

The *Nature* of Teaching

Healthy Water, Happy Home Lesson Plan

This activity introduces the concepts of water quality, aquatic habitat, and indicator species.



Photo by Bart Kraus

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Lesson Plan Overview

Estimated Time

60–90 min.

Target audience

4th- and 5th-grade students

Vocabulary

- Water quality
- Runoff
- Sediment
- Habitat
- Dissolved oxygen
- Amphibian
- Indicator species
- Eastern hellbender
- Healthy water choices

Unit Objectives

Students will be able to:

1. Distinguish between choices that improve or reduce water quality.
2. Provide examples of ways that they can improve water quality from their homes and explain how those choices are beneficial to the environment.
3. Explain what an eastern hellbender is, what it needs to survive, and its role as an indicator species for freshwater ecosystems.

Targeted Grade-Level Indiana Standards

English/Language Arts

4.RF.1, 4.RF.5, 4.RV.1, 4.W.2.1, 4.SL.2.4, 4.SL.3.1
5.RF.1, 5.RF.5, 5.RV.1, 5.W.2.1, 5.SL.2.4, 5.SL.3.1

Science

4.2.5

Required Materials

1 Healthy Water, Happy Home Vocabulary Worksheet per student

1 gameboard per group of 4–8 students

1 die per gameboard

1 Healthy Water, Happy Home player pieces and title sheet per gameboard

1 one-minute timer per gameboard

20 Do Something cards per gameboard

20 Test Your Trivia cards per gameboard

20 Be the Scientist cards per gameboard

1 notebook per team of 2 students

1 pencil per team of 2 students

3 paper clips per gameboard to hold each stack of cards together

1 Healthy Water, Happy Home PowerPoint

Reference Materials

See teacher's notes.

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Procedure

(20–30 minutes)

1. Introduce the concept of water quality.

Possible questions:

Do you know what water quality is?

What makes water quality good and what makes it bad?

Why is good water quality important for plants, animals, and people?

Key concepts: **Water quality, runoff, sediment**

Water quality is important for plants, animals, and people.

2. Introduce the concept of aquatic habitat.

Possible questions:

What is a habitat?

What kinds of animals live in freshwater habitats like rivers and streams?

What do these animals require?

Key concepts: **Habitat, dissolved oxygen**

Aquatic animals need clean water with lots of dissolved oxygen to breathe.

3. Introduce the concept of an indicator species.

Possible questions:

What is an indicator species?

What are some examples of indicator species?

What is an amphibian?

Why would an amphibian be a good indicator species?

Key concepts: **Amphibian, indicator species, eastern hellbender, amphibians as indicator species**

Hellbenders are an example of a freshwater indicator species.

4. Discuss how students and their families can improve water quality from home.

Possible questions:

Since so much depends on good water quality, what are some things that we can do to make water quality better?

Is there anything that you do at home now to improve water quality or keep pollution from getting into the water?

Key Concepts: **Healthy water choices**

Rain barrels and rain gardens are two examples of healthy water choices.

5. Pass out the Healthy Water, Happy Home Vocabulary Worksheet and review with students.

6. Have students play the Healthy Water, Happy Home game.

Directions for the Healthy Water, Happy Home Game

(45–60 minutes)

The goal of this game is to improve water quality and create suitable habitat for indicator species like eastern hellbenders. In this game, you will travel along the riverbed answering questions and completing tasks. Your goal is to reach the center of the gameboard where there is a hellbender, because hellbenders indicate the highest level of water quality.

Split the class into groups of 4–8 students. There should be an even number of students in each group, if possible. Students should divide into teams of two within the groups. One group may have a team of three if there is an odd number of students in the class; just make sure everyone on the team gets a turn rolling the die and reading cards during the game.

Each group should have:

- 1 gameboard
- 1 die
- 1 Title cut from the Player Pieces and Title Sheet
- 1 one-minute timer
- 3 stacks of cards (Be the Scientist, Do Something, Test Your Trivia).

Each team should have:

- 1 notebook
- 1 pencil
- 1 player piece

After the game, review ways that students can improve water quality from home using healthy water choices.

Rules of the Game

1. Each team of 2 students must choose one playing piece. Teams must place their playing pieces at the place marked “start” on the gameboard.
2. Teams should take turns rolling the die. The team that rolls the highest number goes first, and then the game rotates clockwise. Each team must roll the die once per turn and team members should take turns rolling the die.
3. At the beginning of each turn, one team member will roll the die and move that team’s piece as many spots forward on the gameboard as appeared on the die. At the end of a turn, the player who rolled the die should pick up one card that corresponds with the picture on which the team’s player piece landed.
 - If the player piece lands on a crayfish, the player should draw a card from the Do Something deck.
 - If it lands on a water symbol, the player should draw a card from the Be the Scientist deck.
 - If it lands on a rock, the player should draw a card from the Test Your Trivia deck.

The player should **not** show any card to their team partner unless a card specifically says to, and should **not** look at the answer upside down in the box on the bottom of the card, if there is one.

4. The player who draws the card must read the card out loud to the group—but should **not** read the answer upside down in the box on the lower half of the card, if there is one. After the card is read aloud, a player from another team should start the one-minute timer. The player who drew the card has one minute to perform the task or answer the question.
 - If the player answers correctly and in time, that team will get to move on their next turn.
 - If the player does not answer correctly or in time, that player’s game piece must stay at the same spot on the board for another turn and another team member from the same team must draw from the same deck on that team’s next turn.

This process repeats until the team answers a card correctly. They have one chance to complete a task or answer a card correctly per turn. Players should always return a card to the bottom of the deck it came from.

5. The team that travels to the hellbender first wins the game.

Teacher's Notes

Water Quality

Water is a vital natural resource. We need clean water for drinking, swimming, irrigating crops, and sustaining healthy fish and wildlife populations.

- **Water quality** is a measure of the condition of water relative to the requirements of a species. Most species require clean, healthy water. Some of the main causes of poor water quality in urban areas are storm water runoff (runoff) and sediment. Water quality is also measured by the amount of excess nutrients, bacteria, and dissolved oxygen that the water contains.

Water quality is also affected by what people wash down garbage disposals, toilets, and storm drains. If something is toxic to drink, it is likely that you should not put it down the drain. Storm drains often lead directly to rivers. Waste thrown in trash bins is not immune to runoff, either. Once trash is taken to a landfill, rainwater can wash toxins into local rivers and streams. Go online to learn more about hazardous household waste and to search for places you can dispose of household waste in your county. See “Hazardous Products,” Tippecanoe County Solid Waste Management District. <http://www.tippecanowaste.org/hazardous-products>.

- **Runoff** is rainwater that flows over the surface of the ground and into local rivers and streams. Runoff can pick up pollution (e.g., fertilizers, pesticides, and sediment) from surfaces such as yards, streets, cars, and homes and wash them into storm drains. Once the runoff enters storm drains, it eventually moves into local rivers and streams. Runoff is not bad for water quality until it picks up pollutants. Follow this link to learn more about how to reduce runoff: http://www.cleanwaterways.org/kids/stormwater_runoff.html#
- **Sediment** is soil that is moved from land to water. Sediment harms freshwater habitats by making water murky. Murky water makes it hard for animals to find their food. Sediment also clogs fish's gills and makes it difficult for amphibians to

breathe through their skin. Sediment fills in the spaces under large flat rocks that hellbenders use for shelter and nests. Sediment is the most common pollution in rivers, lakes, and streams (EPA).

- **Dissolved oxygen** is the oxygen dissolved in the water that fish and other aquatic organisms need to breathe. Sediment and other runoff hold excess nutrients like nitrogen and phosphorous that can encourage algae blooms that reduce dissolved oxygen levels in the water. Decaying organic matter (like yard waste, pet waste, and food waste) also uses up dissolved oxygen. Aquatic microorganisms and bacteria that consume organic matter use up oxygen in the process of decomposition (Cary Institute of Ecosystem Studies).

Aquatic Habitat

An animal's habitat is where it lives. Many organisms are affected by the health of aquatic habitats. Some animals like fish spend all their time in water. Many animals, like beavers, ducks, and amphibians, spend most of their time in water or eat plants and animals that live in the water. Humans need water for irrigating crops. If we use too much water, or if we pollute the water, fish and wildlife populations start to decrease, and human populations are negatively affected as well.

Indicator Species

Indicator species indicate the health of an ecosystem. These species can indicate good or bad ecosystem health. The eastern hellbender is an indicator species of good freshwater ecosystem health.

- In aquatic systems amphibians are often indicator species because they breathe through their skin and are very sensitive to water quality. When they are larvae, many amphibians have gills that absorb oxygen from the water. When they become adults, most amphibians lose their gills and start to breathe through their lungs, their skin, or both. Amphibians are great indicator species, because they have sensitive skin that is permeable to pollution.

- One specific amphibian that serves as an indicator species in aquatic systems is the **eastern hellbender**. The eastern hellbender is an endangered species of salamander that lives in the eastern United States. Hellbenders are extremely sensitive to water quality because they spend their whole lives in water and breathe through their skin. They have folds of skin along their sides to help them obtain oxygen from the water. Because they are so sensitive to water quality, their presence indicates a healthy freshwater ecosystem. They are the largest salamander species in North America and can grow to two feet long. Their bodies are flat so they can squeeze under flat rocks where they shelter and lay their eggs. They also have paddle-like tails for swimming and tiny eyes, because they rely on their sense of smell to look for food which consists mainly of crayfish. One of the biggest issues causing hellbender populations to decline is poor water quality. Hellbenders need very clean, swift-flowing water rich with dissolved oxygen to breathe and live in. To learn more about hellbenders, click on the link helpthehellbender.org.

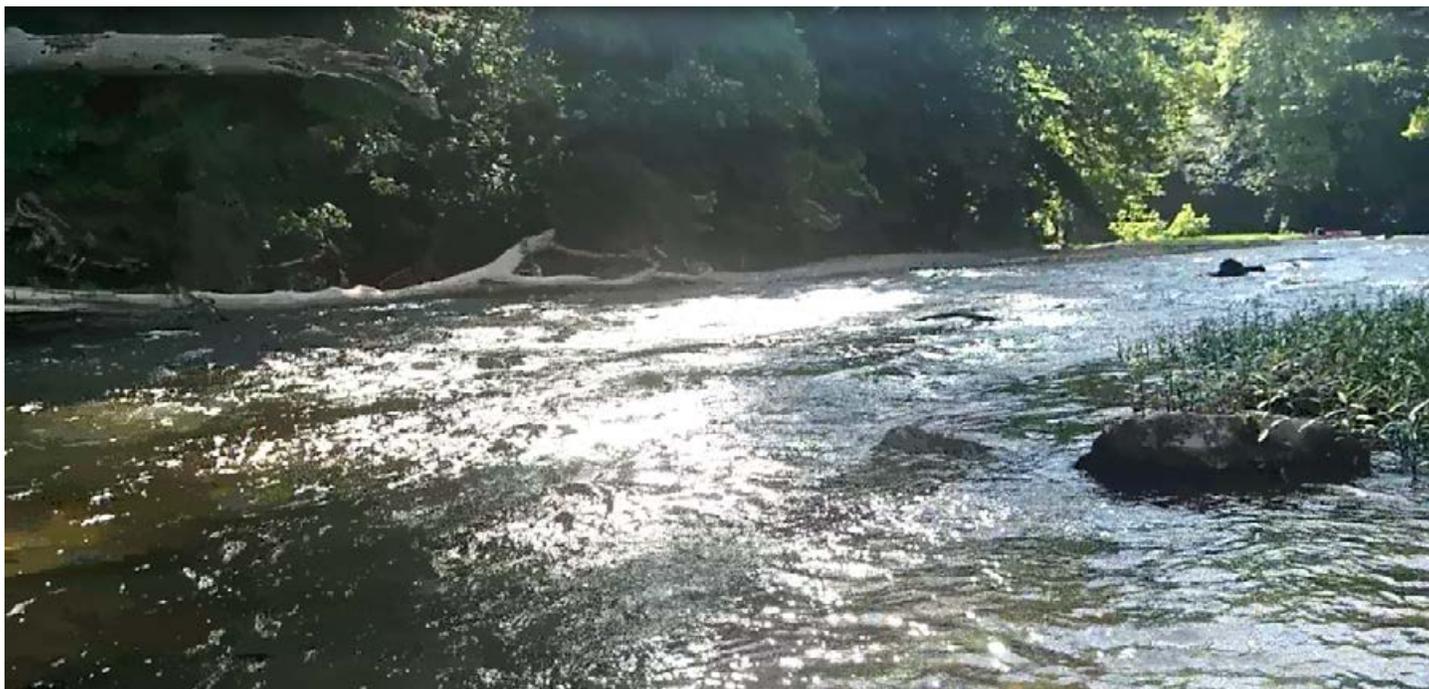
Healthy Water Choices

Choices that students and their families can make to improve water quality in local rivers and streams.

Everyday practices

- *Composting* is the collection of solid food waste and yard waste in a specific area to allow for natural decomposition. Composting improves water quality because it reduces the amount of organic matter sent to landfills and storm drains. If too much yard waste accumulates in a storm drain, it can cause flooding. Storm drains lead to rivers, and if too much organic matter accumulates in a river, the process of decomposition will reduce dissolved oxygen levels, reducing water quality. Compost by mixing soil, dry material (newspaper, grass clippings, leaves), and food in a heap outside or a bin inside. Make an indoor compost bin by punching small holes in the lid of a container like an old coffee tin. Put the tin on top of a tray under your sink or somewhere out of the way, then add soil to it once a week or when the compost is wet. Make sure to turn your compost regularly if it is outside. You can also add red worms to your compost bin to speed up the decomposition process. <http://whatcom.wsu.edu/ag/compost/easywormbin.htm>
- *Wash your car at a car wash or on grass or gravel* to keep pollution and sediments that were once on your car from washing into the street and into storm drains. Car washes have methods of collecting runoff from cars and preventing it from flowing into storm drains.
- *Sweep sidewalks and driveways* instead of hosing them off to reduce sediment runoff into storm drains and rivers. Sediment can contain excess nutrients like nitrogen and phosphorous that can encourage aquatic plant and algae growth, reducing dissolved oxygen levels in the water.
- *Leave your grass clippings and leaves where they are* or bag them to be disposed of with yard waste instead of blowing them into the street where they can wash into storm drains and be carried into rivers and streams. Grass clippings can hold pesticides and fertilizers, clog storm drains, and cause flooding. Once a storm drain floods, water collects pollution in the streets before it flows into local rivers and streams. If grass clippings and leaves get into rivers, they decompose there, dissolving oxygen that fish and hellbenders need to survive. Composting your grass clippings is another way to prevent them from reaching the river.
- *Pick up pet waste* to greatly improve water quality. Pet waste left in yards can be washed into storm drains that eventually lead to rivers and streams. When pet waste gets into rivers and streams, it consumes dissolved oxygen and gives off ammonia as it decays. Pet waste can also carry disease.

- *Minimize fertilizer and pesticide use* to improve water quality by reducing the amount of chemicals collected by runoff and washed into storm drains and eventually into local bodies of water. Excess nutrients from fertilizers can encourage aquatic plant and algae growth, reducing dissolved oxygen in the water.
 - *Recycle electronics*. Electronics like phones and TVs contain heavy metals that can wash into local rivers and streams with rainfall if taken to landfills or left on the side of the road (In.gov 2015).
 - *Rain gardens* are collections of native plants placed in low areas and used to collect rainwater. Rainwater drains to these gardens instead of into the streets where it would collect pollution as runoff and eventually end up in local rivers and streams. Rain gardens filter toxins out of runoff. Find out how to plant a rain garden at http://www.tippeconow.com/opt_rain_garden.php
 - *Plant native plants and trees*. Native plants require less maintenance, pesticides, fertilizer, and water than non-native plants (California Native Plant Society 2015, WREC 2015). Native plants are also better adapted to the climate conditions and provide better soil stability with longer root structures (WREC 2015). More soil stability reduces sediment runoff. Trees are great for reducing sediment runoff and erosion because of their larger root systems.
- Bigger projects**
- *Rain barrels* are used to collect water from your roof or downspout. Collecting water with a rain barrel and using it to water your garden is a great option for improving water quality, because without rain barrels, water runs off our roofs and downspouts and into streets, collecting pollution (fertilizer, sediment, grass clippings). The runoff eventually moves into storm drains that lead to local rivers. The water collected by rain barrels can be used to water gardens or wash cars. Find out how to buy and install a rain barrel at http://www.tippeconow.com/opt_rain_barrel.php.



Player Pieces and Title Sheet

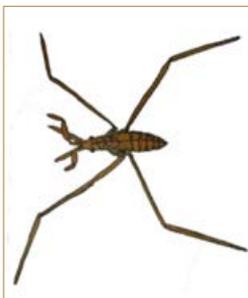
Healthy Water, Happy Home



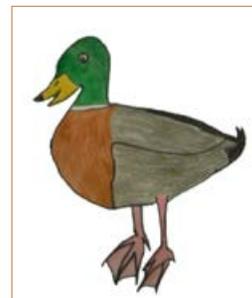
Green Frog



Northern Water Snake



Water Strider



Mallard Duck

Vocabulary Worksheet

WORD BANK

Eastern hellbender

Healthy water choices

Habitat

Sediment

Runoff

Indicator species

Water quality

Dissolved oxygen

1. _____ The measure of the condition of water relative to species' requirements.
2. _____ Rainwater that flows over the surface of the ground and into local rivers and streams.
3. _____ Soil that is collected by water and washed into rivers and streams.
4. _____ The largest salamander in North America.
5. _____ A species whose presence indicates the health of an ecosystem.
6. _____ Where an animal lives.
7. _____ Things you can do to improve water quality.
8. _____ What fish and eastern hellbenders need to breathe in water.

Vocabulary Worksheet — **KEY**

WORD BANK

Eastern hellbender

Healthy water choices

Habitat

Sediment

Runoff

Indicator species

Water quality

Dissolved oxygen

1. **Water quality** _____
The measure of the condition of water relative to species' requirements.
2. **Runoff** _____
Rainwater that flows over the surface of the ground and into local rivers and streams.
3. **Sediment** _____
Soil that is collected by water and washed into rivers and streams.
4. **Eastern hellbender** _____
The largest salamander in North America.
5. **Indicator species** _____
A species whose presence indicates the health of an ecosystem.
6. **Habitat** _____
Where an animal lives.
7. **Healthy water choices** _____
Things you can do to improve water quality.
8. **Dissolved oxygen** _____
What fish and eastern hellbenders need to breathe in water.

Do Something Cards

<p>Do Something Sing it</p> <p>You have one minute to write a rap, song, or poem about <i>healthy water quality</i>.</p> <p>Read, rap, or sing your work to the group. Your partner may help you out.</p>	<p>Do Something Sing it</p> <p>You have one minute to write a rap, song, or poem about <i>minimizing fertilizer and pesticide use for clean water</i>.</p> <p>Read, rap, or sing your work to the group. Your partner may help you out.</p>
<p>Do Something Sing it</p> <p>You have one minute to write a rap, song, or poem about <i>hellbender indicator species for healthy water</i>.</p> <p>Read, rap, or sing your work to the group. Your partner may help you out.</p>	<p>Do Something Sing it</p> <p>You have one minute to write a rap, song, or poem about <i>picking up pet waste for clean water</i>.</p> <p>Read, rap, or sing your work to the group. Your partner may help you out.</p>
<p>Do Something Act it out</p> <p>Pretend to be a girl named Megan. Megan is sweeping the sidewalk clean with a broom. Your partner is a girl named Brianna. Brianna asks what you are doing.</p> <p>Talk about sweeping the sidewalk instead of spraying. Go!</p>	<p>Do Something Act it out</p> <p>Pretend to be a guy named Zach. Zach is planting a rain garden. Your partner is a girl named Becca. Becca asks what you are doing.</p> <p>Talk about rain gardens. Go!</p>
<p>Do Something Act it out</p> <p>Pretend to be a guy named Nick. Nick is washing his car on the grass. Your partner is a girl named Ardith. Ardith asks what you are doing.</p> <p>Talk about washing your car on the grass instead of the street or driveway. Go!</p>	<p>Do Something Act it out</p> <p>Pretend to be a girl named Shelly. Shelly is planting native plants in her yard to improve water quality. Your partner is a guy named Rod. Rod asks you what you are doing.</p> <p>Talk about native plants. Go!</p>

Do Something Cards

<p style="text-align: center;">Do Something</p> <p>Guess the sketch <i>(Do not show your partner this card)</i></p> <p>You must get your partner to guess the word at the bottom of this card with just drawings. No letters, talking, or gestures.</p> <p>You may tell your partner this hint: "Action. Instead of spraying."</p> <p style="text-align: center;">*Flip the timer and start drawing*</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;"><i>Answer: Sweep sidewalk</i></div>	<p style="text-align: center;">Do Something</p> <p>Guess the sketch <i>(Do not show your partner this card)</i></p> <p>You must get your partner to guess the word at the bottom of this card with just drawings. No letters, talking, or gestures.</p> <p>You may tell your partner this hint: "One word. Where an animal lives."</p> <p style="text-align: center;">*Flip the timer and start drawing*</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;"><i>Answer: Habitat</i></div>
<p style="text-align: center;">Do Something</p> <p>Guess the sketch <i>(Do not show your partner this card)</i></p> <p>You must get your partner to guess the word at the bottom of this card with just drawings. No letters, talking, or gestures.</p> <p>You may tell your partner this hint: "Thing. Two words. Reduces runoff from your house."</p> <p style="text-align: center;">*Flip the timer and start drawing*</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;"><i>Answer: Rain barrel</i></div>	<p style="text-align: center;">Do Something</p> <p>Guess the sketch <i>(Do not show your partner this card)</i></p> <p>You must get your partner to guess the word at the bottom of this card with just drawings. No letters, talking, or gestures.</p> <p>You may tell your partner this hint: "Thing. Two words. Holds water and filters runoff."</p> <p style="text-align: center;">*Flip the timer and start drawing*</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;"><i>Answer: Rain garden</i></div>
<p style="text-align: center;">Do Something</p> <p>Guess the sketch <i>(Do not show your partner this card)</i></p> <p>You must get your partner to guess the word at the bottom of this card with just drawings. No letters, talking, or gestures.</p> <p>You may tell your partner this hint: "Thing. One word. Flowing across surfaces."</p> <p style="text-align: center;">*Flip the timer and start moving*</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;"><i>Answer: Runoff</i></div>	<p style="text-align: center;">Do Something</p> <p>Guess the sketch <i>(Do not show your partner this card)</i></p> <p>You must get your partner to guess this noun by acting it out. No talking allowed.</p> <p>You may tell them this hint: "Thing. Be careful what you wash down this."</p> <p style="text-align: center;">*Flip the timer and start moving*</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;"><i>Answer: Drain</i></div>
<p style="text-align: center;">Do Something</p> <p style="text-align: center;">Charades</p> <p>You must get your partner to guess the answer by acting it out. No talking!</p> <p>You may tell your partner this hint: "Something you can do to reduce runoff."</p> <p style="text-align: center;">*Flip the timer and start moving*</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;"><i>Answer: Take your car to a car wash</i></div>	<p style="text-align: center;">Do Something</p> <p style="text-align: center;">Charades</p> <p>You must get your partner to guess this action by acting it out. No talking!</p> <p>You may tell your partner this hint: "Thing. One word. Put it on your garden. Reduces food and yard waste."</p> <p style="text-align: center;">*Flip the timer and start moving*</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;"><i>Answer: Compost</i></div>

Do Something Cards

<p>Do Something Charades</p> <p>You must get your partner to guess this action by acting it out. No talking allowed.</p> <p>You may tell your partner this hint: "Action. Woof."</p> <p>*Flip the timer and start moving*</p> <p><i>Answer: Picking up pet waste</i></p>	<p>Do Something Charades</p> <p>You must get your partner to guess this action by acting it out. No talking allowed.</p> <p>You may tell your partner this hint: Action. "Two words. Earth Day."</p> <p>*Flip the timer and start moving*</p> <p><i>Answer: Planting trees/native plants</i></p>
<p>Do Something Charades</p> <p>You must get your partner to guess this action by acting it out. No talking allowed.</p> <p>You may tell them this hint: "Yard waste."</p> <p>*Flip the timer and start moving*</p> <p><i>Answer: Leave grass clippings and leaves where they are</i></p>	<p>Do Something Charades</p> <p>You must get your partner to guess this action by acting it out. No talking!</p> <p>You may tell your partner this hint: "Instead of throwing it away. . ."</p> <p>*Flip the timer and start moving*</p> <p><i>Answer: Recycling electronics</i></p>

Test Your Trivia Cards

<p style="text-align: center;">Test Your Trivia</p> <p>There's a heavy rain and Erin wants to keep runoff from her house from getting into the street. She also wants to save the water for her garden. What can she use/do?</p> <ul style="list-style-type: none"> a) Minimize pesticide use b) Get a rain barrel c) Leave yard waste or bag it d) Plant a rain garden <p style="text-align: center;"><i>Answer: b) Get a rain barrel</i></p>	<p style="text-align: center;">Test Your Trivia</p> <p>Obed wants to prevent runoff from his yard flowing into the street. What can he use/do?</p> <ul style="list-style-type: none"> a) Recycle Electronics b) Pick up pet waste c) Plant a rain garden d) Compost <p style="text-align: center;"><i>Answer: c) Plant a rain garden</i></p>
<p style="text-align: center;">Test Your Trivia</p> <p>What 2 things can Montana do/use to reduce sediment runoff from her yard?</p> <ul style="list-style-type: none"> a) Recycle Electronics b) Plant a rain garden c) Don't put medicine down the drain d) Plant trees/native plants <p style="text-align: center;"><i>Answer: b), d)</i></p>	<p style="text-align: center;">Test Your Trivia</p> <p>What reduces dissolved oxygen in rivers? Choose all that apply.</p> <ul style="list-style-type: none"> a) Sediment b) Fertilizer c) Putting medicine down the drain d) Plant trees/native plants <p style="text-align: center;"><i>Answer: a), b)</i></p>
<p style="text-align: center;">Test Your Trivia</p> <p>What is okay to put down the drain?</p> <ul style="list-style-type: none"> a) Oil b) Paint c) Medicine d) Water <p style="text-align: center;"><i>Answer: d) Water</i></p>	<p style="text-align: center;">Test Your Trivia</p> <p>What can Paige do to decrease the amount of food waste and yard waste that she sends to the landfill?</p> <ul style="list-style-type: none"> a) Get a rain barrel b) Compost c) Sweep her sidewalk d) Recycle electronics <p style="text-align: center;"><i>Answer: b) Compost</i></p>
<p style="text-align: center;">Test Your Trivia</p> <p>What does a hellbender need to survive? Choose all that apply.</p> <ul style="list-style-type: none"> a) Crayfish b) Flat rocks c) Cool, clean water d) Fertilizer <p style="text-align: center;"><i>Answer: a), b), c)</i></p>	<p style="text-align: center;">Test Your Trivia</p> <p>What is the best definition of an indicator species?</p> <ul style="list-style-type: none"> a) A species that tells us where we can find water b) A species that tells us the health of an ecosystem c) A species that can be used in research d) An endangered species <p style="text-align: center;"><i>Answer: b) A species that tells us the health of an ecosystem</i></p>

Test Your Trivia Cards

<p>Test Your Trivia True or false Dissolved oxygen is good for water quality.</p> <p><i>Answer: True</i></p>	<p>Test Your Trivia True or false Sediment and polluted runoff are good for water quality.</p> <p><i>Answer: False</i></p>
<p>Test Your Trivia What is acceptable to dump down the drain or toilet?</p> <ul style="list-style-type: none"> a) Paint b) Cooking oil c) Cleaning supplies d) None of the above <p><i>Answer: d) None of the above</i></p>	<p>Test Your Trivia What kind of plants hold the soil and filter pollution from water the best?</p> <ul style="list-style-type: none"> a) Invasive plants b) Native plants c) Non-native plants d) Ornamental plants <p><i>Answer: b) Native plants</i></p>
<p>Test Your Trivia What is runoff?</p> <ul style="list-style-type: none"> a) A pond or river b) Rainwater that you collect c) Water that flows over the surface of the ground and into local rivers and streams d) Water that is very fast <p><i>Answer: c) Water that flows over the surface of the ground and into local rivers and streams</i></p>	<p>Test Your Trivia Water is ponding in your yard. What is the best solution to this?</p> <ul style="list-style-type: none"> a) Planting a rain garden b) Picking up pet waste c) Recycling electronics d) Sweeping your sidewalk <p><i>Answer: a) Planting a rain garden</i></p>
<p>Test Your Trivia What is not a healthy water choice? Choose all that apply.</p> <ul style="list-style-type: none"> a) Getting a rain barrel b) Using a lot of fertilizer on your lawn c) Planting a rain garden d) Blowing leaves into the street <p><i>Answer: b), d)</i></p>	<p>Test Your Trivia What is not a healthy water choice? Choose all that apply.</p> <ul style="list-style-type: none"> a) Getting a rain barrel b) Planting a rain garden c) Spraying your sidewalk clean d) Dumping medicine down the drain <p><i>Answer: c), d)</i></p>

Test Your Trivia Cards

Test Your Trivia

What is true about rain barrels?

Choose all that apply.

- a) They attract mosquitoes
- b) You can use the water to water your garden
- c) You can use the water to wash your car
- d) They collect runoff from your house

Answer: b), c), d)

Test Your Trivia

What is true about rain gardens?

- a) They filter pollution from runoff
- b) They collect ponding water in your yard
- c) You can use the water to wash your car
- d) You can use the water to water your garden

Answer: a), b)

Test Your Trivia

True or false

Spraying your sidewalk reduces sediment washed into storm drains.

Answer: False

Test Your Trivia

True or false

Sweeping your sidewalk reduces sediment washed into storm drains.

Answer: True

Be the Scientist Cards

<p>Be the Scientist Correct the sentence.</p> <p>Fix these sentences with your partner. Cover the bottom part of this card so there is no cheating.</p> <p>Hellbenders breathe through their <u>gills</u>. Hellbenders are a type of <u>lizard</u>.</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;"> <p><i>Hellbenders are a type of salamander/amphibian. Hellbenders breathe through their skin. Corrected sentences:</i></p> </div>	<p>Be the Scientist Correct the sentence.</p> <p>Fix this sentence with your partner. Cover the bottom part of this card so there is no cheating.</p> <p>Planting <u>invasive plants</u> is good for water quality because they <u>increase</u> sedimentation and runoff.</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;"> <p><i>Planting native plants is good for water quality because they decrease sediment. Corrected sentences:</i></p> </div>
<p>Be the Scientist Correct the sentence.</p> <p>Fix this sentence with your partner. Cover the bottom part of this card so there is no cheating.</p> <p>Hellbenders eat <u>birds</u> and live in <u>murky</u> water.</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;"> <p><i>Hellbenders eat crayfish and live in clean water. Corrected sentences:</i></p> </div>	<p>Be the Scientist Correct the sentence.</p> <p>Fix these sentences with your partner. Cover the bottom part of this card and let your partner see the sentence.</p> <p>Hellbenders <u>are not</u> an indicator species. They indicate <u>poor</u> water quality.</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin-top: 10px;"> <p><i>Hellbenders are an indicator species. They indicate good water quality. Corrected sentences:</i></p> </div>
<p>Be the Scientist Write a hypothesis.</p> <p>Write a hypothesis for what you think might DECREASE hellbender population numbers.</p> <p>If...<we do this>... , then hellbender populations will decrease.</p> <p>Read it to the group once the timer runs out.</p>	<p>Be the Scientist Write a hypothesis.</p> <p>Write a hypothesis for what you think might INCREASE hellbender population numbers.</p> <p>If...<we do this>... , then hellbender populations will increase.</p> <p>Read it to the group once the timer runs out.</p>
<p>Be the Scientist Make a plan.</p> <p>Draw or write how Brayden can reduce runoff into lakes and streams. You have 1 minute to make your plan, and then you must present your plan to the other teams.</p> <p><i>Hint: What healthy water choices can he make?</i></p>	<p>Be the Scientist Make a plan.</p> <p>Draw or write how Lanie can reduce sediment in rivers. You have 1 minute to make your plan, and then you must present your plan to the other teams.</p> <p><i>Hint: What healthy water choices can she make?</i></p>

Be the Scientist Cards

<p>Be the Scientist Make a plan.</p> <p>Write 2 things Emily can do to improve water quality from home.</p> <p><i>Hint: What healthy water choices can she make?</i></p>	<p>Be the Scientist Make a plan.</p> <p>Write 2 things Brian can do to improve water quality at his school.</p> <p><i>Hint: What healthy water choices can he make?</i></p>
<p>Be the Scientist How does it work?</p> <p>Draw, write, and talk to your partner about sweeping their sidewalk. Explain how it improves water quality.</p>	<p>Be the Scientist How does it work?</p> <p>Draw, write, and talk to your partner about not putting medicine down drains. Explain how it decreases water quality.</p>
<p>Be the Scientist How does it work?</p> <p>Draw, write, and talk to your partner about composting. Explain what composting is, how to do it, and how it improves water quality.</p>	<p>Be the Scientist How does it work?</p> <p>Draw, write, and talk to your partner about native plants. Explain what they are and how planting them improves water quality.</p>
<p>Be the Scientist Make a graph</p> <p>Draw a line graph that shows what hellbender populations would do if all the people in Indiana put a lot of fertilizer on their lawns. The X-axis is time and the Y-axis is number of hellbenders. Nothing fancy. Just draw a line.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center;"><i>Answer:</i> <i>Graph should have a downward trend from left to right.</i></p> </div>	<p>Be the Scientist Make a graph</p> <p>Draw a line graph that shows what hellbender populations would do if all the people in Indiana made healthy water choices. The X-axis is time and the Y-axis is number of hellbenders. Nothing fancy. Just draw a line.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center;"><i>Answer:</i> <i>Graph should have an upward trend from left to right.</i></p> </div>

Be the Scientist Cards

Be the Scientist

Make a prediction.

Eastern hellbenders need flat rocks to hide under and protect their eggs. Predict what would happen if there was too much sediment filling the spaces under the rocks.

*Possible answers:
Hellbender populations will decrease;
dissolved oxygen levels will decrease; water quality will go down.*

Be the Scientist

Make a prediction.

Predict what you think would happen to eastern hellbenders if everyone used leaf blowers to blow yard waste into the street.

*Possible answers:
Yard waste would clog the storm drains, causing flooding and more runoff;
it would decompose in the river, reducing dissolved oxygen.*

Be the Scientist

Make a prediction.

What will happen if Nick bags all of his yard waste instead of blowing it into the street

*Possible answers:
Dissolved oxygen in rivers will increase; yard waste won't clog
storm drains or flood streets.*

Be the Scientist

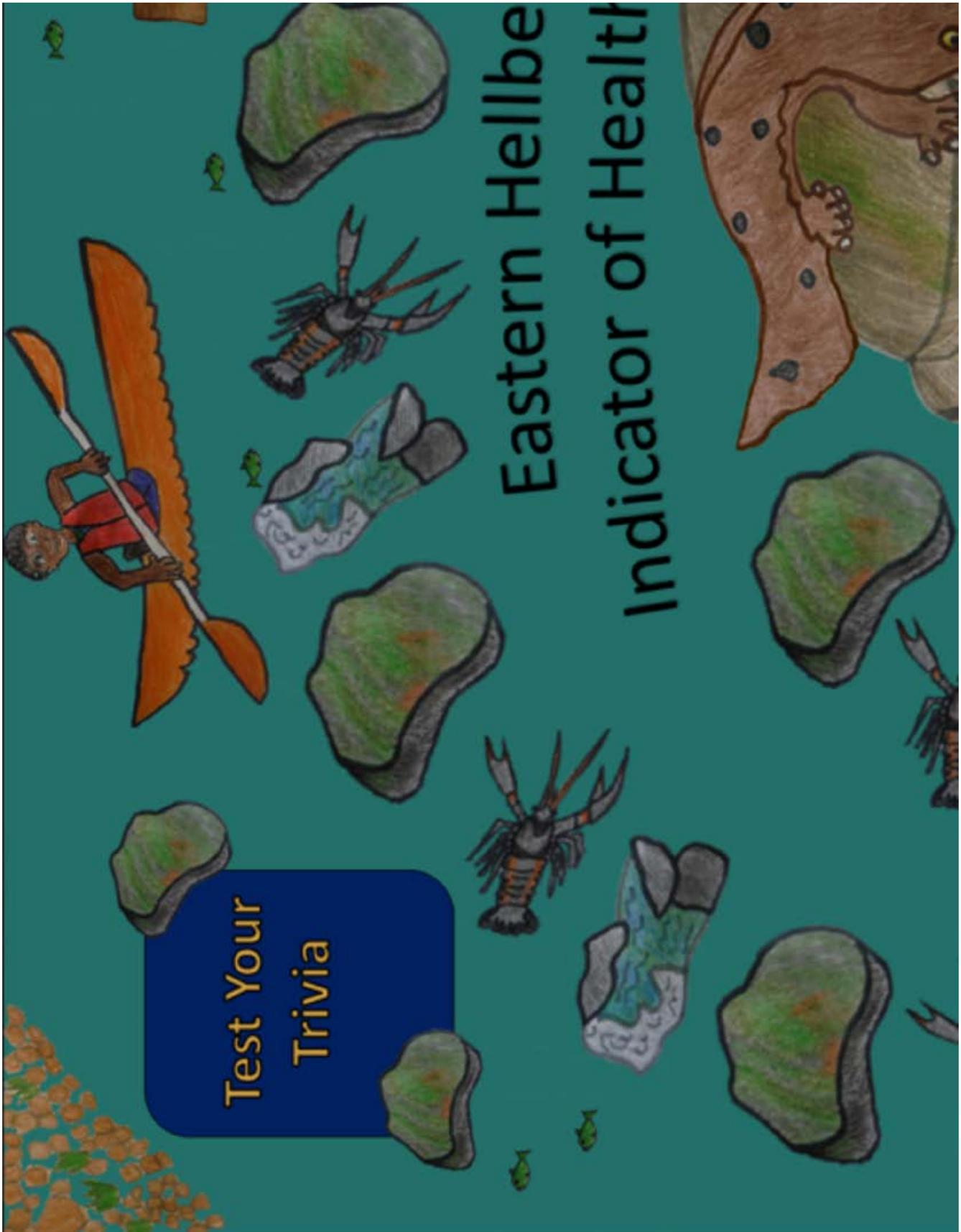
Make a prediction.

Predict what would happen if people used a LOT of fertilizer on their lawns and it washed into the Blue River.

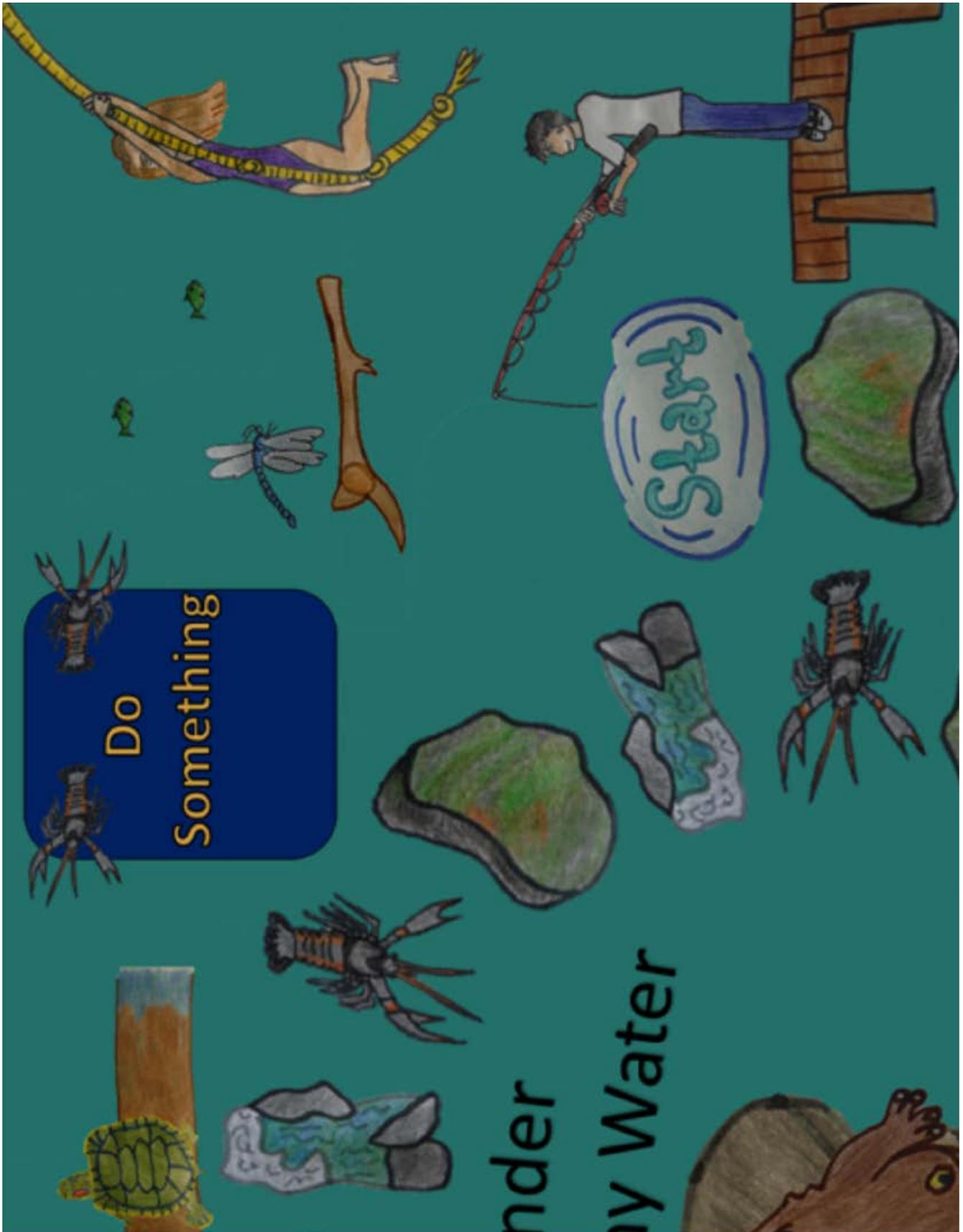
HINT: Does fertilizer stay where it's put?

*Possible answers:
Fertilizer will wash into rivers; dissolved oxygen will decrease in rivers;
algae will bloom in rivers*

Gameboard Part 1



Gameboard Part 2



Gameboard Part 3



Gameboard Part 4





Resources

California Native Plant Society (CNPS). 2015. "Benefits of Native Plants." CNPS. <http://www.cnps.org/cnps/grownative/benefits.php>

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Wabash River Enhancement Corporation (WREC). 2015. "Native Plants." TippiEcoNow. http://www.tippeconow.com/opt_native_plants.php