Beech Maple Forest Classroom Unit

Theme: Forest Overview – What makes up a Michigan forest?  
Recommended Grade Levels:  1st – 3rd grade

Unit Connection: Introductory lesson to Beech Maple Forest Unit (lesson #1)  
Lesson Length: Part 1 – approx. 55 minutes

Subject: Science
Lesson Length: Part 2 – approx. 25 minutes

Essential Questions: What makes up a Beech Maple forest habitat and why?  
How can you assemble different materials in order to build a habitat for living things?

Key Concepts: What makes up a forest, living vs. non-living, how to build a forest terrarium, how to observe a terrarium, how to record observations

Lesson Summary: This lesson is the introductory lesson to the Beech Maple forest unit. Since it is composed of two parts: building forest terrariums and observing their terrariums, it may be completed in one day or broken down over two days. During part one, students will complete a pre-assessment about the living and non-living things that make up a Michigan forest. Students will work in small groups to create forest terrariums by choosing their own materials and justifying why they chose those resources. During part two, students will observe their terrarium, draw a picture and write about their terrarium, and generate questions that they have about their terrariums.

Materials:  pre-assessment worksheet – 1 per student  
“Our Terrarium” worksheet – 1 per group of 4-5 students  
“Terrarium Observation Record” – minimum 5 copies per student  
Student terrarium supplies:  
-Clear containers: peanut butter jars, Mason jars, recycled containers, terrarium…etc. – 1 per group of 4-5 students  
-wax paper (for lids)  
-rubber bands (to hold wax paper in place)  
-Pea gravel, course sand, or pebbles  
-Activated charcoal  
-Spaghnum moss, plants (see #6 on “How to Build a Terrarium” for ideas)  
-Soil, mud  
-Bark, dead leaves, small rotting log, rocks, sticks  
-Plant mister/spray bottle  
-Plastic items (plastic bugs, rulers, pencils, crayons)  
-Newspaper pieces  
-Fruit peel (banana, orange)  
-Optional: small animals (worms, sow bugs, pill bugs, slugs, snails, toads, lizards, tarantulas), food for animals, jar lid (for water dish)

I. Objectives

Objectives:
1) Students will brainstorm and discuss components of a Michigan forest and their importance.
2) Students will work together in a group in order to create a forest terrarium.
3) Students will use their senses to observe their terrariums.
4) Students will draw and record what they see in their terrariums.
5) Students will generate questions that they have about their terrariums.

Michigan State Standards:

<table>
<thead>
<tr>
<th>1st Grade Standards</th>
<th>2nd Grade Standards</th>
<th>3rd Grade Standards</th>
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<tbody>
<tr>
<td>S.IP.01.11 Make purposeful observation of the natural world using the appropriate senses.</td>
<td>S.IP.02.11 Make purposeful observation of the natural world using the appropriate senses.</td>
<td>S.IP.03.11 Make purposeful observation of the natural world using the appropriate senses.</td>
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<tr>
<td>S.IP.01.12 Generate questions based on observations.</td>
<td>S.IP.02.12 Generate questions based on observations.</td>
<td>S.IP.03.12 Generate questions based on observations.</td>
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<tr>
<td>S.IP.01.13 Plan and conduct simple investigations.</td>
<td>S.IP.02.13 Plan and conduct simple investigations.</td>
<td>S.IP.03.13 Plan and conduct simple and fair investigations.</td>
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<tr>
<td>S.IA.01.12 Share ideas about science through purposeful conversation.</td>
<td>S.IA.02.12 Share ideas about science through purposeful conversation.</td>
<td>S.IA.03.12 Share ideas about science through purposeful conversation in</td>
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<table>
<thead>
<tr>
<th>S.IA.01.13 Communicate and present findings of observations.</th>
<th>S.IA.02.13 Communicate and present findings of observations.</th>
<th>S.IA.03.13 Communicate and present findings of observations and investigations.</th>
</tr>
</thead>
</table>

### II. Before you start

**Prerequisite knowledge and skills.**
- general knowledge of what a forest is
- general knowledge of living vs. non-living

**Assessment (formative and summative)**

**Pre-assessment:** What makes up a forest here in Michigan? Students list (or draw) the components of a forest.

**Formative Assessment:** “Our Terrarium” worksheet & Terrarium construction
- Do all of the students actively participate?
- Were they able to work together in a group?
- Did the students list their reasoning (the “why”) for including the items in their forest terrarium?
- Are the students able to participate in the discussion about why they want to include certain items in their terrarium?

### III. The Plan

<table>
<thead>
<tr>
<th>Time</th>
<th>Parts</th>
<th>Lesson Description</th>
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<tbody>
<tr>
<td>Prep work (before the lesson)</td>
<td>Before the lesson:</td>
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</table>
| - | -Create your own terrarium to be used for comparison during the observation activities in the following lessons. Bring in your terrarium to show the students only AFTER the students have created their own terrariums. Also, you should complete an “Our Terrarium” worksheet for your terrarium as well to list the materials used and why you chose those items. *See attachment - “How to Build a Terrarium” – to assist in creating an effective terrarium.  
- Make at least 5 copies of the “Terrarium Observation Record” sheet for each student and staple together into observation packets.  
- Make copies of other worksheets. |
| Motivation (Opening/Introduction/Engagement) | Part 1 – Build a Terrarium  
**Introduction:** In science, we’re going to be learning about Michigan’s Beech Maple forests and the different plants, animals, and resources that make up a forest.  
**Pre-assessment:** Before we learn more about the forest, I want to find out what you already know about forests in Michigan. Explain pre-assessment: What makes up a forest here in Michigan? Students list (or draw) the components of a forest. Make sure to clarify that they need to think about a forest in Michigan and not a jungle or a rainforest.  
*Students complete pre-assessments individually.* |
Terrarium activity:
In science, we’re going to be learning about a Beech Maple forest and the different parts of a forest. In order to do this, you’re going to work in small groups to create forest terrariums. A terrarium is a small, closed container where you keep and observe living and non-living things in a natural habitat. It’s like a mini-forest in a container.

Review living vs. non-living
Living: anything that is or has ever been alive (dog, flower, plant, road kill, log)
Non-living: anything that is not now nor has ever been alive (rock, soil, sand, mountain, glass, wristwatch)

Divide students up into groups of 4-5 students. Give each group 1 copy of the “Our Terrarium” worksheet.

In order to make your mini-forests, you need to talk with your group about what you should put in your terrariums. I have a lot of supplies on the table that you can use. Some of the things might be important in creating a mini-forest, but some things might not be important. With your group, you need to choose what you think is the most important in order to create a mini-forest. I’m going to allow you to look at all of the supplies that I have, and then you need to go back with your group and fill out the “Our Terrarium” worksheet about what you want to put in your group terrarium.

Allow the students to look at all of the supplies, but not to take any of the supplies. Make sure to include some unnecessary supplies in the selection so that students need to think about what they should use. Write questions on the board: What does a forest need to survive? What makes up a forest?

After the students have looked at the supplies, have them fill out the “Our Terrarium” worksheet based on the questions on the board: “What does a forest need to survive? What makes up a forest?” Designate 1 student per group as the writer. Remind the students that they also need to write down why they want to include each item. Model an example like the following:

“I’m going to put a piece of bark in my terrarium so that my worm can hide underneath it.”

Students work in groups to fill out the “Our Terrarium” worksheet.

After the groups have filled out the “Our Terrarium” worksheet, designate 1 student from each group to collect the supplies written on the sheet.

Students will work together in their groups in order to create their terrariums based on the list that they created. Make sure that students label their terrariums and leave their materials list near their terrariums for future reference.

Part 2 – Terrarium Observation
Introduce Terrarium Observation Record:
Regroup the class and explain that real scientists study and observe their experiment for a long period of time. Like scientists, the students will also be observing their terrarium every day for the next few days and/or weeks, drawing pictures of what they see, writing about what they see, and thinking of questions that they have about their terrarium. Explain the “Terrarium Observation Record” packet and model how to fill it out accurately and completely.

Have students make their first observations of their terrariums and fill out one “Terrarium Observation Record” sheet in their packets. After observing their terrariums, place their terrariums near the windows in order to receive sunlight.

Wrap-Up:
Show the class the terrarium that you created and place it next to the students’ terrariums in the sunlight to be used for comparison in a future lesson.

Resources:
The following two websites were very helpful in giving step-by-step instructions on how to create effective terrariums:
- How to Create a Terrarium Garden by The Garden Helper. Found at: http://www.thegardenhelper.com/terrarium.html

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How to Build a Terrarium

Materials: Large clear container with screen or wax paper
- Pea gravel, course sand, or pebbles
- Activated charcoal
- Spaghnum moss
- Soil
- Plants (see #6 for ideas)

Bark, dead leaves, small rotting log
- Jar lid (for water dish)
- Plant mister/spray bottle

Optional: small animals (worms, sow bugs, slugs, toads, lizards, tarantulas) and food for animals

Directions:

1. **Selecting a container** – Choose any clear container. I’d recommend an open container (versus a closed container) since it’s easier to keep and maintain. Ideas include:
   - aquarium tank (with or without screened lid)
   - large pickle jar
   - large popcorn container

   *Note: If you’re going to be studying the water cycle during the school year, a closed-environment terrarium is helpful for teaching the water cycle, but it is a bigger challenge to make and maintain. For information on making a closed terrarium with kids, visit: [http://www.stormthecastle.com/terrarium/terrariums-for-kids.htm](http://www.stormthecastle.com/terrarium/terrariums-for-kids.htm).

2. **Pea gravel, very course sand, or pebbles** – Place this on the bottom of the container. Depending on the size of your container, you will want to spread at least an inch of drainage material evenly across the entire bottom of your terrarium. For large or deep containers, up to 3 inches of material may be used. This allows for good drainage of the water in the terrarium. Proper drainage is essential to ensure that the soil doesn't become over-saturated, which may lead to root rot, and the death of your plants.

3. **Activated Charcoal** - On top of the drainage layer, it is a good idea to spread a thin layer (approx. ½ in.) of activated charcoal like you would use in your aquarium filter (so you can purchase it at any pet shop with aquarium supplies). This layer will help to clean the air of the fumes caused when the organic materials begin to decompose.

4. **Spaghnum Moss** – Add a layer of this on top. This prevents the soil in your terrarium from settling down into the pebbles. It is kind of a like a filter that will allow the water to filter down, but not the soil.

5. **Add Soil** (approx. 2-3 in.) - Regular potting soil works fine. There is no need to try a fancy mix.

6. **Add the plants** - Care should be taken in this step. You want to arrange things in a way that is pleasing to the eye. You may want to make sketches before you plant. Or you may want to dig some small holes and move the plants around - trying different locations and arrangements. Common terrarium plants include:

<table>
<thead>
<tr>
<th>Plant</th>
<th>Notes</th>
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<tbody>
<tr>
<td>Palm Neanthe Bella</td>
<td>Low light and grows slowly - hardy</td>
</tr>
<tr>
<td>Swedish Ivy</td>
<td>Very durable low care plant</td>
</tr>
<tr>
<td>Bird Nest Sansiviera</td>
<td>Extremely hardy</td>
</tr>
<tr>
<td>Irish Moss</td>
<td>Makes nice groundcover</td>
</tr>
<tr>
<td>Scottish Moss</td>
<td>Very hardy and good looking</td>
</tr>
<tr>
<td>Croton</td>
<td>Come in many bright colors but need a lot of light</td>
</tr>
<tr>
<td>Pothos</td>
<td>Medium Light , nice shaped leaves</td>
</tr>
<tr>
<td>Herbs (parsley, mint, chives, oregano or others)</td>
<td>Hardy, stay small, often add a nice aroma</td>
</tr>
<tr>
<td>Ferns</td>
<td></td>
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7. **Add other materials.** Add bark, dead leaves, or a small rotting log for materials to decompose.

8. **Add critters** - If you intend to add critters of any kind (like worms, pill bugs, sow bugs, slugs, snails, toads, lizards, tarantulas) to your terrarium, you will need to make sure you have some source of food and water. The water source can be made out of any shallow dish or saucer, depressed into the soil creating a 'lake' within the landscape for them to drink from. Also, if you include an animal, you must have a screen on the container so that the animal can receive fresh air (through the screen) but cannot escape.

9. **Mist the terrarium.**
Beech Maple Forest Pre-Assessment

What makes up a forest here in Michigan? What is in a forest? Write (or draw a picture) of anything that you can think of that is in a forest.

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</table>
**Our Terrarium**

Names: _____________________, _____________________, _____________________,
_______________________, _____________________

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<thead>
<tr>
<th>WHAT did you put in your terrarium?</th>
<th>WHY did you put that in your terrarium?</th>
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<tbody>
<tr>
<td>Example:</td>
<td>worm can hide underneath it</td>
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<tr>
<td>Piece of bark</td>
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Name: ________________________________

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## Terrarium Observation Record

**Today’s Date:** ____________________

<table>
<thead>
<tr>
<th>My terrarium looks like this:</th>
<th>(draw a picture)</th>
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**What do you notice in your terrarium?**

(Write about what you see)

<table>
<thead>
<tr>
<th>What do you notice in your terrarium?</th>
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**This is what I want to know:**

(Questions that you have)

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<th>This is what I want to know:</th>
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