cities affect the watershed?

5. How can farms affect the watershed?

6. What do you think would happen when it rains in an area that recently had a fire?

If you want to save your watershed masterpiece, let it dry and hang it up.

Caring for the Watershed

Goals: Design ways to protect the quality and quantity of water in a watershed.

Instructions

You have learned about forest fires, farming and agriculture, city stormwater, and flooding in the watershed. Each of these events affects the amount of water in the watershed and the cleanliness of the water.

With careful planning, we can prevent some of these events from happening. We can make sure we have plenty of clean water for ourselves and the other living things in the ecosystem. Choose one environmental event (forest fires, farming, agriculture, or city pollution). Imagine a way you could help prevent this event. Answer the following questions:

1. What environmental event did you choose?

2. How does this environmental event affect the watershed?

3. Describe how you will help prevent this environmental event from hurting the watershed.

Bonus: Draw or build your prevention plan.