Taking Action!

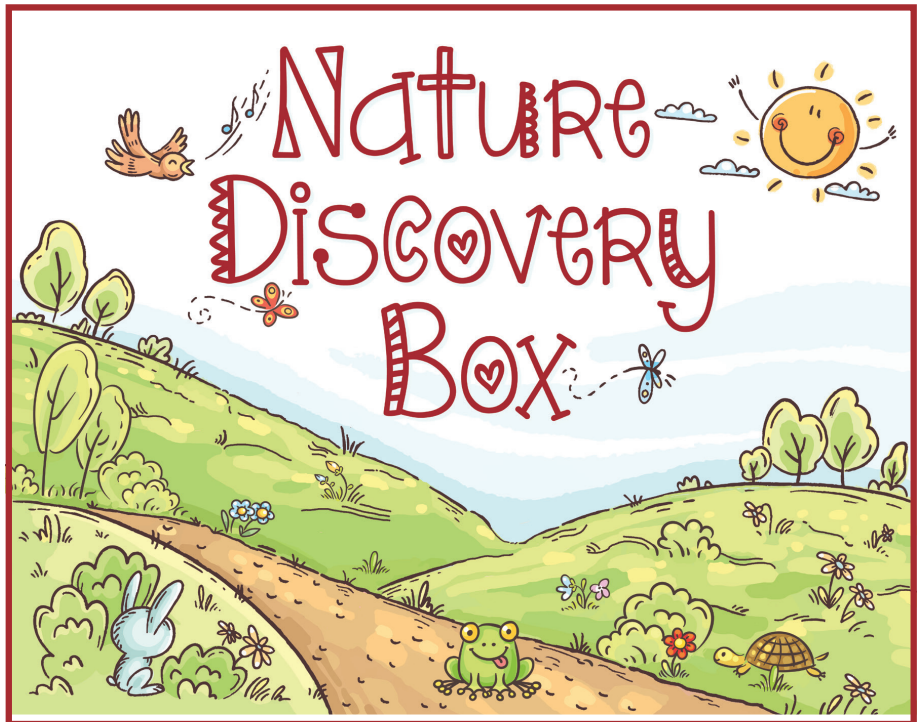
- Limit your Water Use – There are many things you can do to help conserve water in your home. Some include turning off the faucet when you are brushing your teeth, waiting until you have a full load when doing laundry and/or dishes, and cutting down your shower time, among many more!
- Pick up Litter – If you see trash on the ground or in a body of water, put your gloves on, pick it up and throw it away in the nearest trashcan. This helps wildlife avoid being trapped, tangled, or from eating something that can be harmful to them.
- Plant a tree – trees act as a filter for our waterways. Planting a tree can help clean the water that goes into our streams, the bay and the ocean.
- Dispose of Chemicals Properly – Disposing of hazardous chemicals improperly can be harmful to our watershed. Be sure to drop your hazardous chemicals off at a community collection center. Some communities have hazardous waste collection days. Many household chemicals such as old paint or used motor oil can also be recycled at a recycling center.
- Educate Others – Now that you have a better understanding of how we are all connected to water, educate your family and friends on the cool facts you have learned! Help them understand that our actions are an important part of the water cycle.

Share your Adventure!

Post your photos and experiences online and tag Oregon Ridge Nature Center or send them to info@OregonRidgeNatureCenter.org. We'll chose a few of the best photos and experiences to share in our Social Media to help others learn what can happen when a family sets out to connect with nature.

facebook twitter Instagram

Nature Discovery Box



#7 WATER YOU DOING

Learn the importance of water to nature and us!

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Welcome

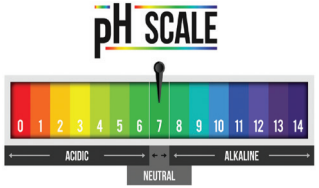
Thank you for joining us for our Nature Discovery Box series. This week we will plunge into all things water! We hope you will enjoy spending some time outside exploring the aquatic world with some of the activities included in this box.

Did You know?

- Nearly 97% of the water on earth is in our oceans and it covers 71% of the surface of our planet.
- Only 3% of the water found on earth is freshwater (no salts) that is drinkable. Freshwater can be found in lakes, rivers, streams, underground and in glaciers. Most of the earth's freshwater is stored in glaciers (68%) and underground (30%), leaving less than 1% of all water on earth that is easily accessible to living things.
- Water makes up a big part of people. Babies are 78% water and adults are 60% water.
- Water is a part of our blood and it brings nutrients to all our cells. We use it to get rid of wastes. It even helps us regulate our body temperature and protects our brain and spinal cord.
- You (and over 18 million other people) live in the Chesapeake Bay watershed! Our actions impact the Bay. The watershed is over 64,000 square miles and has 150 major rivers and streams and 100,000 smaller tributaries.
- The Chesapeake Bay holds more than 18 trillion gallons of brackish water (salt & freshwater mixed together). 51 billion gallons of freshwater flows into the bay each day from its tributaries. The Bay receives about half of its water volume from the Atlantic Ocean in the form of saltwater.

Some animals can live only in fresh water while others live only in salt water. The Diamondback Terrapin is an animal that prefers to live in the brackish water of the Chesapeake Bay.

pH Experiment



pH is the measure of acidity. It is rated on a scale of 0 to 14. A pH of 0 is super acidic, like vinegar and a pH of 14 is alkaline, like tootpaste. A stream should have a pH somewhere in the middle (7). When a stream's pH is too low or too high, the animals living in the stream cannot survive. A stream's pH can raise or lower based on pollution running into the stream. The biggest polluters are road salt that is spread to melt snow and exhaust from cars.

To see how pH strips work, grab your pH experiment bag from your Nature Discovery Box, a small bowl of vinegar, a small bowl of toothpaste mixed with water, and a small bowl of water. Dip one pH strip per solution into each bowl for about 2 seconds. Pull the pH strip out and match it to the color guide included in your pH experiment bag.

Stream Search

For this activity you'll need the Stream Report Card from your Discovery Box. Before entering the stream to start your search, complete the following tasks:

- As you approach your stream, circle the adjective that best describes the feature you are grading.
- Using the thermometer provided in your box, take the temperature of the stream and record it on your Stream Report Card
- Using the small strip of yellow paper provided, test the pH of the stream. Dip the paper in the stream and wait for it to change colors. Match the color of your paper to the color on the pH key.

Now you're ready to enter the stream! Follow the steps below to complete your stream study.

- Scan the banks of the stream for larger animals. Do you see frogs or snakes?
- Turn rocks just outside the water to look for salamanders. Remember: any animal you find must be returned to its original location. If found under a rock, place the rock back where you found it and the animal next to the rock so it doesn't get smashed.
- Use the macroinvertebrate key and guide to identify anything you find on top of and under the water's surface. As you find macroinvertebrates, gently brush them into your tray using the paint brush provided. The white background will help you see the features of these tiny creatures.
- Make sure you bag any trash you find and place it in a trashcan.

Once your stream study is complete, sanitize any equipment that touched the water with a diluted bleach solution (this includes any footwear, nets, animal collection trays, etc.) The critters living in your surveyed stream can carry diseases that are harmful if spread from one body of water to another. Thankfully, these diseases aren't harmful to humans and are easily prevented by proper sanitation of your equipment.

DIY Underwater Viewer

A lot of living things hide beneath the water's surface, most of which we may not typically see when looking in a stream or pond. Ripples and reflections on the water's surface can make it difficult to see what is going on under the water. In this activity, we will use the items labeled DIY Underwater Viewer to make a tool to help you during your explorations to see the way things like plants, insects, tadpoles and fish live under the water!

- With adult help, use scissors (not provided) to cut off the bottom of your container. Then, remove the lid and carefully cut a hole in the lid but be sure to keep the edge of the lid intact.
- Place the plastic wrap around the top opening and re-secure the lid over the top of the container. This creates the bottom window to see through.
- Head outside on your water exploring adventure! With an adult, find a pond, creek, stream, river, etc. that you have permission to explore.
- Place the plastic wrapped end of your viewer into the water and look through the end that you cut out. Don't forget to use patience and practice being still!

What did you see? Minnows? Algae? Crayfish? Insects? Tadpoles?

Water Cycle in a Bag Experiment

Now that we've learned about the water cycle and all the different ways water moves through it, let's experiment and see the water cycle in action using the materials in your box labeled "Water Cycle in a Bag"!

- First, carefully draw some clouds around the top of your plastic bag and some water along the bottom of the bag.
- Next, fill your plastic bag with about a ¼ cup of water. Optional: Add about 4 drops of food coloring.
- Close the bag and use the tape to hang it on the window. (A sunny window is best.)
- Wait a couple of hours and check on your bag. You should start to see a change in your bag. It may take between two hours and 1 day to see the change. You will begin to see droplets of water sticking to the side of the bag. Some of these will be up high (in the clouds) while other droplets will be on their way back down (like rain).

What happened? The water in the bag is being heated by the sun! It is evaporating into water vapor and rising to the top of the bag, then it turns back to liquid as it condenses and sticks to the side of the top of the bag! Eventually the condensation droplets will slide down the bag, like rain, back into the water at the bottom.

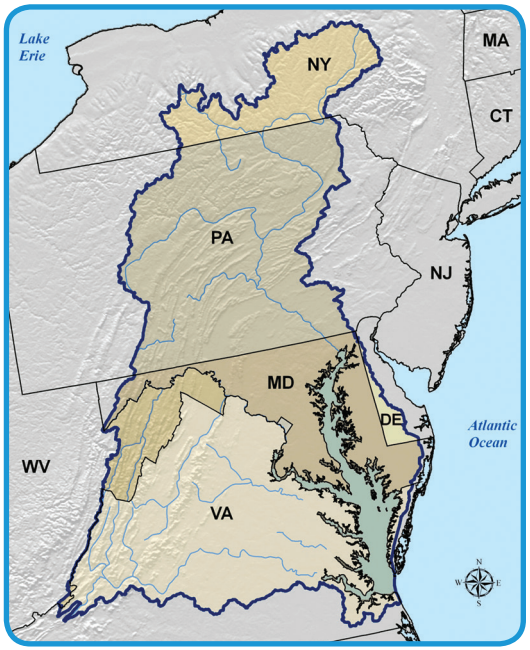
Safety First

Make sure you always follow these safety tips when exploring near water...

- Always explore water with adult supervision. Let the adult wade in first, they can help identify any hazards before children enter.
- Wear the right shoes and clothes! When exploring in water, be sure to wear clothes you can get wet and dirty! Shoes should have toe and heel straps and a good sole. Ones that cover your toes are best. Flip flops should be avoided, they can get stuck in the mud, break or create slippery conditions.
- Leave things that can't get wet at home!
- Find access spots on the bank or shore that allow for safe entry and exit. Avoid steep banks or drop-offs.
- Stay hydrated! Bring a water bottle along on your exploration; sometimes it's easy to think you aren't thirsty when exploring in water. On hot summer days it's really important to drink.
- Be observant! It's a good idea to know about the surroundings and be aware of things like poison ivy, animal homes and other hazards that may be in the area. Explore water that is clean and not polluted. Never explore water during or following a rain storm.

What is a Watershed?

Did you know that you live in a shed? We all do – a watershed, that is! A watershed is all of the land area from which surface runoff and groundwater drain into a body of water. We live in the Chesapeake Bay Watershed! And it covers 64,000 square miles – it's huge! It includes parts of Maryland, Pennsylvania, Virginia, West Virginia, Delaware and even New York. That means that if someone spills a glass of water onto the ground anywhere in our watershed, it will eventually go into the Chesapeake Bay. That also means that if juice, detergent, pesticides, fertilizer, gasoline or anything else spills onto the ground, it ends up in the Chesapeake Bay, too. With over 18 million people in our watershed, we have to be extra careful to protect our beautiful bay.



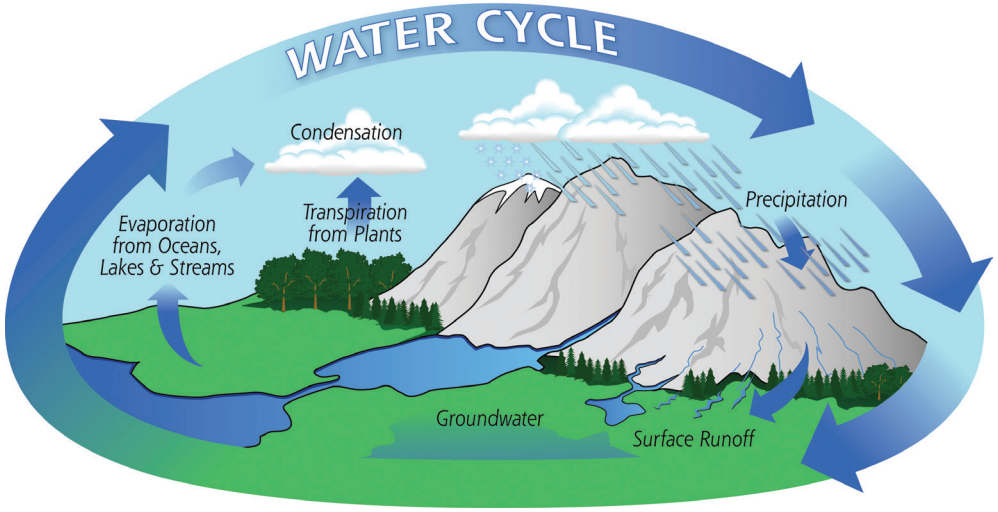
Water Cycle

Did you know that the earth has been recycling water for over 4 billion years? This process is called the water cycle and it means that the water we drink today is the same water that dinosaurs drank!

The water cycle is the movement of water between our oceans, atmosphere and land through precipitation (rain and snow), flowing through streams and rivers and rising into the atmosphere through evaporation and transpiration. Water moves as a liquid (water), a gas (vapor) and solid (ice).

Let's make a Water Cycle Necklace using the items in your box and the graphic below to learn more about the different ways water changes and moves through the water cycle.

- First add a white bead. This represents condensation, when water vapor collects in white fluffy clouds at the start of the water cycle.
- Add the light blue bead. This represents precipitation, when rain, sleet, freezing rain or snow falls from the clouds.
- Add the brown bead. This represents rain falling on the ground/earth and soaking into the ground to become groundwater.
- Add the dark blue bead. This represents the rain falling on rivers, streams, and lakes that makes up our surface water.
- Add the green bead. This represents the role of plants in the water cycle... they take up water in their roots by transpiration.
- Add the yellow bead. This represents evaporation, when the sun's heat changes liquid water from oceans, lakes and streams into water vapor.
- Add the clear bead. This represents the "water vapor" (gas) that rises to become the white fluffy clouds again.



Wetland in a Pan Activity

Try this activity to discover how important our wetlands are to our waterways.

- Gently crumple your aluminum foil and flatten it out again. This will become your watershed map. You should have many valleys and ridges. Pick one end to be the top with tall mountains. The other end will be low near the bay.
- With the permanent marker, use the lines from your crumpled foil as a guide to draw streams and rivers. Add lakes and ponds where you think they would form. Draw natural areas such as trees, rocks and sandy banks.
- Think about the best placement of your pictures of urban and agricultural areas. Cut them apart with scissors (not provided) and tape (not provided) them onto your foil.
- Crumple newspaper and place in the aluminum pan with one side higher and one side low. Place your foil map into the pan so the mountainside is propped up by the newspaper and the land slopes down toward the bay area.
- Using your spray bottle, simulate rain with 20 sprays of water to your watershed. What path did the rain take through your watershed?
- Carefully use the washable markers in your box to draw pollution from the factories, agricultural areas and larger roads.
- Spray your watershed with 10 sprays. What happens to the pollution?
- Soak your sponges in water and squeeze out all the extra water. Carefully place the sponges in a line along the land just before the bay. Try not to leave any holes. This represents the wetlands.
- Draw more areas of pollution and spray your watershed with 10 more sprays. What happens?
- What hapened when you added the pollution? What happens to the color at the bottoms of the sponges? How important are our wetlands?

Orb Snail 

Critter Cubes

 Caddisfly

Let's play a game to practice identifying macroinvertebrates that you may find while exploring a stream. As you have already learned, these beneficial creatures help us to determine how healthy a stream is. In this activity, you will practice identifying common macroinvertebrates and determine if your imaginary stream is healthy. You can play with others or play alone!

In your box you will find materials labeled Critter Cubes Game that you will need to create this activity. First, you will need to cut out the T shaped blocks and glue one onto each wooden block. Once dried, it is time to play! Roll your blocks as you would dice. Each roll represents the macroinvertebrates that you find when looking in an imaginary stream. Use the key (labeled Critter Cube Count) to decide what macroinvertebrates are doing and if they tolerate pollution or not! Was your imaginary stream healthy or unhealthy? When you are finished, store you blocks in the bag provided and play again later.

Hints for your hunt...

#1 A stream – Streams are small, flowing bodies of water. Streams are essential to the survival of animals as they provide a place to live, eat and drink. Oregon Ridge has two streams on the property. If visiting, be sure to bring water shoes so you can cool off in the water.

#2 A pond – a pond is a small body of still water. Ponds are great for finding critters! We have several ponds at Oregon Ridge. Can you find at least 2 of our ponds?

#3 A river – A river is a large stream of water that flows to an even larger body of water. Oregon Ridge does not have any rivers, but there are several rivers in our area.

#4 A rain cloud – Rain clouds are usually low, dark gray clouds. An easy way to tell if rain clouds might be hanging around is if the forecast is calling for rain, so check the weather, then head outside!

#5 Condensation – Condensation is water that collects on a cold surface during a humid day. Check the inside of the windows in your home for condensation. If none is present, make your own condensation by pouring a cup of ice-cold water into a glass and leaving it to sit outside.

#6 Morning dew – Morning dew can be found the morning after a warm clear day is followed by a cool, clear evening. As soon as you wake in the morning, head outside to see if your grass is wet. If it didn't rain the night before and the grass is wet, you've found dew.

#7 An outdoor water spigot – Outdoor water spigots are essential to the people who care for Oregon Ridge. We use them to water our animals and plants. Water spigots in your own backyard can provide hours of fun via a sprinkler or hose. But keep in mind, water is not an endless supply and for most, it costs money, so use it wisely.

#8 An animal in or on water – There's an entire world often left unseen underwater. A great place to spot an animal in or on water is at the Oregon Ridge Lake, but approach slowly... even though the animals are underwater, they can see movement and will flee.

#9 A puddle – Puddles can be a great source of entertainment for people of all ages. They are also important for many animals. Some animals use them for a quick drink, while others lay eggs and raise their young in them! Puddles are best found after a rain event. No rain in the forecast? Make your own puddle and watch quietly to see if anything approaches.

What's swimming in your stream?

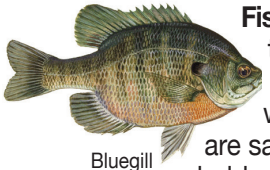
What better way to cool down on a hot summer's day than to step into a stream! A simple stream search will also reveal what lives in it, what lives around it, and how healthy it is. Remember that there is a lot more to streams than what meets the eye. They are a place where life begins and is sustained. Animals like fish, some amphibians and some insects spend their entire life in the water, while others are born there, then go through metamorphosis and leave the water to live elsewhere. Animals commonly found in and around streams are as follows. Look for these cool critters as you enter the stream to continue your grading.


Mayfly

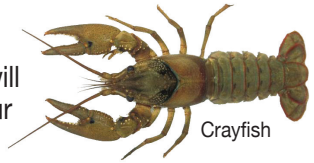
A lot of **insects** begin their life under water. Some insects spend their entire life underwater. Use the Macroinvertebrate guide to identify any insect or creature without a backbone that you may find. To find these animals, look for them zipping along the top of the water, under rocks, attached to aquatic vegetation or camouflaging with the stream bottom.


Dusky Salamander

Look for **salamanders** under moist rocks near a stream. They're safe to touch, but only if your hands are wet but free of lotions and hand sanitizer. Once done, put them next to a rock so they can safely crawl under to re-hide themselves.


Bluegill

Fish spend their entire lives underwater. Look for them swimming together in the ripples of a stream. The easiest way to catch a fish is to have one person hold a net downstream while the other walks toward the fish from upstream. Fish are safe to hold out of the water, but only for as long as you can hold your breath.


Crayfish

Crayfish are another common find in just about any stream. They swim backwards, so to catch them, you will need to put a net behind their tail and gently move your hand in front of their face. They have strong pinchers, so always hold them behind their armpits.


Northern Watersnake

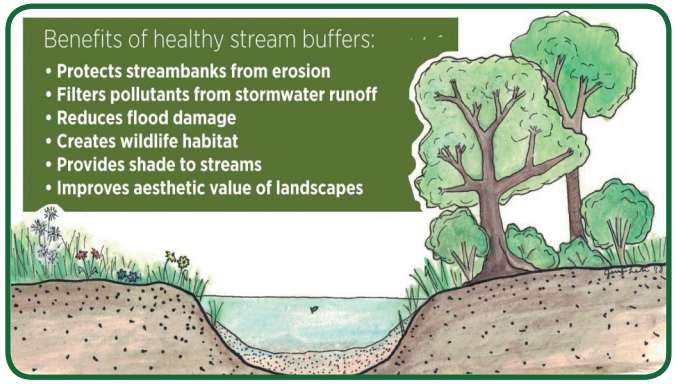
Snakes sometimes frequent streams. It is best to give water snakes distance as they usually aren't friendly. Definitely do not try to catch them, instead, view them from a distance. As long as you give them distance, they won't bother you.


Green Frog

Some **frogs** like to hang out on the banks while others live in the water. To catch a frog on the bank, cup your hands together and cover them. Once in your hands, make a "C" shape with your thumb and pointer finger. Wrap and close your "C" shaped fingers just above their hips. When handling a frog, your hands should be wet. Also remember that frogs are slippery, so hold them close to the ground in case they slip away.

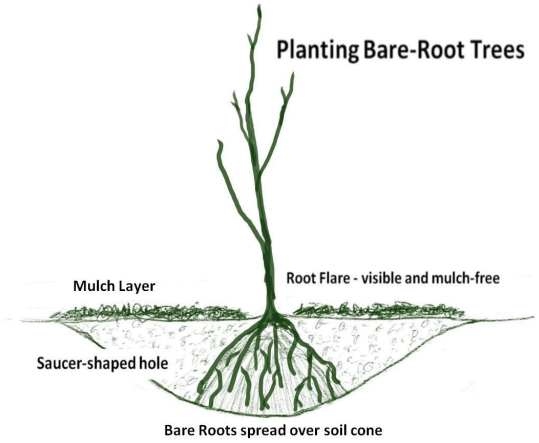
Stream Buffers

Did you know that plants such as trees, shrubs, grasses and other vegetation help protect our streams? Well, they sure do! These plants help absorb excess nutrients, such as nitrogen and phosphorus, before they go into the stream and pollute it. Plants will use the nutrients as food to help them grow. Plants also help keep soil in place using their roots. This helps prevent erosion, the movement of broken material, along stream banks. Erosion can be harmful because it moves soil into the stream which can clog waterways, causing harm to wildlife. Plants along the stream can also help create a habitat for wildlife that lives in and around the stream. They do this by providing food, such as leaves and berries, and by providing shelter, such as fallen logs and root balls.



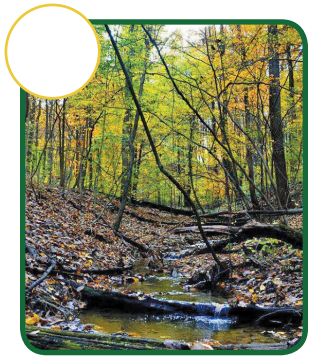
Tree Planting

Now that we have learned how great plants are for our streams, lets do something about it! In this activity, we will plant a white pine tree to help our streams. First, you want to find a spot for your tree that will give it plenty of space and sunlight to grow. If possible, try to find a spot within 20 feet of a stream bank... of course you'll need to make sure you have the landowner's permission. Next, you will want to use a spade or shovel to dig a hole deep and wide enough for the roots to spread out and extend downward. You will then place the seedling into the hole, making sure it is at the proper depth. This is the point where the stem meets the roots. Once the tree is placed in the hole, gently pack the soil around it. Be sure that the tree is secure. Once it is planted, water your seedling and watch it grow!

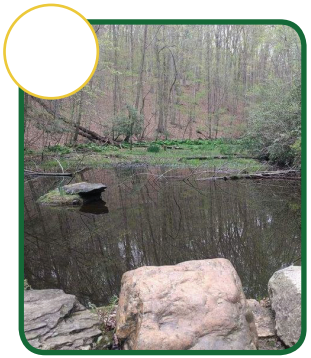


Scavenger Hunt

Find all 9 and check them off!



A stream



A pond

A river

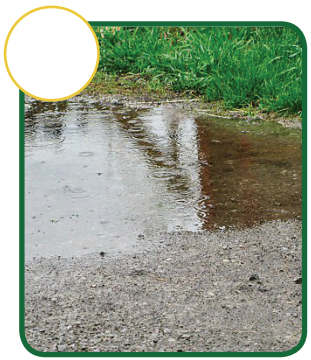
A rain cloud

Condensation

Morning dew

An outdoor water spigot

An animal in or on water



A puddle

You'll find hints for your hunt on the next page...