



Where Does the Rain Go?

Location: **Winans Meadow**

Habitat Focus: **Water**

Location:

GFT Map: Trailhead #2

[http://
www.gwynnsfallstrail.org/
trail_information.cfm](http://www.gwynnsfallstrail.org/trail_information.cfm)

Materials:

Pencils

Journals



Resources to explore before the field trip:

The Gwynns Falls: Baltimore Greenway to the
Chesapeake Bay by W. Edward (Ed) Orser
pages 13-19

Our Chesapeake Bay Handout

Chesapeake Bay Program website

<http://archive.chesapeakebay.net/wshed.htm>

Where Does the Rain Go?

*Where does the rain go
When it falls on the land?
It makes plunking noises on our roof
and forms puddles in my hand.*

*It dribbles down the windows
And trickles off our door.
When it sloshes on my rain boots,
It makes puddles on our floor.*

*It plops on all the grass and trees
and makes the flowers grow.
I can watch it flowing down the
street, but then where does it go?*

Activity: Read a poem and move down the hill.

Read "Where Does the Rain Go?" poem out loud. Ask students how the poem describes the need for water in a habitat? (Answer: in the last stanza the phrase "grass and trees and makes the flowers grow.")

Say:

Look for the nearest hill that is not in the woods. Set your backpack or notebook on the ground at the bottom of the hill. Walk or run to the top. Imagine that you are rain falling and follow the path the rain would make as it hits the top of the hill and flows downward. Run, roll, skip or walk down the hill. GO!

Reflection: Discuss moving down the hill.

After all the students have reached the bottom of the hill, gather them into a circle.

Ask:

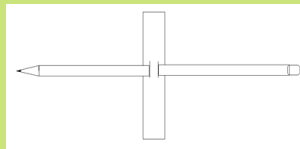
What just happened? How did you move down the hill? How did it feel? How was your movement different at the top of the hill vs. at the bottom of the hill? Where did you end up? What if the hill had been higher? Where did you feel the most energy?

Activity: Build a fluttermill. (Say: Instructions are on journal page __)



Directions: Make a Flutter mill

1. Find two forked twigs on the ground and trim them into two Y's of the same size.
2. The smooth, round pencil will be a crossbar.
3. Select a cattail and cut two pieces of the tough leaves, 1 inch wide and 4 inches long. These will become the blades of the fluttermill.
4. With your fingernail or other sharp edge, cut two slits, side by side, lengthwise in the center of each cattail leaf. The slits should be long enough to insert the crossbar pencil.
5. Carefully slip the pencil down through one slit and up through the other. Do this with both cattail leaves.
6. Place the strips of cattail leaf at right angles to one another on the pencil, like the arms of a windmill. Adjust them carefully.



7. Separate the Y-shaped twigs by nearly the length of the pencil and push them deep into the ground at a very shallow spot in the stream.
8. Set the pencil with the cattail leaves onto the Y-shaped twigs.
9. The cattail leaves must just brush the water's surface. The fluttermill should turn with the easy rhythm of a real watermill that used to grind wheat into flour.

Alternative if the stream bottom is too stony to lodge in fork sticks: Hold out your hands in front of you, thumbs up. Place the pencil between your thumb and pointer. Place your hands over a riffle in the stream so the blades turn.



A Bit of Science

As gravity pulls the water downhill, the energy in the water turns from potential (stored) energy to kinetic (moving) energy. The flow of the water downhill is kinetic energy. The greater the height of the water, the more potential energy it has.

A Bit of Natural History

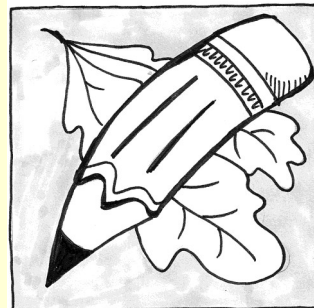
The Gwynns Falls Watershed- As the stream flows from the piedmont plateau of Central Maryland down to the coastal plain of the Middle Branch, Inner Harbor, and Chesapeake Bay, it cuts a valley [see the hills around this meadow] and flows over rapids and waterfalls [see the stream here], which is why it has **falls** in its name. All of the area from which the water drains into the stream is its **watershed**. Note: the small tributary of the Gwynns Falls at Winans Meadow is called **Dead Run**. The name may derive from it having very few steady spring sources. But at times of heavy rain, the large number of impervious surfaces upstream (i.e., parking lots for shopping centers and office complexes and highways) can lead the stream to rise rapidly and even flood. Ask students if they can discover evidence of times the water level has been much higher along the banks i.e., litter, debris, etc. (From The Gwynns Falls by Ed Orser)

Reflection: Draw your fluttermill.

Ask: Where would you place your mill to make the blades turn faster?

Say:

Get your journal from your backpack. Open to a blank page. Write the date. Label the page "fluttermill." Draw your fluttermill, and make it take up half the page. Use wavy lines to show the water. Draw an arrow to show which way the water is flowing. Draw another arrow to show how the cattail leaves turn.



Activity: SCAVENGER HUNT - Find and explore the Winans Waterwheel.

Say: When humans began using this land for their habitat, they needed water for drinking, for bathing, for watering their food plants, and for many other needs. They even used the energy of the water as it moves. Find evidence of something that humans made so that they could use the power of water.

Hints:

- 1) There are trail signs about this object.
- 2) It is in the woods nearby.



When students find the object, let them safely explore it. Then ask them to share their ideas about how they think water made it work. The answer to *how* it works does not need to be provided now. Research can be done back in the classroom. See **A Bit of History**

A Bit of History

Say:

Just below the old Wagon Road (did you notice evidence of a road?), the movement of a waterwheel activated two pumps which pumped water uphill to four tanks under the roof of Crimea Mansion. Crimea Mansion was the home of Thomas Winans and his family who lived here over 150 years ago. Is anything familiar about the name "Winans?"

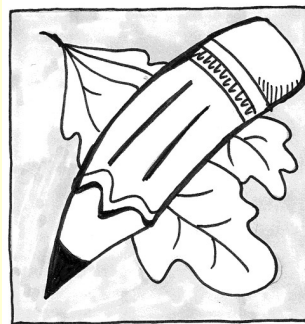
(Answer: the name of this meadow.)

If students haven't seen the sign that describes the Thomas Winans Estate, have them visit Panel #1, *Crimea Estate* at the Winans Meadow trailhead.

Reflection: Draw the Winans waterwheel and compare it to the fluttermill.

Say:

Get your journal. Open to the page where you drew your fluttermill. Label the blank half of the page "Winans Mill." Draw the old waterwheel. Make it take up half the page. Use wavy lines to show where you think the water came to the waterwheel. Draw an arrow to show how you think the blades turned. How is your fluttermill the same as the Winans waterwheel? How are the two waterwheels different?



A Bit More History – Water Wheels, the Power of Water, and Transportation

Winans Meadow

Themes with page numbers keyed to *The Gwynns Falls: Baltimore Gateway to the Chesapeake* book by Ed Orser

1. Land and Water: Watersheds (pp. 13-19)

–Watersheds as storm drains:

Most storm water runs into drains, which in turn run into streams (not underground pipes, as people often think), so litter and other kinds of waste that are dumped or carried along into storm drains end up in the stream and eventually in the harbor, bay, or ocean. (To illustrate this point, ask students where they think a styrofoam cup would end up if were thrown onto a parking lot?)

2. Early People along the Gwynns Falls (pp. 20-23 and 24-27)

–Native Americans:

Native Americans from two major language groups crossed the stream as they traveled on hunting expeditions from their villages. The Algonquians lived along the lower Chesapeake Bay, and the Susquehannocks (for whom the Susquehanna River is named) lived along the upper Bay. They found shallow points where they could “ford” the stream on foot; one traditional ford was downstream near Washington Boulevard, where the river stops falling because it has reached the flatter coastal plain. (Of course they could easily cross this small stream here, but the Gwynns Falls becomes much deeper and wider downstream.)

–English explorers:

Captain John Smith and a small expedition from the new Virginia Colony explored the Chesapeake Bay in the summer of 1608 (four hundred years ago); they sailed into today’s Baltimore Harbor, to the mouth of the Gwynns Falls in the Middle Branch, and up the Patapsco River as far as Elkridge.

The colony of Maryland was established in 1634, with its first settlement along the southern shores of the Chesapeake Bay. (What do you think that Captain John Smith was looking for on his expedition? Gold? Iron? A water passage to India? Information about Native Americans? The answer is "all of the above.")

3. European Settlers: Farms and Mills (pp. 50-57)

–Early European farmers grew wheat:

In the colonial and early national periods early European settlers established farms in this area. They grew wheat and other grains, because the soil of the hilly area was not suitable for tobacco, the main crop of the flatter tidewater parts of Maryland. (Ask students to imagine how the open meadow here might once have been wheat fields.)

–Water power for mills:

Wheat needed to be ground by mills to make flour, so they used the power of water from streams like the Gwynns Falls; they built small dams to divert water into a ditch or trough (called a "mill race"), and when the water fell over a mill wheel, power from the wheel turned large mill stones to grind the wheat and produce flour (Does it look like this stream could have been powerful enough to turn a water wheel? Once it did!)

4. Transportation: Roads and Railroads (pp. 61-75)

–Early roads:

Franklinton Road (which is how you came to Winans Meadow) were used by horse-drawn carriages and wagons to travel from farms in this area to take goods and people to Baltimore City and the port. In the early days they were built by private companies and had toll gates where people paid to use them. People who rode through this section of the valley wrote that they felt like they were far from any city, almost like being in the mountains. (Does it still seem like that today?)

–Railroads:

America's first railroad was the Baltimore and Ohio, and the first stream that it had to cross was the Gwynns Falls. That stone bridge, the Carrollton Viaduct, was built in 1829. Railroads were a big improvement over horse-drawn wagons and bumpy roads; the iron rails provided a smooth track, and the use of steam created power to pull heavy loads. The goal of the B&O, as it was called, was to connect Baltimore across the Allegheny Mountains to the Ohio River and the new frontier areas of the Midwest. (If you took the Gwynns Falls Trail from here, you could actually go through a small side arch of the original bridge, the Carrollton Viaduct, which is still used for trains today.)

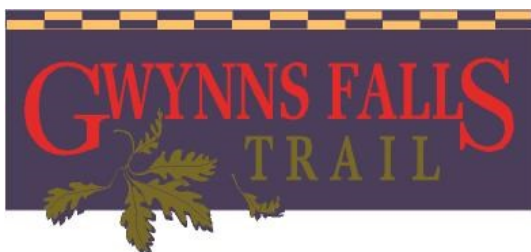
5. The Estate that Became a Park (pp. 121-128)

–Thomas Winans, one of the early builders of railroads, was invited to Russia to construct Russia's first railroad. When he returned to America in the 1850s, he was a wealthy man. He used his fortune to buy a mansion in the city. Then he bought this land for a country estate he called the Crimea; on it he built a stone mansion house (called Orianda—it's at the top of the hill and is still used; see the photo on the panel in the meadow). Winans used the meadow area for farming (you can see the old storage cellar and stone ruins of some of the farm buildings near the picnic pavilion). He was an inventor, too, and historians believe the nearby iron wheel was used to power a pump to send water through pipes up the hill to the Orianda House (see the water wheel in the woods near the meadow). (On the Second Sundays of the month, children and their families can take free rides on miniature trains in the park; the entrance is at Eagle Drive, off of Windsor Mill Road.)

–The Winans Estate was bought by the city in the 1940s to create a park. A lawyer, whose last name was Leakin, left money to help purchase it in its will, so this part of the park was named Leakin Park. Across the stream, the city already had bought the land to make Gwynns Falls Park. Today, Gwynns Falls/Leakin Park is one of the largest woodland parks in an eastern city in America. There are maps for the miles and miles of hiking trails that run all through the park. (Does it look/feel like you're in a large city right now? Do you see any houses or hear any traffic? Why is it a good thing to set aside land like this for a park?)

6. Famous Baseball Players (pp. 138-141)

–Three members of the Baseball Hall of Fame grew up playing on fields along the Gwynns Falls. They lived in neighborhoods downstream from here. Babe Ruth became famous playing for the New York Yankees. Leon Day, who was African American, grew up in the period of segregation, so he played in what were called the Negro Leagues. And Al Kaline went straight from Baltimore's Southern High School to play for the Detroit Tigers. Leon Day died in 1995, and the athletic fields in the park near here were named for him. (Who is your favorite baseball player today?)



What's for Lunch?

Location: **Winans Meadow**

Habitat Focus: **Food**

Location:

GFT Map: T2

Materials:

Pencils

Journals

Sweep nets*

Transparent jars with screw lids

Light-colored towel or sheet on which to sort seeds

[Golden Guide to Insects](#)



Resources to explore before the field trip:

Insect chart with general characteristics of bees, wasps, flies, ants, beetles, moths, butterflies,

Chart of generic anatomy of insects

The Insect's World by Ethel Jacobson

Insects are creatures with three pairs of legs,

Some swim, some fly; they lay millions of eggs.

They don't wear their skeletons in, but out,

They come in three parts. Some are bare; some have hair.

Their hearts are in back; they circulate air.

They smell with their feelers and taste with their feet,

And there's scarcely a thing that some insect won't eat

Flowers and woodwork and books and rugs,

Overcoats, people, and other bugs.

When five billion trillion keep munching each day,

It's a wonder the world isn't nibbled away!

Activity: Who's eating in the Meadow? - Students capture, observe, sketch, and release insects.

Say: What insects have you seen so far? What do you think they are eating? (Pollen, nectar from flowers; other insects) We are going to catch some insects that are in this meadow.

Demonstrate how to sweep a net through flower heads where insects are feeding. Note how to twist the wrist at the end of the sweeping actions so the mesh part loops over the hoop, trapping the insects inside. Demonstrate how to transfer the captured insects to the jar. Distribute nets and jars.

Say: If you need help transferring the insects to the jar, ask a classmate or one of the adults.

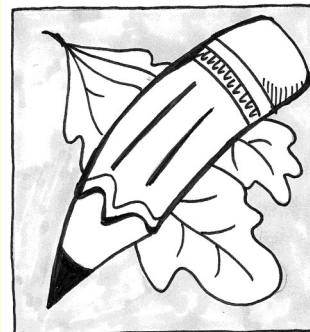
Say: Once you have caught an insect in your net and placed it in the jar, observe it carefully and sketch it in your journal. Once you've finished sketching your insect, continue catching insects.

Once the activity is over, **say** : Open your jar and let the insects go in the meadow.

Reflection: Sketching in Journal

Say:

- Make sure your insect drawing has three body parts and a set of three legs on each side of its body. The legs and wings grow out of the middle part, the thorax.
- Be sure to count the wings and notice whether the wings fold over the back of the body or extend to the side. Use the chart to label the insect (bee, wasp, ant, butterfly, moth, fly, and beetle).

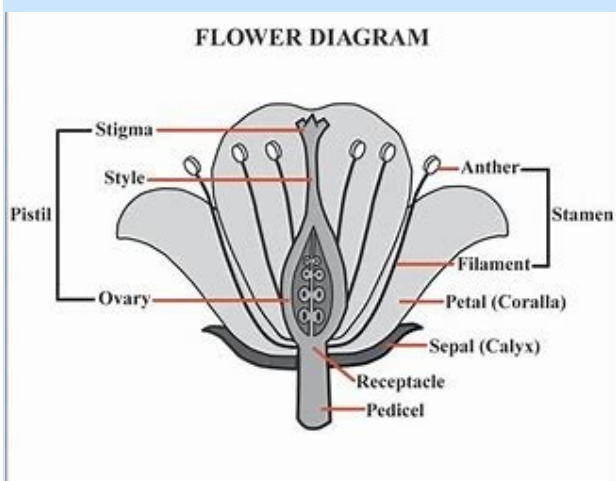


A Bit of Science

Insects and Flowers

Insects visit flowers to eat pollen and/or drink nectar. Many plants depend on insects to transfer pollen from anthers (male part) to the stigma (female part) of the flowers, enabling fertilization and reproduction.

Source: WordPress.com



There are many important pollinating insect species in these orders (groups):

- *Hymenoptera* (bees, wasps, and ants)
- *Lepidoptera* (butterflies and moths)
- *Diptera* (flies)
- *Coleoptera* (beetles)

Pollinators usually use several habitats because they require resources found in different habitats at different times. For instance most pollinating insects require:

- Nest sites (many bees and wasps)
- Larval feeding sites (beetles, butterflies, moths, flies, and some wasps)
- Hunting sites (some wasps and flies)
- Over-wintering sites

Adapted from: <http://diagnostics.montana.edu/insect/pollinators/>

Extension: Students use online or classroom resources to identify insects.

Back in the classroom: Student collect, observe, sketch, and identify insects in the school yard.

Activity: Scavenger Hunt - Students find and sort seeds according to observed attributes and then according to means of dispersal.

Ask: What do you think the animals that live here eat?
(Fruits, seeds, leaves.)

Say: Seeds are a rich source of protein and energy. Many animals eat seeds. Let's see how many different kinds of seeds we can find.

Direct the students to collect seeds for about **5 minutes** and then bring them back to a designated place. Establish a signal that will indicate when five minutes are up.

As the students return to the central location, have them place all the seeds they've found on the light-colored towel or sheet. Ask them to sort the seeds into piles, putting similar ones together.

Once the group has placed all the seeds into piles, discuss the attributes they used to sort them. (These may include size, shape, color, texture etc.)

Ask: What are seeds for?

Share: Some information in the **Sidebar: Seed dispersal.**

Direct the students to re-sort the seeds by the way they travel (i.e., windblown, eaten by animals, hook to animals or humans, explode from plant, float). If the students haven't collected seeds from one of these categories, direct them to search for those.

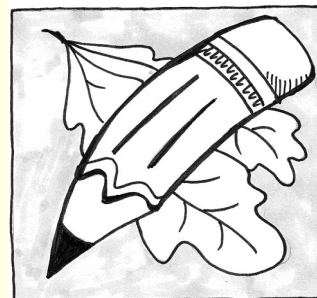


A Bit of Science Seed Dispersal

Fruit and the seeds inside them contain the genetic material to produce new plants. Most plants produce lots of seeds, but only a few of those seeds grow into adult plants. If a seed is dropped right below the parent plant, it may not grow at all, since the parent has evolved ways to keep other plants from growing nearby. For example, it might shade out new seedlings, or it might produce a poison to keep them from growing. So in order to grow, seeds must disperse, or get away from the parent plant. They do this by flying or floating away, by being eaten by an animal, by shooting out from the parent plant, or by sticking onto a human or other animal and being carried away.

(Adapted from OBIS – Delta Education <http://www.outdoorbiology.com/?q=node/84>)

Reflection: Draw pictures of the seeds you collected or tape some of the ones you especially like into your journal.



Activity: Flying Seed Race - Students observe and discuss the attributes of wind-dispersed seeds and design a method for deciding which seed flies best.

Direct the students to search for seeds that are designed to be blown away by the wind. (Or use the windblown seeds from the previous activity.) Once the students have found some wind-dispersed seeds, have them arrange the seeds on the ground so the group can form a circle around and compare them.

Ask: How are the seeds the same? How are they different?

Ask: Which seed do you think will fly the furthest? Why do you think so? Which seed will fly the longest time before hitting the ground? Why do you think so?

Say: How could we figure out which seed is the best? Work with the students as they decide what criteria of 'best' to use to design a trial to test the seeds.

Test the seeds with the students.

Back in the classroom:

Research what kinds of seeds humans eat. Play in the schoolyard the game, Seed-Go from Delta Education – OBIS – Lawrence Hall of Science
<http://www.outdoorbiology.com/?q=node/8>

A Bit of Science

Humans and Seeds

Seeds are a rich store of energy. Some have good protein levels, vitamins, and minerals. Seeds are seasonal. Stored seeds are hard to keep from becoming moldy or insect ridden, unlike nuts that have a hard shell. If you eat whole seeds without grinding or cooking them, only a little of the protein inside is able to be digested. If you cook the whole seed, more of the protein is available. Grinding and cooking improves protein availability even more. Archeologists have found grindstones which may have been used to grind grass seeds before 160,000 years ago - when the first modern humans appear in the fossil record. (Adapted from <http://www.naturalhub.com/natural-food-guide-grains-beans-seeds.htm>)

Birds and Seeds

Birds don't have to grind seeds with a grindstone because they have special digestive systems. Those birds that eat seeds have a crop, or a doggy bag inside their bodies, which they use to carry seeds away to a place where it's safe to eat. After seeds go to the crop they reach the gizzard. The gizzard grinds the seeds using small rocks that the birds eat. This grit smashes the seeds open inside the bird's body. Watch for birds pecking the ground for grit. (Adapted from: <http://www.backyardnature.net/birdguts.htm>)

Reflection: Gather the group together.

Ask: What parts of these seeds helped them fly?

Activity: Scavenger hunt - Sorting Food in a Root Cellar

Students experience the inside of a root cellar, consider its purpose, and list adjectives to describe the structure and experience.

Say: We've talked about how animals get food. Humans store food as well. There is a place here where people store food. See if you can find it. Let the students search for the root cellar.

Lead the group into the Winans family root cellar. Once the students have settled into the house **ask:** What does it feel like inside here? Why is it cold? Why is it damp? Why would the Winans have built it? What did they store in here? What kinds of foods need to be kept cold? Why?



Share with them some of the story in the Cultural History sidebar.

Back in the classroom:

- Students use their lists of adjectives to compose a descriptive paragraph about the root cellar.
- With permission, students dig a hole in the schoolyard. Measure the temperature in the hole, at ground level, and above the ground level (from a second story window, at the top of the flagpole, on the roof).
- Research root cellars using the websites on the resource list.

Reflection: Write in journal and discuss.

Say: Spend the next five minutes writing as many words (adjectives) as you can to describe the inside or outside of the Winans' root cellar. Think of adjectives that no one else might think of.

After 5 minutes, assemble the students in a circle. Students take turns sharing their adjective lists to determine which adjectives are unique to their list. Ask one student to read aloud one descriptive word from his/her list. Then **ask:** Did anyone else write that word? If not—the student should star the word as unique. Proceed around the circle, each student sharing a word and checking to see if it's unique. Continue until all the students have shared all their words.

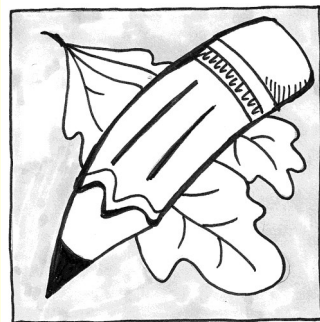
A Bit of History

Root Cellar History

For thousands of years people have stored food in the ground to keep it from spoiling. Root cellars keep food at a low temperature and steady humidity so it's cool during the summer and warm during the winter. After harvesting in the fall, farmers placed potatoes, turnips, and carrots in the root cellar. Other foods stored in the root cellar over the winter include beets, onions, jams, canned food, salted meats and fish, Winter squash, and cabbage. Sometimes they stored food in the cellar in the morning to keep it cool until supper time. Farmers also used the stored vegetables to feed their livestock through the winter.

Every home used to have a root cellar. Some root cellars were in a separate building like this one. In the Chesapeake Bay area archeologists dug up home sites from 1600 to the mid 1700s, and they found cooling pits that people had dug inside their houses—probably to keep milk, butter, and cheese cool.

Historians tell us that root cellars were even part of the Underground Railroad, sheltering runaway slaves.





Who Lives Here?

Location: **Winans Meadow**

Habitat Focus: **Shelter**

Location:

GFT Map: T2

Materials:

Blindfolds (one for each pair of students)
Found materials from the ground



Resources to explore before the field trip:

"I Get Started on this Venture" and "The Old, Old tree" (chapters about building a shelter in *My Side of the Mountain* by Jean Craighead George)

Maryland's Forests: Past Present, and Future by Jonathan Kays (MD Cooperative Extension)
<http://extension.umd.edu/publications/pdfs/fs627.pdf>

A House is a House for Me

by Christina Rossetti (1830-1894)

A hill is a house for an ant, an ant.
A hive is a house for a bee.
A hole is a house for a mole or a mouse
And a house is a house for me.

A web is a house for a spider.
A bird builds its nest in a tree.
There is nothing so snug as a bug in a rug. And a house is a house for me.

.....
A flower's at home in a garden.
A donkey's at home in a stall.
Each creature that's known has a house of its own.
And the earth is a house for us all.

Activity: Meet a Tree - Blindfolded students are led by a partner to a tree, which they explore and then they try to relocate it without a blindfold.

Ask: What is your house made from? (students share)

Say: Many animals live here in the meadow or in the forest. Some of them live in or on trees. Today you're going to get to know one of the trees.

Say: This game is for partners. When I finish giving directions, you'll find a partner, blindfold that person, and lead him or her to a tree that attracts you. Your partner will explore that tree by touching, smelling, and listening.

Discuss with the students how to keep a blindfolded partner safe. Demonstrate having the 'blind' partner hold the 'guide's' elbows, walking slowly, and telling the partner about upcoming hazards. **Say:** Do not take you partner into any tree that has vines growing in it or on it. (Unless you do a lesson about poison ivy/oak)

Say: You will help your 'blind' partner explore the tree and to feel its uniqueness. Use your fingers to touch the bark. Find out if the tree is alive. Reach for leaves. Can you put your arms around it? Are plants growing on it? Any signs of animals? Lichens? Mosses? Insects?

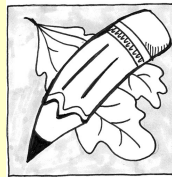
Say: When your partner is finished exploring, lead him back to where you began, but take an indirect route. Then remove the blindfold and let the partner try to find the tree with his eyes open. Then switch roles.

Reflection:

Gather the group together.

Ask: What was special about your tree? How did you find your tree? Did anything about your tree surprise you?

On a journal page, draw a picture of your tree. Do a bark rubbing using the next page. Label it with the date.



Extension: Pairs of students who finish the activity take another turn with a new tree.

Back in the classroom: Students play this game in their schoolyard. Students can adopt 'their' tree and observe it over the course of the school year.

A Bit More about Children & Trees

As the child searches for *his* tree, what was a forest becomes a collection of very individual trees. A tree can be an unforgettable experience in the child's life. Many times children will come back long after this game is over and find 'their' tree. (Adapted from *Sharing Nature with Children* by Joseph Cornell)

A shelter provides protection from the heat, cold, and rain. It may offer a hiding place or a place that predators can't enter. "Some animals spend their entire lives in trees - many birds, for instance, as well as squirrels, raccoons, opossums and several types of insects. These animals are born in trees, live in trees, raise their young in trees and, especially when trees are close together, seldom come down to the ground. For these animals, trees provide shelter from the weather and from enemies. Trees provide food in the form of fruits, nuts, leaves, bark, and roots. Even dead trees provide shelter and food for insects such as termites and beetles." From http://www.inhs.uiuc.edu/resources/tree_kit/teacher/lespl1.html

Activity: Build a Shelter - Students use natural materials to build a miniature shelter for an imaginary being

Ask: Why do people build houses? (possible responses: to keep something out, to keep something in, to hide, for safety, to stay warm, to stay cool, to stay dry)

Say: Imagine you are a miniature person, a very tiny, magical being about the size of your thumb. You want to build a small shelter that will keep you warm and dry overnight. Gather sticks, branches and leaves that you find laying on the ground and find a spot to build a small magical hut. When you finish your shelter, find someone else who is finished building and give that person a 'tour' of your shelter. Then take your hut apart and scatter the leaves and sticks in the woods or meadows where you found them. Make sure the place where you built the hut looks as if you had never been there. Remember to stay within site of me. Any questions? GO!



Extension: Students who finish building and sharing their shelters can add to their shelters, share with a new person, or build a new shelter.

Back in the classroom:

Students

- Examine schoolyard trees to find insects <http://www.fs.fed.us/r6/nr/wildlife/animalinn/activity-tree.htm>
- Construct miniature shelters using natural materials on the schoolyard
- Research shelters that animals build (e.g., beaver lodges) http://www.wildernessclassroom.com/www/schoolhouse/boreal_library/animals/beaver.htm
- Build a bat house <http://free.woodworking-plans.org/bat-house-plans.html>
- Build a bee hive <http://www.dnr.state.md.us/wildlife/Habitat/WildAcres/wabees.asp>
- Attract birds to the schoolyard with nest materials, bird bath, roosting box <http://www.allaboutbirds.org/NetCommunity/Page.aspx?pid=1144>
<http://wondertime.go.com/create-and-play/article/nest-quest.html>

A Bit More about...

Children and Miniature Worlds

"From sand boxes to doll houses to model train sets, children love to create miniature worlds that they can play inside of. Through creating miniature representations of ecosystems, or neighborhoods, we help children conceptually grasp the big picture. The creation of small worlds provides a concrete vehicle for understanding abstract ideas...Small worlds work wonders for children. They provided the same kind of emotional security that islands provide for vacationers. The world is simplified and knowable. They provide cognitive accessibility because all the disparate elements of a place are brought into one view." (From *Children in Nature* by David Sobel)

Reflection: Discussion

Once the students have built, shared, and un-built their shelters, gather them together and **ask:** What did you use to build your shelter? What made your spot a good one?

If you could make another shelter, would you change anything? If yes, what would you change?



A Bit of History

Maryland Forests

"Many people think present-day forests have never changed or been changed. In fact, most of Maryland's forests have been harvested and regrown three to five times since European settlement... Maryland's forests were virtually untouched before the arrival of the first European settlers...Prior to this, Native Americans had cleared and burned small areas of forest for agriculture, berry production, and hunting, but activities were primarily near settlements along the Chesapeake Bay and its tributaries." *Maryland's Forests: Past, Present, and Future* by Jonathan Kays (MD Cooperative Extension) <http://extension.umd.edu/publications/pdfs/fs627.pdf>



How Much Space Do We Need?

Location: **Winans Meadow**

Habitat Focus: **Space**

Location:

GFT Map: T2

Materials:

Pencils
Journals
10 meter tape measure
One stopwatch for every two students
Plastic cups
Scoop nets (one per student)
White trays
Magnifiers on string (one per student)

Resources to explore before the field trip:

"Pooh Sticks" from *Winnie the Pooh* by A.A. Milne
"Four Hundred Years ago" in
The Gwynns Falls: Baltimore Greenway to the Chesapeake Bay by Ed Orser pp. 20-23 (John Smith)
Paddle to the Sea by Holling Clancy Holling

Where Go the Boats?

by: Robert Louis Stevenson

*Dark brown is the river.
Golden is the sand.
It flows along forever,
With trees on either hand.*

*Green leaves a-floating,
Castles of the foam.
Boats of mine a-boating—
Where will it all come home?*

*On goes the river
And out past the mill,
Away down the valley,
Away down the hill.*

*Away down the river,
A hundred miles or more,
Other young people *
Shall bring my boats ashore*

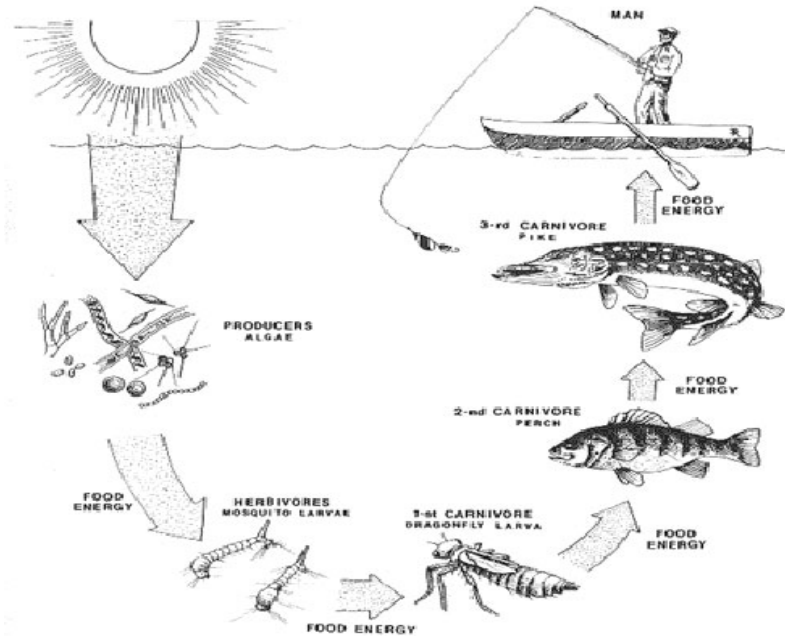
Activity: Racing Sticks – Students race sticks in the stream and observe water flow direction, obstacles and current speeds. They measure a 10 meter section of shoreline, then record the number of seconds it takes for their stick to travel 10 meters, and predict the time needed for the stick to reach the Inner Harbor. They calculate the answer back in the classroom

Ask: Which way is the water flowing? Where do you think this water goes?

Say: You are going to investigate stream currents by floating and timing sticks in the stream. First you will find a stick and practice floating it in the stream. For about 10 minutes before the timed trials, let the students find a stick on the ground and observe as it floats down the stream.

After 10 minutes direct the group to mark a starting line on the ground with a stick, measure 10 meters with the tape, and mark a finish line for the times trials.

Say: Each one of you will float a stick from the starting line to the finish line while your partner times it. Then record the time in your journal on the Stick race page. If your stick is caught on a rock or in an eddy, you may choose another stick to float.



A Bit of Geography

Watersheds as storm drains

Most storm water runs into drains, which in turn run into streams (not underground pipes, as people often think), so litter and other kinds of waste that are dumped or carried along into storm drains end up in the stream and eventually in the harbor, bay, or ocean. (To illustrate this point, ask students where they think a styrofoam cup would end up if it were thrown onto a parking lot.)

From Ed Orser

Extension: Teams who finish early can modify their stick to try and increase its speed.

Back in the classroom:

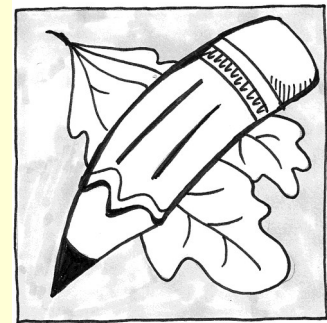
Students and teacher solve the math problems in the students' journals to answer the question: How long would it take your stick to reach the Inner Harbor?

Reflection: Discuss and write in journal

Ask:

Why do you think the sticks travel at different speeds?

- 1 What causes some sticks to get trapped?
- 2 Where are the fastest and slowest stretches in the race course?
- 3 How many hours do you think it would take your stick to reach the Inner Harbor (near the Ravens stadium) in downtown Baltimore City?



Say: Turn to the stick race page in the journal and write your prediction:

How long would it take your stick to reach the Inner Harbor?

My prediction = _____ hours

Say: We'll be working together to find the answer to this question when we get back to school.

Activity: Who Lives Here? – Students collect, observe, sketch, and respond to questions that require inference and comparison about aquatic animals.

1. **Ask:** What do you think lives in this water?
2. **Say:** You will be exploring the river to find out what lives there.
3. Point out the boundaries of the activity. Explain the importance of the buddy system, and divide the group into buddy teams.
4. Show the students how to use a dip net and observation tray for capturing and observing organisms.
 - Gently sweep the net along the bottom of the river, through any vegetation, and along the sides of rocks and other objects.
 - Scoop up some vegetation or bottom sediment and strain out mud by dipping the net into the river
 - Transfer any organisms and vegetation you caught into an observation tray filled with river water.
5. Give each student a dip net and observation tray.
6. **Say:** Find as many different kinds of plants and animals as you can, but one of each kind is enough. Remember to stay with your buddy at all times.
7. After the teams have searched for about 15 minutes, bring out all the plastic cups and magnifiers as aids for observing small organisms. Make sure macroinvertebrate sheets are available.
8. After about 10 minutes, gather the students together and arrange the trays so that everyone can see them. **Ask:**
 - Where did you find most of the animals?
 - Where did you find most of the plants?
 - Which types of plants and animals were found most often?
 - Which ones were the hardest to find?
 - Who found an animal that no one else found?
 - How many different kinds of organisms did we find?
 - Which organism would you like to be if you could live in the water for a day? Why?
 - What do you think keeps the organisms that live in the stream from being carried downstream in the currents?

After everyone has had the chance to look over the contents of the trays, **say:** record your observations on the Stream Study page in your journal.

Direct the students to release the animals gently back to the same area where they scooped them up.

(Adapted from <http://www.outdoorbiology.com/?q=node/106>)

Extension:

Students use classroom and online resources to identify organisms.