

The Olbrich Explorer K/1 Tropical Ecology Explorer curriculum provides hands-on learning focused on the sensory exploration of plants. Olbrich staff provides a program introduction, guided tours of the tropical Conservatory, and support for adult chaperones as they guide small groups through 4 different hands-on activity stations. Each station has detailed information sheets that instruct the adult chaperones on how to lead the activity. The information sheets will appear on the table at each station but please *read the curriculum and share the Copy Pages with all chaperones prior to your field trip.* Enjoy!

Conservatory Walk

Olbrich educators lead students on a trek through the Bolz Tropical Conservatory encouraging them to use their senses and pointing out plants that are useful to humans.

Explorer Activities

Seeds: Use your EYES!

- Learn what a seed looks like on the inside
- Match seeds with the plants they grow into

The Smelly World of Plants: Use your NOSE!

- Experience the scents of live plants
- Smell the familiar plant spices and guess their names

Plant Parts: Use your HANDS!

- Touch something you can't see and guess what it might be
- Feel some plants that have a unique texture

Bottle Biology: Use your Senses!

- Plant a Discovery Cup Garden with sensory plants

Supplemental activities are included in the curriculum for use in your classroom before and after your visit to Olbrich Botanical Gardens.

Rainforest Plants

Conservatory Walk

Objective: Students experience the sights, sounds, feelings, and smells of a tropical forest. Students learn to identify similarities and differences between plants and how these correspond to their different roles in ecosystems. Students are encouraged to ask questions and to develop strategies for finding answers through observation and experiment.

Method: Olbrich educators take students on a tour of the tropical Bolz Conservatory. Students are encouraged to use their senses to make observations about the environment and plants they see. Students compare what they experience in a tropical environment with our Wisconsin environment.

Background for Teachers:

The tropical rainforest is an exciting place to explore, especially because many of the plants that grow there are unfamiliar to us in Wisconsin. When you enter the Bolz Tropical Conservatory at Olbrich you will immediately feel the warmth and moisture. Is it this hot and humid all the time in Wisconsin? Is it ever this hot and humid in Wisconsin? Also make sure to take a deep breath when you first go in to experience the unusual smells of many of the flowers. There are many sounds to observe -- water falling, birds, watering equipment, other people.

The Conservatory has supplemental heating during the cold seasons, but we do not try to maintain the warmer summer temperatures year round. It may be as cool as 65 F during the winter months. The cool temperatures do not harm the plants but will slow their growth during these lower periods of light. The relative humidity is maintained to at least 60% through 220 misting nozzles scattered throughout the Conservatory.

Back on the Bus:

After your trip to Olbrich, ask students what they thought was most interesting about their trip to Olbrich's "rainforest." What was their favorite plant? What was the most surprising thing they learned? What colors do they remember seeing in the Conservatory? What kinds of smells?

Chaperones & Teachers:

Please read through these detailed instructions before you begin guiding students through the activity.

Feel free to ask Olbrich Educators any questions!

Seed Pillows

Use Your EYES!

These pillows look like giant seeds. Inside of every seed is a new plant waiting to grow.

Materials

Bean Seed Pillow

Corn Seed Pillow

Bean Seeds and Seedling

Corn Seeds and Seedling



Have the students look at the two pillows.
Each pillow represents ONE seed.

THE BEAN

1. Open the velcro flaps on the bean pillow and LOOK inside to see the young plant.
2. Ask the students to find the leaves of the new plant.
3. Ask the students to find the root of the new plant.
4. Examine the real bean seeds and plant on the table.

THE CORN

1. Lift the flap and LOOK inside the corn seed.
2. Ask the students to find the leaves of the plant.
3. Ask the students to find the root of the plant.
4. Look at the real corn seeds and plant on the table.

Seed Pillows

DISCUSSION



**Do the two seeds look the same inside? How are they similar?
How are they different?**

The white parts of the seeds are food storage areas for the seed. They store the food that gives the seed energy to grow into a plant.

- ❑ **How many storage areas does the bean have?** (*Answer: 2*)
- ❑ **How many does the corn have?** (*Answer: 1*)

- ❑ **How many leaves does the bean seedling have?** (*Answer:2*)
- ❑ **The corn seedling?** (*Answer:1*)

Plant scientists call seeds with one food storage area monocots.
Plants with two food storage areas are called dicots.

Where have you seen bean and corn seeds before?

Answer: On a plate!

Explain that many seeds are food for humans.

- ❑ **What are other examples of seeds being food?**
(*Answer: beans, corns, nuts, etc.*)

If you have time, ask the students to draw a picture of the corn and the bean. Ask them to include how the two seeds are the same and how they are different.

Chaperones & Teachers:

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Seeds

Use Your Eyes!

Seeds come in lots of shapes, sizes and colors.



Do: Work together to match the seeds in boxes with the picture of the plant they will grow into.

Here are the answers:

1	2	3	4	5
Beans	Popcorn	Coffee	Maple Tree	Lettuce

6	7	8	9	World's Biggest Seed!
Onion	Peas	Pumpkin	Sunflower	Coconut



Ask: 1. How are the seeds different?

Answer: seeds are different sizes, shapes, colors, and even make different sounds when you shake the seed boxes.

2. Have you ever used any of these seeds before? For what?

Chaperones & Teachers:

Please read through these detailed instructions before you begin guiding students through the activity.

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Bottle Biology

Use Your Senses!

Plant a tiny multi-sensory garden.



Plant Discovery Cup Gardens

1. Pass out one cup and lid to each child. Have them each initial the bottom of their cup with the marker.
2. Help them carefully place 1-2 tablespoons of damp soil into their cup.
3. Before you plant each plant, take a minute to explore it with your senses.
 - a. Smell the creeping thyme. **What does it remind you of?**
 - b. Touch the spike moss. **How do the leaves feel?**
 - c. Look at the *Sinnigia*. **What colors do you see?**

Plants use things like scent to attract insects that pollinate them. They have modifications like fuzzy leaves to protect against being eaten.

4. Place a small portion of each plant into each discovery cup and snap the lid in place.

DISCUSSION



What do the plants in your Discovery Cup Garden need to survive?

1. Sun
2. Water
3. Soil
4. Food

How will you take care of your garden?

- Make sure to water it when it gets dry.
- Place it near a window or light source
- **What about FOOD? Where do plants get their FOOD?**
 - they make food from the sun's energy
 - get nutrients from the soil they grow in

Later, if the children wish to add "food" for their plants, they can collect a dead insect and place it in their cup. The insect will break down slowly in the soil and provide nutrients for the tiny plants inside!

Once the kids are finished making their Discovery Cup Gardens they can wear them around their necks.

Chaperones & Teachers:

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Leaves

Use your EYES!

Scientists use similarities and differences to group together (classify) different plants.



- **LOOK** at the leaves in front of you. **How are they the same? How are they different?**
- Try grouping the leaves by...
 1. Size
 2. Shape
 3. Color
 4. Edges (rough or smooth)



- **Are there any other ways to group the leaves?**
- **What sense(s) did you use to group the leaves?**
- **Which characteristic (size, shape, etc) had the most leaves? Which had the fewest number of leaves?**



Leaf Rubbings

After talking about their similarities and differences, use the laminated leaves with the paper and crayons to make leaf rubbings.

LOOK at the different patterns that each leaf makes.

Chaperones & Teachers:

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Smelly Plants

Use your NOSE!

The plants on this table are for TOUCHING and SMELLING.



Do:

1. Have the students TOUCH and gently rub the leaves between their fingers. This releases the oils inside the plants that contain the smell. **What do the plants feel like?**
2. Ask the children to SMELL their fingers. **What do they smell like?**
3. Some of these plants are named for the way they smell. Have students guess the plants' names by their smell. Check the names on the plant stakes to see if your noses are correct.



Ask:

Why do plants have strong smells?

There are several answers...

1. Some plants use their scent to protect themselves from predators - if the animals don't like the SMELL of a plant they won't eat it.
 2. Other plants use their smells to attract animals - if animals like the smell they will eat the plant's fruit and scatter the seeds.
- **What do people use smelly plants for?**
(Answer: spices, gum, candy, teas, perfumes, lotions, soap, air fresheners, etc.)

Chaperones & Teachers:

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Spices

Use your NOSE!

Spices are plant parts that people use in cooking.



Have students gently squeeze the spice jars right under their noses — try passing one spice jar around at a time and discussing it together.



What does this spice smell like to you? What does it remind you of? Try guessing its name. Encourage imagination!

Tell the children the real names of the spices, and together, come up with some foods that contain these spices.

Answers: These spices are used in...

A= Coffee flavor	Drinks, candies
B= Vanilla Bean	Ice cream, cookies
C= Black Pepper	Pepper shakers
D= Cinnamon	Chewing gum, pies, cakes
E= Ginger	Gingerbread cookies

Chaperones & Teachers:

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Touch Box

Use Your Hands!

The touch box has mystery plant parts inside. It could be a stem, leaf, seed, flower, or fruit.



1. Line up the students so that they walk by the Touch Box one at a time.
2. Tell them to reach their hand into each of the holes and feel what is inside—don't take it out! They can shake it, test its weight, and feel its texture.



What plant part do you think you are feeling? Is it a stem, leaf, flower, fruit, or seed?

Have them keep their answers a secret so everyone gets a chance to guess!

3. Tell the children to pick one object to draw. They will try to imagine what it looks like by just feeling it.
4. When all of the children are busy drawing, show them each object and read the information about each plant part! Have fun comparing their drawings to the actual objects.

Chaperones & Teachers:

Please read through these detailed instructions before you begin guiding students through the activity.

Feel free to ask Olbrich Educators any questions!

Touch Plants

Use Your Fingers!

Each of the plants on the table has an interesting feel.



Have the children gently TOUCH each of the plants.

How do the plants feel?

Watch what happens when you touch the *Mimosa*.



- **Why do some of the plants have hairy leaves?**
 - The “hair” on the leaves protects the plant. Animals don’t like the fuzzy leaves, so they leave the plants alone!
- **How do the leaves on the cactus feel? (Sharp!)
Why do cacti have these spikes?**
 - Thirsty desert animals munch on cacti for water. The spikes protect the cacti from animals that might eat them.
 - They sometimes store water in these spikes.
- **Why do the *Mimosa* leaves close up when you touch them?**

- *Mimosa* leaves close when insects crawl on them. Instead of being able to eat the plant, the confused insects just fall off!

Activities to Supplement Your Visit to Olbrich Gardens

Before your visit...

SEEDS

Study how seeds travel and why? Read a story about seeds and talk about why seeds need to travel away from the parent plant to insure successful reproduction. Why is this important? If seeds didn't travel and a natural disaster (fire, flood) destroyed a field, what might happen?

Collect various types of seeds and determine how they travel. After collecting the seeds, classify them by the way they travel: wind (pine, dandelion, maple), hitchhiking (beggar's ticks), as food for animals (nuts, berries), exploding (touch-me-not, sweet pea). Make display cases of the various types of seeds.

Discuss why some plants (oak tree) produce thousands of seeds while others produce much fewer (coconut tree). You can relate this situation to the animal kingdom where humans have few offspring and frogs/insects produce thousands and millions of offspring. Discuss reproductive success due to other influences (predators, competition, etc.)

SIMILARITIES AND DIFFERENCES

Ask students to name different kinds of seeds and collect some outside or in the kitchen. Have students group the seeds and explain the logic of their groupings (color, shape, etc.). What features did students find in common? Encourage creativity. There really isn't a "wrong" way to group the seeds as long as students can explain their reasoning.

Ask your class to sort themselves into different groups. Obvious groups like boys/girls, and brown eyes/blue or green are good to try as starters. Then you can ask the class to think of their own. Examples are best when they sort the class into two groups exactly, although it's also fun to try more complex examples (organize yourselves into groups with people who have the same colored shirts).

SPICES

Talk about what spices are and how we use them in our daily lives. Ask students, "What is your favorite spice? What would life be like without spices?" It can be fun to make

up different types of foods or recipes using spices. Or even imagine your very own spice. What would it taste like?

After your visit...

RAINFOREST WALK

Your students may have a kinesthetic remembrance of their visit to the Bolz Tropical Conservatory. Remind them of the differences they noticed between the Conservatory and conditions outdoors in Wisconsin. Ask the students to close their eyes and imagine they are back visiting the Conservatory at Olbrich. Ask them about the various sites, sounds and smells they remember. Remind them to think about the “weather” inside. What do they remember best? Have the students share their memories or draw a picture of what they remember.

SEEDS

Plant a bean. Place a soaked bean in a transparent plastic cup with a moist paper towel so that the bean can be easily observed. Each day, students can observe the bean as the roots and stem begin to grow. Have the students keep a visual diary, drawing the bean as they see it each day.

LEAVES

Make your own collection of leaves. It’s fun to press leaves between the pages of books. You can also use a magnifying glass to look closely at the veins and edges of a leaf. Use crayons or pencils and paper to make leaf rubbings. Ask the students to choose one of their favorite leaves to rub. Students can make collages by rubbing more than one leaf. Point out the branching lines in the middle of the leaves. These are veins that bring food, water and air to all parts of a plant. Humans also have veins that do almost the same thing for our bodies.

TASTING SPICES

Make some mulled cider with cinnamon and cloves. Then compare the mulled cider with the plain cider to see if spices make it taste better.

SMELL

Ask the students what their favorite smelling flowers or leaves are. Make a list as long as you can of “smelly plants”. Discuss why plants are “smelly”. Is it just to please humans or maybe to attract a pollinator or discourage a predator.

Explain that smells have a strong effect on people and animals. Just as really bad smells can make you feel sick to your stomach, many scientists believe that good smells can make people feel better. Try smelling different things and talking about how it makes you feel.

Discovery Cup Gardens

Dear Teacher,

When your class leaves Olbrich Gardens, each student will have a small Discovery Cup Garden to take with them. Discovery Cup Gardens are part of Bottle Biology, a hands-on curriculum that uses recyclable containers to teach about science and the environment. See www.bottlebiology.org for more information.

Having these small “ecosystems” in your classroom can offer many learning opportunities for your students. Just caring for and observing Discovery Cup Gardens can be a great learning experience for your students. If you’d like, take it a step further and do some scientific experiments. Different treatments can be given to the gardens to see what the outcomes are. Below you will find lots of suggestions for ways to experiment with your gardens. Use your imagination and let the students find the answers right before their eyes.

Thanks,
Olbrich Education Staff

Care and feeding of your Discovery Cup Gardens

If you are not using the Discovery Cup Gardens for scientific experiments, but would simply like to keep them alive to observe, here are some simple things to do to keep them healthy:

- ❑ Water the gardens once every two weeks, just a light mist of water or quick squirt from a water bottle. The trick is to avoid watering the plants too much or too often, as the container will hold in a lot of the water.
- ❑ Keep the gardens in a place where they can get several hours of light each day. Natural light is best (such as in a window) but artificial light will work, too.
- ❑ Keep your Discovery Cup Garden from getting too cold or too hot and your plants should thrive!
- ❑ Finally, keep an eye on the plants, as many will get too large to fit comfortably in their small home over time. These can be transplanted into larger containers or simply removed to allow enjoyment of your other plants.

Transplanting

When the plants have outgrown their original container, transplant them into a spacious new home. Try a two-liter soda bottle or a glass or plastic aquarium. Transplant everything all at once, or give some of the smaller plants in your original container some breathing room by removing and replanting only the larger plants.

Bottle Biology Extension Activities

Classroom Observations

Observe the Discovery Cup Gardens for a period of several weeks. Make notes about the gardens. Try experimenting with different conditions in the different cups:

- ❑ Add water to some gardens, but not to others. Use different types of water solutions (try adding vinegar, salt, or water collected from a pond or puddle) and compare them to a bottle that gets tap water.
- ❑ Fertilize one garden with plant food and use plain water on another.
- ❑ Try putting one garden under bright lights, and put one garden in the dark or wrapped in black paper.
- ❑ Take the lids off some of the gardens and leave the lids on some of the gardens. What happens? What is the difference between the two?
- ❑ Add a new plant or organism to one of the gardens and observe how conditions change.
- ❑ Wrap the gardens in different colors of cellophane to observe any effects of different light colors.

Theme gardens

Now that your class is full of Bottle Biology experts, create new landscapes in small containers (soda bottles, take-out containers, etc.) that tie into other lessons you are doing in the classroom. Plan, design, create, and plant theme gardens that correspond to work that your students are doing in class.

- ❑ While studying dinosaurs, plant a garden of “prehistoric” plants like ferns and mosses. Populate your garden with plastic dinosaurs.
- ❑ World cultures or geography can be studied by planting bottle dome gardens with seeds from exotic fruits from each country or plants native to different regions of the world.
- ❑ TerrAqua columns are great for studying water cycles and watery pond or lake habitat. See www.bottlebiology.org for more information on TerrAqua columns.
- ❑ For a unit on nutrition, plant an edible bottle dome garden with quick-growing vegetables like lettuce or radishes!

Outdoor Adventures

Tie the mini world in your Discovery Cup Gardens to the world outside your school.

- ❑ Start a new garden (or add to an existing one) with plants or mosses collected outside. What types of plants do well in your container? Which plants don't seem to thrive?
- ❑ Create a miniature “backyard” in your container. Add things like acorns or small insects- just be sure to add the appropriate food for the insects- to make a microcosm in a bottle. Remember, everything needs food, water, and space to survive.