The Evolution of the T2L Science Curriculum

Over the last four years, the Teach to Learn program created 20 NGSS-aligned science units in grades K-5 during our summer sessions. True to our plan, we piloted the units in North Adams Public Schools, and asked and received feedback from our science fellows and our participating teachers. This feedback served as a starting point for our revisions of the units. During year 2 (Summer of 2015), we revised units from year 1 (Summer/Fall 2014) and created new units to pilot. In year 3, we revised units from years 1 and 2 and created new units of curricula, using the same model for year 4. Our understanding of how to create rich and robust science curriculum grew, so by the summer of 2018, our final summer of curriculum development, we had created five exemplar units and established an exemplar unit template which is available in the T2L Toolkit.

We made a concerted effort to upgrade all the existing units with exemplar components. We were able to do much, but not all. So, as you explore different units, you will notice that some contain all elements of our exemplar units, while others contain only some. The fully realized exemplar units are noted on the cover page. We did revise all 20 units and brought them to a baseline of "exemplar" by including the Lessons-At-A-Glance and Science Talk elements.

Grade 2 Habitats

MCLA NAPS Williams

Teach To Learn

A collaboration between MCLA, Williams College, and North Adams Public Schools

Funded by NSF DUE-IUSE Award #1432591

T2L Curriculum Unit

Habitats

Life Science/Grade 2

In this unit, students are introduced to the concept of habitats within an environment. Students have basic knowledge about the structures of individual plants and animals from their Kindergarten and 1st grade science unit. In this unit they will learn about the different habitats that plants and animals live in and the basic elements they need to stay alive. (Adapted from *Next Generation Science Standards [NGSS]*). Students will learn that plants need light, air, water, minerals, favorable temperatures, and a mechanism to disperse seeds to survive, while animals need food, water, air, shelter, and favorable temperatures to survive. Students will use their developing literacy skills to gather information about the types of plants and animals that are typical of different environments such as the temperate forest, desert, tropical rain forest, grassland, arctic, and aquatic environments.

This unit is intended to be taught with the DESE Model Curriculum Literacy Unit *Animals Depend on Their Habitats,* which focuses on the impact that a changing habitat has on polar bears.

Unit Creation and Revision History

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This unit was developed with funding from the National Science Foundation DOE-IUSE Award No. 1432591
This unit is downloadable at http://mcla.edu/teach-to-learn

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UNIT PLAN

Stage 1 Desired Results

	Meaning	
2-LS2-3(MA). Develop and use models to compare how plants and animals depend on their surroundings and other living things to meet their needs in the places they live. [Clarification Statement: Animals need food, water, air, shelter, and favorable temperature; plants need sufficient light, water, minerals, favorable temperature, and animals or other mechanisms to disperse seeds.] **2-LS4-1. Use texts and media to compare: a. different kinds of living things in an area, and b. differences in the kinds of living things living in different types of areas.** [Clarification Statement: Examples of areas to compare might include temperate forest, desert, tropical rain forest, grassland, arctic, and aquatic.] [Assessment Boundary: Assessment does not include specific animal and plant names in specific areas.] ***K2-LS-6. Recognize that people and other animals interact with the environment through their senses of sight, hearing,***	**UNDERSTANDINGS** ***Students will understand that...*** ● Animals depend on their surroundings to get what they need including food, water, shelter, and a favorable temperature. ● Animals depend on plants or other animals for food. They use their senses to find food and water and they use their body parts to gather, catch, and eat food. ● Plants depend on air, water, minerals (in the soil), temperature, and light to grow. ● Animals can move around, but plants cannot and they often depend on animals for pollination or seed dispersal. ● Different plants survive better in different settings because they have varied needs. ● Living things exist in different places, both on land and in water.	**ESSENTIAL QUESTIONS** **Why do certain plants and animals only live in certain areas?** **What happens to plants or animals when their habitat changes?**

touch, smell, and taste. ***K2-LS-7. Recognize changes in appearance that animals and plants go through as the seasons change.*** ***KS-LS-8 Identify the ways in which an organism's habitat provides for its basic needs (plants require air, water, nutrients, and light; animals require food, water, air, and shelter).*** **RI.2.5 Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text efficiently.** **RI.2.7 Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text.** W.2 Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.	***Student Learning Targets*** ***I can statements*** 1. I can name and identify various habitats 2. I can list what plants and animals need to survive in their habitats and predict what will happen to a plant or animal that is deprived of any of these elements. 3. I can create food web and food chain model to explain what would happen if a plant or animal disappears from a food chain. 4. I can use an example to explain how an animal changes its behavior when its habitat changes. 5. I can use pictures and text features from an informational text to answer questions. 6. I can explain why decomposers are an important part of any habitat and give an example of one plant and one animal that is a decomposer. 7. I can design and conduct an experiment to determine what kind of habitat earthworms prefer and record observations using pictures and sentences.
Stage 2 – Evidence	
Evaluative Criteria	**Assessment Evidence**
	CEPA: The Perfect Habitat Students will design and build a physical model of a habitat suitable for a specific plant and animal and describe how the habitat will

	provide the basic needs of the plant and animal. **OTHER EVIDENCE:** End of lesson assessments include: • Type II prompts to be written in science journals • Composition of summary paragraphs • Teacher observation of student application of focus skills

Stage 3 – Learning Plan

Lesson Sequence

Lesson 1: What is a Habitat? This lesson introduces the idea that a habitat is the place where a plant or animal lives; students will compare and contrast pictures of major environments including deserts, rain forests, tundra, oceans, temperate forests, etc.

Lesson 2: Animal Needs. Students will learn that an animal's habitat has the air, water, food, shelter, and favorable temperatures it needs to survive. The students will explore the idea that plants and animals depend on one another and are part of a food chain/food web.

Lesson 3: Animals in Winter. This lesson is adapted from the "Animals in Winter" lesson in *Hands on Nature,* which introduces how animals have developed both physical and behavioral adaptations to cope with habitat conditions that change over the course of the year. The full text of this lesson after Lesson 3 in your binder.

Lesson 4: Plant Needs. This lesson is based on Investigation #1: *Brassica* Seeds from the FOSS "New Plants" Bin, and the accompanying literacy lesson.

Lesson 5: Plants and Animals Around the World (Literacy Lesson). In this lesson, students will read the "Plants and Animals Around the World" selection from the FOSS "*New Plants"* book to gather information about the characteristics of various habitats and the types of plants and animals that inhabit them. (It may take several days to read the entire story with students. There is also a link [see LESSON DETAILS] to an online activity that students can use (with support) to work on their skills in making arguments with evidence.)

Lesson 6: Forest Floor. This lesson is adapted from the "Forest Floor" lesson from *Hands on Nature,* which introduces how plants and animals live and interact on the forest floor. The focus is on earthworms and learning about their habitat preferences through experiments with live earthworms. The complete text of the original "Forest Floor" lesson from *Hands on Nature* follows Lesson 6 in this binder.

Lesson 7: Plant Needs Experiment. This lesson should be used one to two weeks after the "Plants Needs" lesson when the *Brassicas* have had a chance to sprout and develop leaves.

Lesson 8: Seed Dispersal. This lesson is adapted from the "Seed Dispersal" lesson from *Hands on Nature* that addresses the final habitat "need" of plants – a mechanism for dispersing their seeds. It can be supplemented with a literacy lesson based on the "How Seeds Travel" story from the FOSS *New Plants* reader (FOSS lessons follows this lesson in your binder.)

Adapted from Massachusetts Department of Elementary and Secondary Education's Model Curriculum Unit Template. Originally based on Understanding by Design 2.0 © 2011 Grant Wiggins and Jay McTighe. Used with Permission July 2012

Lessons at a Glance

 Accessing internet Video

 Independent online student research

YouTube YouTube

 Outdoor education

 Kinesthetic Learning

Lesson	Core Activities	Extensions	Aspects of Lesson
1.What is a Habitat?	• Defining and Understanding Habits • Habitat Video • Sing Habitat Song	• Animal Groups	 YouTube
2.Animal Needs	• "Life in a Field" Puppet Show • "Who Am I" • Field Food Web		
3. Animals In Winter	• "Animals in Winter" Puppet Show • Winter Tales • Animal Bingo		

4. Plant Needs	• Plant Brassicas • What Plants Need	• Planting Outside	 
5. Plants and Animals Around the World (Literacy Lesson)	• "Plants and Animals Around the World" • Online Habitat Game		 
6. Forest Floors	• Forest Floor Puppet Show • Hand Lens • Looking at Worms		
7. Plant Needs Experiment	• Create the Condition		
8. Seed Dispersal	• See inside a Seed • Mix and Match Seeds • Seeds Needs (Optional)		

Lesson Feature Key

Lessons in this unit include a number of features to help instructors. This key is a quick guide to help identify and understand the most important features.

Icons

Talk science icon: Look for this icon to let you know when to use some of the talk science strategies (found in the unit resources of this unit)

Anchor phenomenon icon: Indicates a time when an anchoring scientific phenomenon is introduced or when an activity connects back to this important idea.

Text Formatting:

[SP#: ....] Any time you see a set of brackets like this, it indicates that students should be engaged in a specific science or engineering practice.

Underlined text in the lesson: This formatting indicates important connections back to the central scientific concepts, and is useful to note these connections as an instructor, as well as for students.

Callouts

Teaching Tip

In these call out boxes, you'll find tips for teaching strategies or background information on the topic.

Student Thinking Alert

Look out for common student answers, ways in which students may think about a phenomenon, or typical misconceptions.

Tiered Vocabulary List

Tier 1	Tier 2	Tier 3
Desert	Arctic	Habitat
Ocean	Aquatic	Food chain
Forest	Shelter	Hibernate
Air	Survive	Migrate
Winter	Cope	Germinate
Root	Nutrient	Rainforest
Soil	Mineral	Tundra
Stream	Informational text	Grassland
Floor	Thrive	Decomposer
Seed	Broad	Castings
	Fungus	Brassica
	Moist	
	Cast	
	Prefer	
	Conclusion	
	Experiment	
	Disperse	

Lesson 1: What is a Habitat?

BACKGROUND

Overview of the Lesson

This lesson will introduce students to the concept of a habitat by having them mobilize their prior knowledge to identify different habitats and their key characteristics.

Focus Standard

2-LS2-3(MA). Develop and use models to compare how plants and animals depend on their surroundings and other living things to meet their needs in the places they live.

Clarification Statement

Animals need food, water, air, shelter, and favorable temperature; plants need sufficient light, water, minerals, favorable temperature, and animals or other mechanisms to disperse seeds.

Learning Targets

I can define a habitat as a place where plants and animals live.
I can summarize the characteristics of at least one habitat including temperature, moisture, and the types of plants and animals living there.

Assessment

Complete a paragraph about habitats that:

1. Defines a habitat.
2. Describes a specific habitat based on images and background knowledge.

WIDA Language Objectives

Level A: Match pictures of plants and animals to pictures of their habitats.
Level B: Complete a paragraph on habitats using a word bank and paragraph frame.
Level C: Compose a paragraph on habitats with a clear beginning, middle, and end.

Targeted Academic Language

Tier 1: desert, ocean, forest
Tier 2: arctic, aquatic
Tier 3: habitat

Resources and Materials

Quantity	Item	Source
8	**Habitat Pictures**	**Bin**
1	"What do you know about…?" Probing Questions	Binder
1	Chart paper/ blackboard/ or projecting device to record class discussion	Classroom Teacher
1	Habitat song lyrics	Binder
1	*Habitat Song* video	CMC Website

	Laptop and Speakers	Classroom Teacher
1	Habitats summary paragraph frame and word bank	Binder
1 per group	Optional: stuffed animals in various sizes	Classroom Teacher
1 per group	Optional: large paper for drawing a habitat	Classroom Teacher
A few per group	Optional: markers or crayons	Classroom Teacher

****Items in bold should be returned for use next year****

LESSON DETAILS

Lesson Opening

Activator: *What do you know about…?*

Split children into groups of 3 or 4 and give each group two pictures of a habitat, explain that these pictures are clues about what they will be studying next in science. Their first task is to discuss everything they know about each of the two places in their pictures, allow 3-4 minutes for the groups to discuss and complete this task. If students seem stuck, you can give them the "What do you know about…?" Probing Questions worksheet.

Teaching Tip

Write on the board a list of items for students to discuss when looking at the picture. Write things like weather, animals, plants, water, etc, to get them thinking about varying types of details that go into a habitat.

During the Lesson

1. Defining a Habitat
   Building off the activator, ask each group to hold up one of their pictures (or project an image from your computer) and ask the group(s) who examined the picture to say one thing they know about the habitat, record their comments on chart paper, the blackboard or a projecting device. You can use the "What do you know about…?" *Probing Questions* worksheet to generate additional information if students need help. Continue to ask each group about the habitats they looked at and record their comments. Note that these places all seem very different. Ask students if there is anything that is the same about them. Through questioning, lead them to an understanding that all are *places where plants and animals live*. Explain that we call these places **habitats,** and that is what they will be studying for the next few weeks.

2. Why are habitats important? (Habitat Video)
   Begin by asking students if they think it is important that the Earth has all different kinds of habitats, conversation can be generated by asking whether or not certain animals can survive in different habitats. (Can a whale survive in a temperate forest?) Have students provide evidence to support their answers, you can also generate some ideas as a group. Explain that this is one of the BIG (ESSENTIAL) QUESTIONS we will keep asking as we learn more and more about habitats in this unit. **[SP7: argumentation]**

3. Play the *Habitat* Video

4. Pass out the lyrics to the *Habitat song* by Bill Oliver, first read the lyrics of the song with the students, engaging in vocabulary activities as you go along to ensure students understand what the song is about.

5. Listen to the habitat song once without singing along, and then sing the song a few more times together.

6. Revisit the BIG (ESSENTIAL) QUESTIONS in light of what students learned from the song. You might ask a question like, "How would our lives be different if there were no oceans?"

Lesson Closing

Review the basic definition of a habitat as "a place where specific plants and animals live," ask students to name the different habitats discussed during the lessons, you can start a poster to record all the different habitats they know about or learn about as the unit unfolds.

Lesson Extension

Bring in different-sized stuffed animals (for example: a salamander, a bird, and a raccoon). Split the class into several small groups and give each group an animal and instruct each group to create an appropriately sized habitat for their animal (if the weather is nice this can be done outside, be sure to review the rules and guidelines for outside work with your class. If it is cold or rainy, groups can create a poster describing the habitat via drawings and words. **[SP2: using models]**

Assessment

Complete a paragraph about habitats that

1. Defines a habitat.
2. Describes a specific habitat based on images and background knowledge.

Lesson 2: Animal Needs

BACKGROUND

Overview of the Lesson

This lesson is adapted from the "Life in a Field" lesson from *Hands on Nature*, which introduces the concept of habitats and the needs of animals that habitats must fulfill. The MA Standard states the basic needs as: food, water, shelter, air, and favorable temperature. *Note to teacher: You may add air and favorable temperature into the lesson discussions. Tell students "a place to raise their young" is the same as "shelter".*

Focus Standard(s)

KS-LS-8 *Identify the ways in which an organism's habitat provides for its basic needs (plants require air, water, nutrients, and light; animals require food, water, air, and shelter).*

2-LS2-3 (MA). Develop and use models to compare how plants and animals depend on their surroundings and other living things to meet their needs in the places they live.

Learning Targets

I can list at least three of the five elements animals need to survive.
I can create a food web given a selection of plants and animals.
I can explain what would happen if a plant or animal disappears from a food chain.

Assessment

Students will write the answer the following in their science journals or on the Lesson 2 Assessment:
1. What must a habitat have for animals to survive?

2. Put these plants and animals in a food chain: cricket, skunk, grass, mouse, and fox.
3. What would happen if someone removed all the mice from the field?

WIDA Language Objectives
Level A: Match pictures that relate to the five habitat elements that animals require.
Level B/C: Explain orally or in writing why each habitat element is important to an animal's survival.

Targeted Academic Language
Tier 1: air,
Tier 2: shelter, survive,
Tier 3: food chain

Resources and Materials

Quantity	Item	Source
1	**Tri-fold board (with sheet) for puppet show**	**Provided with Bin**
	Laptop and Projector	Classroom Teacher
1	**Life in A Field Puppet Set – locate the required puppets in the puppet bag**	**Bin**
1	Projection of field a in winter	Classroom Teacher
1	Projection of a picture of a field	Classroom Teacher
1	Who Am I Description Field Food Web Activity Life in A Field Puppet Show script	Binder (All from Hands on Nature p. 65-72)

	Who am I Animal Images (see list on p. 68 of Hands on Nature)	Classroom Teacher to project
1	Who am I Animal Name Cards (use index cards and see list of animals in Hands on Nature p. 68)	Classroom Teacher to make
1 set	Index Cards	Bin
1	**Sun plate with strings attached**	**Bin**
7	**Green headbands labeled twigs, leaves, berries, flowers, seeds grass, and roots**	**Bin**
20 - 30	**4 foot pieces of yarn/string**	**Bin**
1 per student	Lesson 2 Assessment	Binder (teacher to make copies)

****Items in bold should be returned for use next year****

LESSON DETAILS

Lesson Opening

Activator: Brainstorm

Remind students that in the last lesson they learned about the different types of habitats where plants and animals live and see if students can recall the word **habitat.** Explain that for the next few lessons they will be learning about animal habitats. Ask students to turn to a partner and talk about what would make a good habitat for a bear (or any other animal you, the instructor, would like to choose.) Ask your students to think about what the bear would need to find in the habitat to make it a good place to live. After a minute or so, draw the groups together and call on a few pairs to share one idea from their discussion. Explain today they will be learning about what animals need to have in their habitats to help them **survive**.

During the Lesson

The activities in this lesson are described in the "Life in a Field" lesson copy (at the end of this lesson). The activities we suggest for inclusion in this lesson are listed below with any suggested modification. Note: we have included the entire lesson in the binder, but not all the activities in the original are included in the recommended sequence below.

1. The Puppet Show *"Life in a Field"*

The puppet show can be performed by the teacher or by students while the teacher reads the script. [Puppet shows will occur in many lessons; you can discuss how to involve each student in the puppet shows.) It is important that the scripts are read fluently (so that listeners can understand the meaning) and that children involved in the show are able to actively listen to the content.

After the puppet show, ask your students, "What are the basic needs that a habitat must provide?" Be sure to identify the different habitat Marsha Mouse visits in her travels (forest and pond), maybe add "pond" to the habitats list you started in lesson 1. (The four elements mentioned in the puppet show do not align exactly with the Massachusetts Standards.) Tell students there are two more habitat elements animals need that we didn't learn about in the puppet show. Ask the students the following questions to help them identify these things:

1. "If we put Marsha Mouse on the moon with some food and water and dug her a nice hole to live in, would she be able to survive? What's missing?" Or, ask students to shut their mouths and hold their noses and ask, "What's missing?" The conclusion the students should reach is that animals need air (specifically oxygen, which they learned about in *The Habitat Song*).

2. Show the picture of a field in winter and ask, "What if the field looked like this all year long, would Marsha Mouse and her friends survive?" The conclusion the students should reach is that animals need favorable temperatures.

3. Record the five animal habitat needs on chart paper during the discussion of the puppet show, this chart will be used again in the "Plant Needs" lesson.

2. Who am I?

1. See the *Who am I?* description in the Hands on Nature lesson. Before doing this activity, project an image of a field at the front of the classroom and explain that a field is a type of habitat. Explain to students that they will be learning about some of the animals that live in the field. Now show a few of the *Who am I?* pictures (classroom teachers will need to project images of the animals listed in the Who am I? activity at the front of the classroom) and read the descriptions of what each animals eats. Ask students, is this an animal that eats plants, animals, or both, you can introduce the terms ***herbivore*** and ***carnivore*** if you wish, but this is not required. You can call them "plant eaters" (herbivore) and "meat eaters" (carnivore).

2. Read the instructions for playing the *Who Am I?* game in the attached Hands on Nature lesson. For K-2 students, it is suggested that the teacher/leader do the guessing. **[SP1: asking questions]**

   You can also play the *Who Am I?* game this way. (Suggested by a grade 2 teacher, but it does require a good bit of time):
   1. Display a chart with the 20 animal names (example is in the bin)
   2. Select a volunteer to come to the front of the classroom.
   3. Tape one animal paper to the child's back as he/she faces the animal names chart.
   4. The rest of the students remain in their seats.

Teaching Tip

Give the students example questions to ask the class that will help them reach the conclusion about what animal they are, this way they dont get stuck trying to think of questions and wasting time.

5. The student with the animal on their back asks five yes/no questions to try to guess the name of the animal.
6. The class together answers yes or no to each question.
7. If the child does not know the animal after five questions, the class shares the answer, this is to allow all students time to have a turn.
8. Repeat with all students.
9. Finally, make a class chart classifying: meat eaters (carnivores), plant eaters (herbivores), and animals that eat both plants and animals (omnivores).

3. Field Food Web

BEFORE starting this activity be sure to explain the purpose, which is learning how plants and animals depend on each other. Next, brainstorm some ideas about how they depend on each other. **[SP2: using models]** This activity can be done as listed in the instructions for the *Hands on Nature* lesson attached. Give ONE or TWO pieces of string to each herbivore and carnivore to distribute down the food chain when they select their preferred plant or animal to eat. You can experiment with giving everyone just one string to see the effect when animals are picky eaters. You can also do this activity outside, or in a larger space in the school if the classroom is too small.

Lesson Closing

Review the five things animals need in their habitats: air, water, food, shelter, and favorable temperatures.
Ask students "What did we learn today about how the plants and animals in a field, depend upon one another?" Review the key concepts from the Food Web activity:

1. Animals depend on plants and other animals for food (this is called a *food chain*.)
2. Some animals eat plants and some animals eat other animals (some plants eat animals too).
3. If a plant or animal disappears from a food chain, some of the animals that depend on that organism for food may also disappear if they do not have any other type of food they can eat.

Assessment

Students will write the answer the following in their science journals or on the Lesson 2 Assessment:

1. What must a habitat have for animals to survive?
2. Put these plants and animals in a food chain: cricket, skunk, grass, mouse, and fox.
3. What would happen if someone removed all the mice from the field?

Lesson 3: Animals in Winter

BACKGROUND

Overview of the Lesson

This lesson is adapted from the "Animals in Winter" lesson from *Hands on Nature* (located after this lesson), which demonstrates how animals have developed both physical and behavioral adaptations to cope with habitat conditions that change over the course of the year.

Focus Standard(s)

2-LS2-3 Develop and use models to compare how plants and animals depend on their surroundings and other living things to meet their needs.

K2-LS-7. Recognize changes in appearance that animals and plants go through as the seasons change.

Learning Targets

I can explain how an animal changes its behavior when its habitat changes, using an example.
I can explain how animals adapt to seasonal changes in its habitat, using an example.

Assessment

In their science journals, have students write a description of an animal that undergoes a physical change between seasons and an animal that changes its behavior to cope with seasonal changes in its habitat (such as in winter).

Targeted Academic Language

Tier 1: winter
Tier 2: cope
Tier 3: hibernate, migrate/migration

Resources and Materials

Quantity	Item	Source
1	**Tri-fold board (with sheet) for puppet show**	**Bin**
1	- Animals in Winter puppet show script - Animals in Winter background information - Bingo directions and bingo cards The above are from Hands on Nature p. 87-94	Binder
1	**Animals in Winter puppet set – locate the required puppets in the puppet bag**	**Bin**
1 bag	**Puppet show props**	**Bin**
1	Projection of Forest Pictures (summer and winter)	Classroom Teacher
1 set	**Winter Tale scenario cards**	**Bin**

****Items in bold should be returned for use next year****

LESSON DETAILS

Lesson Opening

Activator: Habitat Change

Project pictures of a forest in summer and winter for the students and have them discuss the difference in the summer forest habitat and winter forest habitat. Select a few students to share out some of the differences they identified then ask the class, "What do you think happens to the animals when their habitat changes in winter?" Let students share some ideas and explain that during the lesson they will be learning about how animals' bodies change, and how some animals change their

behavior to **cope** with seasonal changes in their habitats. Encourage them to use their science words such as "I predict" or "I believe" when answering questions about the animals lives in the summer vs. winter. Also encourage them to answer in complete sentences when discussing what the habitat looks like in the summer vs the winter, responses should be similar to:

"In the winter, the habitat _____."
"In the summer, the habitat _____."

During the Lesson

1. ***Animals in Winter (Puppet Show)***
   The puppet show can be performed by the teacher or by the students with the teacher reading the script. In addition to the puppets, locate the bag of props (in Bin) needed for the puppet show ahead of time. In addition to holding up the puppets and asking students about how each character coped with the winter changes in their habitat, you may want to reread parts of the puppet show specifically focusing on hibernation and migration.

2. **Winter Tales**
   Refer to the description in *Hands on Nature* lesson attached, only the scenarios that students are likely to be familiar with have been selected: monarch butterflies, Canadian geese, honey bees, beavers, frogs, woodpeckers, and bears. Remember to encourage the students to use sound effects.

   Before children present their skits, explain that the audience will guess the animal, explain how it copes with winter, and state whether the animal copes by changing its body, changing its behavior, changing both, or changing nothing at all. You may want to make a recording poster (see template below) during the discussion to document the learning, you may also want to discuss how the coping strategies help the animals meet their needs for air, water, food, shelter, and favorable temperatures.

Animal	Coping strategy	Body or Behavior?

3. **Animal Bingo**

   Animal Bingo can be played per the norm, however you may choose to simplify the descriptions of the animals as you read them for second graders. Consider using 12 animals instead of 16 for the same reason and/or time constraints (prizes may be added). Three different versions of the bingo card are provided in the bin.

   An alternative way to play would be to split the students into small groups (each with an adult) and have each group read the clues as written and match them up with an animal picture because there is rich vocabulary in the descriptions that could be discussed in a small group setting. There are handouts of the descriptions to support this alternative (see binder).

Lesson Closing

Sharing Circle: Have students stand in a large circle and answer the questions: "I'd like to be a _____ in winter because _____." and revisit the essential questions.

Assessment

In their science journal have students write a description of an animal that undergoes a physical change between seasons and an animal that changes its behavior to cope with seasonal changes in its habitat (such as in winter).

Lesson 4: Plant Needs

BACKGROUND

Overview of the Lesson

This lesson is based on Investigation #1: *Brassica* Seeds from the FOSS "New Plants" Bin, and the accompanying literacy lesson in which students read the first story. (The full lesson plans for both these follow Lesson 4 in this binder, the intention is NOT to teach the entire FOSS lessons). Instead of observing the growth and development of the *Brassica* plants (as in the FOSS lesson), after 2 weeks of growing time, students will place their growing plants in different conditions that deprive them of light, water, or nutrients to determine which of the essential elements is the MOST critical for the survival of a *Brassica* plant. (The follow-up observations can be incorporated into your weekly science time or completed during another time.)
Teachers may want to learn more about the unique seeds we will be planting by visiting the fast plants website.

For more information on Brassica Seeds check out the website: http://www.fastplants.org/life_cycle/

Focus Standard(s)

KS-LS-8 *Identify the ways in which an organism's habitat provides for its basic needs (plants require air, water, nutrients, and light; animals re3quire food, water, air, and shelter).*
2-LS2-3(MA). Develop and use models to compare how plants and animals depend on their surroundings and other living things to meet their needs in the places they live.

Clarification Statement

Animals need food, water, air, shelter, and favorable temperature; plants need sufficient light, water, minerals, favorable temperature, and animals or other mechanisms to disperse seeds.

RI.2.5 Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text efficiently.
RI.2.7 Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text.

Learning Targets

I can list at least three of the five elements plants need to survive (air, water, nutrients/minerals, space, and favorable temperatures) in their habitat.
I can predict what will happen to a plant that is deprived of any of these elements.
I can use pictures and text features from an informational text to answer questions.

Assessment

Type II: A. What do plants need to survive in their habitat? B. Predict what a plant will look like if it does not get enough _____. (Pick one: light, water, and nutrients/minerals.)

Targeted Academic Language

Tier 1: root, soil
Tier 2: nutrient, mineral, informational text
Tier 3: germinate

Resources and Materials

Quantity	Item	Source
1	Live plant	Classroom Teacher
1	Foss Science Stories: New Plants (FOSS p. 1-3)	Binder
1	**Investigation 1 Brassica Seeds (FOSS p. 1-31)**	**Bin**
Class set	**Small plastic cups with holes for seeds**	**Bin**
1 bag	Potting soil	Bin
1	**Tray (to place under the seeds)**	**Bin**
1	**Grow light set-up**	**Bin**
1	**Basin for distributing the soil**	**Bin**
Class set	Labels for planter cups	Bin
1	Paper towel roll	Classroom Teacher
6	**Plastic cups for carrying soil or water**	**Bin**
1 vial	*Brassica* seeds	Bin
Class set	***"New Plants"* science stories (What Do Plants Need: p. 3-7)**	**Bin**
1	Chart paper to record brainstorm/ learning	Classroom Teacher

****Items in bold should be returned for use next year****

LESSON DETAILS

Lesson Opening

Show the live plant you, the teacher, have brought in as an example to your class and lead the "Discuss Plants" activity on pg. 11 of the Foss *Brassica* lesson. You could refer to the plant on hand, and ask, "What is this?" "How do you know it's a plant?" "Is it alive?" "How do we get new plants?" Remind the students of the five things animals need to survive in a habitat, then ask students to think turn and talk about what plants need to survive and record answers.

During the Lesson

1. **Introducing Recording**

   Explain to the students that over the next few weeks they will be growing plants of their own to help them learn more about what plants need to survive. Explain that they will be working in groups of 4, and that they will use their science journals to record what they observe about their plants. Explain that for the first week everyone will be giving the plants all they need to grow, and then the class will do an experiment in which some of these things that plants need are taken away, the students will observe what happens to the plants.

2. **Planting *Brassicas***

   Follow the instructions for planting the *Brassica* seeds on pg. 18 of the FOSS lesson. ***Note that pages 14-17 contain the prep work you will need to do ahead of time.*** Each group of students should plant four plants so that in week 3 they can selectively deprive one plant of water, one of light, and one of nutrients, while allowing one plant to keep getting everything it needs (this plant is the experimental control). **[SP3: investigation]** After students complete their planting have them complete

Teaching Tip

Make sure that every student gets a plant that gets all its nutrients so that they can take it home at the end of the week, be prepared for them to get upset when a plant dies.

their day one observation in their science journal, plan on having them complete an observation every 2-3 days for the next 7-10 days, by day 9 the plants should be leafed out and ready to move to the experimental conditions.

3. **What Plants Need**

   Read the *"What Do Plants Need?"* story p. 3-7 in the *New Plants* FOSS book, and use the lesson plan from FOSS Science Stories Lesson (p 1-3) to guide the reading.

Lesson Closing

Complete a chart of plant needs, you can pull out the chart of animals needs created in the "Animal Needs" lesson. Ask the students what they notice about these two lists. Discuss how students might organize the information in these two charts to show what is needed by BOTH plants and animals, and what is needed by only plants or only animals.

Extension

If the teacher would like and if there is room for it, the class should together plant a few of these outside in a classroom garden. They could then record the plants daily progress in their science journals as they compare them to their own plants that they are personally growing .

Assessment

Type II: A. What do plants need to survive in their habitat? B. Predict what a plant will look like if it does not get enough _____. (Pick one: light, water, and nutrients/minerals.)

Lesson 5: Plants and Animals Around the World (Literacy Lesson)

BACKGROUND

Overview of the Lesson

In this lesson, students will read the "Plants and Animals Around the World" selection from the FOSS *New Plants* book to gather information about the characteristics of various habitats and the types of plants and animals that inhabit them, it may take several days to read the entire story with students. There is also a link (see LESSON DETAILS) to an online activity that students can use (with support) to work on their skills in making arguments with evidence.

Focus Standard(s)

RI.2.5 Know and use various text features (e.g., captions, bold print, subheadings, glossaries, indexes, electronic menus, icons) to locate key facts or information in a text efficiently.
RI.2.7 Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text.

Learning Targets

I can use a table of contents to locate a given section of a text.
I can use a glossary to help understand unfamiliar words.
I can use evidence to explain why a particular plant or animal would or would not survive well in a given habitat.

Assessment

1. Teacher observation of students using table of contents and glossary.
2. Assessing the students ability to use evidence to support conclusions (teachers need to design this assessment).

Targeted Academic Language

Tier 1: stream
Tier 2: thrive, broad
Tier 3: rainforest, tundra, grassland

Resources and Materials

Quantity	Item	Source
1 or more	Computers to access on-line habitats game http://www.abpischools.org.uk/page/modules/human_animal_habitats/activity.cfm?age=Age%20range%205-7&subject=Science	Classroom Teacher
Class set	***New Plants* Books (Plants and Animals Around the World p. 22-39)**	**Bin**
1	*Plants and Animals Around the World*: FOSS lesson plan (p. 10-12)	Binder

****Items in bold should be returned for use next year****

LESSON DETAILS

Note: Remember to record observations of your Brassica plants

Lesson Opening

See *"Plants and Animals Around the World"* FOSS lesson plan (included in binder).

During the Lesson

1. *Plants and Animals Around the World* Story: See *"Plants and Animals Around the World"* FOSS lesson plan (included in binder p. 10-12) to guide the story *Plants and Animals Around the World* from *New Plants* p. 22-39.

2. Online Habitat Game

In this game, students can look at pictures and read text (click on the "info" tabs at the top of each picture) to gather evidence about whether a given habitat would or would not be suitable for a particular animal, there are several habitats available for students to explore. Students will need help reading the informational text, but there is a voiceover that explains why their selected answers are correct or incorrect. The point of this activity is to have students provide evidence about WHY a habitat is suitable or not, they should not rely solely on background knowledge. This could be done as a whole class activity, with the screen projected, or independently on individual computers. **[SP7: argumentation]**

Link to game: http://www.abpischools.org.uk/page/modules/human_animal_habitats/activity.cfm?age=Age%20range%205-7&subject=Science

Lesson Closing

You may need multiple days to complete this lesson given the length of the story and the depth of the online activity. The online activity is a great way for students to practice making arguments with evidence. Teachers are encouraged to write them up per the NAPS Lesson Planning Format and incorporated into future version of this Habitats Unit Plan. Revisit the essential questions from this unit, "Why do so many organisms exist in different habitats?" Ask students to contribute ideas from their work in this series of literacy lessons to a chart that captures ideas about this big question.

Extension

If possible, the students could be doing research on their plants and their habitats with computers that they have access to on this day. Teacher should survey websites that are appropriate for the students and suggest them as they navigate the internet in search of resources.

Assessment

1. Teacher observation of students using table of contents and glossary.
2. Assessing the students' ability to use evidence to support conclusions (teachers need to design this assessment).

Lesson 6: Forest Floor

Note: This lesson can be taught before or after Lessons 7 and 8 depending on your schedule and how quickly your Brassica plants develop leaves.

BACKGROUND

Overview of the Lesson

This lesson is adapted from the "Forest Floor" lesson from *Hands on Nature,* which introduces how plants and animals live and interact on the forest floor. The focus of this lesson is on earthworms and their habitat preferences. The complete text of the original "Forest Floor" lesson from *Hands on Nature* follows this lesson.

Focus Standard

2-LS2-3(MA). Develop and use models to compare how plants and animals depend on their surroundings and other living things to meet their needs in the places they live.

Clarification Statement

Animals need food, water, air, shelter, and favorable temperature; plants need sufficient light, water, minerals, favorable temperature, and animals or other mechanisms to disperse seeds.

Learning Targets

I can explain why decomposers are an important part of any habitat.
I can give an example of one plant and one animal that is a decomposer.
I can design and conduct an experiment to determine what kind of habitat the earthworms prefer.

Assessments

1. Science journal responses to the following:
   a. Why are decomposers important and what do they do?
   b. Name one plant and animal that is a decomposer.
2. Students will design and conduct an experiment to determine if earthworms prefer maple or pine forests.

Targeted Academic Language

Tier 1: floor
Tier 2: fungus, moist, cast, prefer
Tier 3: decomposer, castings

Resources and Materials

Quantity	Item	Source
1	**Tri-fold board (with sheet) for puppet show**	**Provided with Bin**
1	Forest Floor puppet show script/background information (Hands on Nature p. 73-79)	Binder
1	**Forest Floor puppet set (locate the required puppets)**	**Bin**
8-12	**Hand lenses**	**Bin**
13	Paper plates	Bin
1 roll	Paper towels	Classroom Teacher
8-12	**Flashlights**	**Bin**

13	Oak Tag for shading the earthworm habitat	Bin
1 bag	Maple leaves	Classroom Teacher
1 bag	Pine needles	Classroom Teacher
30	**Earthworms**	**Contact Sue Beauchamp 1 week days prior to teaching this lesson**
1	Instructions for worm habitat construction	Binder
1	Earthworm illustrations (labeled and unlabeled)	Binder
6	**Quart container with mesh lids**	**Bin**
1 bag	Shredded newspaper	Bin
1 bag	Soil – enough for a handful for each habitat	Bin
8-12	**Cups to carry water and soil**	**Bin**
2 cups	Vegetable scraps chopped fine	Classroom Teacher or Cafeteria

****Items in bold should be returned for use next year****

LESSON DETAILS

Note to teachers: Remember to have your students record observations of their Brassica plants in their science journal.

Lesson Opening

1. Ask students to refer back to your expanding habitats list and discuss that within any of these habitats there are even smaller and more specialized habitats. Within a forest, for example, there might be brooks or small ponds that provide a

very different habitat than the dry land, there might be some animals that live in the trees and never come down to the ground, or other animals that live under the ground.

2. Ask a class brainstorm a list of all the plants and animals they can think of that live very close to or under the forest floor.

3. Explain that today they are going to learn about some special plants and animals that live on the forest floor and how they depend on one another.

During the Lesson

The activities in this lesson are described in the *Hands on Nature* "Forest Floor" lesson found after this lesson, the parts we suggest for inclusion in this lesson are listed below with suggested modifications. *Note: We have included the entire original lesson in the attachment, but not all the activities are included in our recommended sequence*.

1. **Forest Floor Puppet Show** (see original in attached "Forest Floor" lesson)
   Again, the puppet show can be performed by the teacher or by students with teacher support. Be sure to discuss what would happen if a habitat did not include any decomposers to emphasize why they are important.

2. **Using a Hand Lens**
   Before continuing, take a few minutes to introduce students to the hand lenses and the proper way to use them, have the students place them against their eye and have them move an object (in their other hand) back and forth to bring it into and out of focus, you can have students practice by looking at the skin on their hands or the tip of a pencil. You should also review some ground rules about the care that needs to be taken when working with live animals. Now have everyone wash

their hands well so that they do not give any germs to the worms when they handle them and remind them to handle the worms as little as possible.

3. **Meet an Earthworm** (see original in attached "Forest Floor" lesson)

4. **Worm Preferences**

   Explain to the class that they will be doing a series of investigations to determine what kind of habitat earthworms prefer, and will try and figure out if the worms prefer a light or dark habitat. They will also try and figure out if the worms prefer a wet or dry habitat. Ask a few students to share a prediction about which habitat the worm will prefer, you can explain that scientists do investigations to help them figure out whether their predictions are true. Have the class brainstorm how they could tell if an earthworm prefers a light or dark habitat and then repeat the process with the dry/moist question. Now divide the students into small groups, each group will need (paper plates, paper towels, cup of water, oak tag sheet, flashlight) to conduct their two investigations. **[SP3: investigation]**

Light Preferences		Moisture Preferences	
Light	Dark	Wet	Dry

Once the students have set up the two habitats for the worms, have them record what they are seeing in their science journal. As a class, you can have the groups sharing their observations and compile the data into a chart

similar to the one above, make sure to discuss the meaning of the data, particularly if all worms did not behave as expected. **[SP4: interpreting data]**

Lesson Closing

Sharing Circle: Have the class stand in a large circle and let each child share something they learned about earthworms (or how/why scientists conduct experiments) today. Encourage them to use their science vocabulary, such as words like habitat, in their responses.

Assessments

3. Science journal responses to the following:
   a. Why are decomposers important and what do they do?
   b. Name one plant and animal that is a decomposer.
4. Students will design and conduct an experiment to determine if earthworms prefer maple or pine forests.

Lesson 7: Plant Needs Experiment

Note: Can be taught on same day as Lesson 8.

BACKGROUND

Overview of the Lesson

This lesson should be completed one to two weeks after the "Plants Needs" lesson giving the *Brassicas* a chance to sprout and develop leaves.

Focus Standard(s)

K2-LS-8 *Identify the ways in which an organism's habitat provides for its basic needs (plants require air, water, nutrients, and light; animals require food, water, air, and shelter).*

W.2 Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.

Learning Targets

I can record observations of nature using pictures and sentences.

I can use observational evidence to draw conclusions.

Assessment

Write a report that explains the impact of deprivations of water, light and nutrients on plant growth and develop conclusions about which element is most critical and why.

Targeted Academic Language

Tier 2: conclusion, experiment

Tier 3: *Brassica*

Resources and Materials

Quantity	Item	Source
1	Opaque box to depriving some of the plants of light (a copy paper box turned upside down works well)	Classroom Teacher
	Materials from Lesson 4 including grow light set, plant trays, cups for watering, and *Brassica* plants	**Bin**
4-6 sets	**Condition labels (ALL NEEDS, NO LIGHT, NO WATER, NO NUTRIENTS)**	**Bin**
3	**Pie tins**	**Bin**

****Items in bold should be returned for use next year****

LESSON DETAILS

Lesson Opening

1. Divide your students into small groups to review and discuss their observations, have them decide on two things they would like to share with the class, after 2-3 minutes of small group discussion, have each group share.

2. Ask students if they can remember what plants need to survive in their habitat, have the poster you created in Lesson 4 on hand if necessary. Explain that they will now start an experiment to determine which of these things is most important for the *brassica* plants.

3. Discuss the concept of an investigation: What is an investigation? Who conducts investigations? How do you do an investigation? (Make sure students understand that in an investigation you are testing something out to see what happens, and that you may have an ideas ahead of time about what you think will happen.)

Student Thinking Alert
Yes, police officers do conduct investigations! They have a formal way of looking at something or someone to discover the answer or truth of what happened at a crime scene: just like a scientist!

During the Lesson

1. Create the Conditions

a. Review the growing conditions that have been present for all the plants (light, water, nutrients). Ask the students, "What could we do to help us figure out what will happen if our *brassica* plants don't get water? How could we change where we put them or what we have been doing to help them grow?" Proceed with similar questions to help students design conditions, perhaps suggest using a box to deprive the plants of light. The intention is to guide the students (through questioning) to come up with the idea that instead of leaving all the plants under the grow light and giving them access to water and nutrients that they could be deprived of light, water, and nutrients. Guide the students in deciding how to vary the growing conditions: Where will we put the plants? How much water will we give them? How will they deliver nutrients, but no water?

b. Split the students into small groups to move equipment as needed and create the new growing environments. You will probably want to label these environments (NO LIGHT, NO NUTRIENTS, NO WATER, ALL NEEDS).

c. Have students decide which plant is going to return to the original environment and which plants are going to go in each of the other three environments. Then have students create labels (blank labels in the bin) to affix to the plants to indicate these assignments. **[SP3: investigations]**

2. **Careful Observations**
   Have students retrieve their individual plants and make careful observations of what they look like now, using the experiment recording sheet, then have them place their plants into the new growing conditions.

Lesson Closing

End the lesson by reviewing students' predictions about what might happen to plants when they are deprived of their needs. Finally, have them predict which condition will result in the weakest plant and/or which element is most critical for a healthy plant. Explain that they will be making observations for the next couple weeks to see what happens to the plants over time and see if their predictions were true. ***Plan to record observations every 2-3 days for a week or two.***

Assessment

Write a report that explains the impact of deprivations of water, light and nutrients on plant growth and develop conclusions about which element is most critical and why. Teachers should develop any supports and scaffolds needed for the students to complete this task successfully.

Lesson 8: Seed Dispersal

NOTE: Part of the lesson uses raw peanuts, as an alternative, you can use thawed lima beans or edamame. If your class requires a peanut alternative.

BACKGROUND

Overview of the Lesson

This lesson is adapted from the "Seed Dispersal" lesson from *Hands on Nature* that addresses the final habitat need of plants — a mechanism for dispersing their seeds. It can be supplemented with a literacy lesson based on the "How Seeds Travel" story from the FOSS *New Plants* reader (FOSS lessons follows this lesson in your binder.)

Focus Standard

2-LS2-3(MA). Develop and use models to compare how plants and animals depend on their surroundings and other living things to meet their needs in the places they live.

Clarification Statement

Animals need food, water, air, shelter, and favorable temperature; plants need sufficient light, water, minerals, favorable temperature, and animals or other mechanisms to disperse seeds.

Learning Targets

I can explain why it is important for seeds to travel away from the parent plant to grow properly.
I can describe at least two mechanisms for seed dispersal.

Assessment

1. Explain why it is important for seeds to travel away from the parent plant to grow properly.
2. Name two different ways that seeds can travel away from the parent plant.

Targeted Academic Language

Tier 1: seed
Tier 2: disperse

Resources and Materials

Quantity	Item	Source
1 container	Lima Beans	Bin
8-12	**Hand Lenses**	**Bin**
1	**Tri-fold board (with sheet) for puppet show**	**Provided with Bin**
1	Seed Dispersal puppet show script (Hands on Nature p. 139-140)	Binder

1	**Seed Dispersal puppet set – locate the required puppets**	**Bin**
1 bag	**Assorted Seeds**	**Bin**
	Fruits with seeds – to supplement the assorted dried seeds, if desired	Classroom Teacher/Sue Beauchamp
1 pod	**Milkweed seeds**	**Bin**

****Items in bold should be returned for use next year****

LESSON DETAILS

Lesson Opening

Ask the students to tell you everything they know about seeds from what they have studied so far, make sure they understand that most plants make seeds that then fall to the ground and start new plants.

Reread page 7 from the "What Do Plants Need" story in the FOSS *New Plants* book. Ask the students, "If plants cannot move, how do you think they get from place to place so that they have enough space to grow?" Allow students to suggest some ideas.

During the Lesson

1. **See Inside a Seed**
   This activity can be based off of the description in *Hands on Nature* "Seed Dispersal" following this lesson. **[SP3: Planning and Carrying Out Investigations]**

2. **Puppet Show**
   As always, the adults can perform or you can involve the children in performing the puppet show. Tell them to be on the lookout for the different ways seeds travel away from their parent plant, and review the various seed dispersal methods presented in the puppet show: wind, water, animals.

3. **Mix and Match**
   See activity description in *Hands on Nature* "Seed Dispersal" following this lesson. Follow the K-2 suggestion of splitting students into small groups with a variety of seeds to examine. You can have the children draw a picture of the seeds and make predictions about each seed's dispersal method. You could ask them to explain their reasoning as to why they are predicting a particular method of dispersal. **[SP7: argumentation]**

4. **Seeds' Needs (optional extension activity)**
   See the activity description in *Hands on Nature* "Seed Dispersal" lesson, under "Extensions". You can use leftover soil and containers, or re-plant in your *brassica* containers. (You can also feed the *brassicas* to the worms!)

Lesson Closing

Review the main points of this lesson and update your poster on "Plant Needs" from Lesson 4. Review the poster(s) and discuss things that BOTH plants and animals need (air, water, favorable temperatures) and the things specific to plants (light, nutrients from the soil, and some help from the habitat to disperse its seeds) and specific to animals (food, shelter). You can equate nutrients from the soil to the food animals require, and then return to the essential questions from the unit:

1.) Why do certain plants and animals only live in certain areas?
2.) What happens to plants or animals when their habitat changes?

Assessment

1. Explain why it is important for seeds to travel away from the parent plant to grow properly.
2. Name two different ways that seed can travel away from the parent plant.

Curriculum Embedded Performance Assessment (CEPA)
Create a Habitat

In this task, students will create a habitat of their choice based on what they have learned in this unit. They will identify at least one plant and one animal to live in their habitat and produce a written explanation of how the plant or animal will meet its basic needs in their chosen habitat.

Science Talk and Oracy in T2L Units

Science talk is much more than talking about science. In line with the science and engineering practices, students are expected to make a claim that can be supported by scientific evidence. The MA STE Standards (and the NGSS) value the importance of engaging in an argument from evidence. NGSS defines how this practice takes form in the real world: *"In science, reasoning and argument are essential for identifying the strengths and weaknesses of a line of reasoning and for finding the best explanation for a natural phenomenon. Scientists must defend their explanations, formulate evidence based on a solid foundation of data, examine their own understanding in light of the evidence and comments offered by others, and collaborate with peers in searching for the best explanation for the phenomenon being investigated."*

Students are asked to participate in articulate and sensible conversations in which they are able to communicate their ideas effectively, listen to others to understand, clarify and elaborate ideas, and reflect upon their understanding. These forms of talk can be developed using scaffolds such as the A/B Talk protocol (below) and strategies for class discussions (from the Talk Science Primer, link below). Oracy is developed in the physical, linguistic, cognitive, and social-emotional realms; each of these realms can be expanded upon over time in order to develop a thoughtful speaker. Being able to display appropriate body language, use proper tone and grammar, be thoughtful and considerate thinkers, and allow space for others thoughts and opinions are all important facets of oracy to work on and through with students. Incorporating the appropriate scaffolding is an important aspect of fostering these skills. Techniques for teaching effective science talk often include modeling, discussion guidelines, sentence-starters, and generating roles, while gradually putting more responsibility on students to own their thinking and learning.

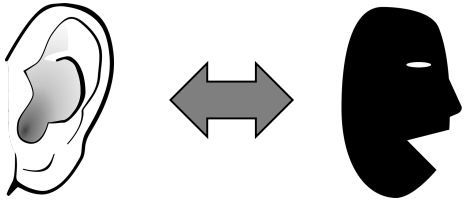
Part of creating a safe school environment for students is allowing them a space that is comfortable enough for them to express ideas and ask questions, while being validated for their thoughts and questions; students should be feel comfortable and confident when speaking and listening for understanding. Effective talk is an important part of being an active, intelligent member of a community and society. Successful development in oracy is important for future employability and general well-being of adults.

The following resources should be helpful examples of how to employ effective use of progressive oracy and science talk in your classrooms.

- Oracy in the Classroom: https://www.edutopia.org/practice/oracy-classroom-strategies-effective-talk
- Science Talk Primer: https://inquiryproject.terc.edu/shared/pd/TalkScience_Primer.pdf

A/B Talk Protocol

Adapted from https://ambitiousscienceteaching.org/ab-partner-talk-protocol/

1. Share your ideas  **Partner A** ● I think _____ happened because… ● Evidence that supports my idea is… ● The activity we did with _____ helps me know more about _____ because… ● One thing I'm wondering about is…	2. Listen to Understand  **Partner B** ● I heard you say _____. What makes you think that? ● I heard you say _____. What if _____? ● Can you explain the part about _____ again? ● What do you mean when you say _____?
3. Clarify and elaborate  **Partner A** Answer partner's questions or ask for clarification in order to understand a question.	4. Repeat steps 2 & 3 until all questions are answered  
5. Switch roles and repeat steps 1-4 	6. Reflect on your understanding in writing ● My idea about _____ changed when my partner said _____. ● I will add _____ to my idea about _____ because… ● I still have questions about… ● I may be able to answer my question(s) if I could investigate _____.

List of Unit Resources

Lesson 1

Quantity	Item	Source
8	**Habitat Pictures**	**Bin**
1	"What do you know about…?" Probing Questions	Binder
1	Chart paper/ blackboard/ or projecting device to record class discussion	Classroom Teacher
1	Habitat song lyrics	Binder
1	*Habitat Song* video	CMC Website
	Laptop and Speakers	Classroom Teacher
1	Habitats summary paragraph frame and word bank	Binder
1 per group	Optional: stuffed animals in various sizes	Classroom Teacher
1 per group	Optional: large paper for drawing a habitat	Classroom Teacher
A few per group	Optional: markers or crayons	Classroom Teacher

Lesson 2

Quantity	Item	Source
1	**Tri-fold board (with sheet) for puppet show**	**Provided with Bin**
	Laptop and Projector	Classroom Teacher
1	**Life in A Field Puppet Set – locate the required puppets in the puppet bag**	**Bin**
1	Projection of field a in winter	Classroom Teacher
1	Projection of a picture of a field	Classroom Teacher
1	Who Am I Description Field Food Web Activity Life in A Field Puppet Show script	Binder (All from Hands on Nature p. 65-72)
	Who am I Animal Images (see list on p. 68 of Hands on Nature)	Classroom Teacher to project
1	Who am I Animal Name Cards (use index cards and see list of animals in Hands on Nature p. 68)	Classroom Teacher to make
1 set	Index Cards	Bin

1	**Sun plate with strings attached**	**Bin**
7	**Green headbands labeled twigs, leaves, berries, flowers, seeds grass, and roots**	**Bin**
20 - 30	**4 foot pieces of yarn/string**	**Bin**
1	Lesson 2 Assessment	Binder (teacher to make copies)

Lesson 3

Quantity	Item	Source
1	**Tri-fold board (with sheet) for puppet show**	**Bin**
1	- Animals in Winter puppet show script - Animals in Winter background information - Bingo directions and bingo cards The above are from Hands on Nature p. 87-94	Binder
1	**Animals in Winter puppet set – locate the required puppets in the puppet bag**	**Bin**
1 bag	**Puppet show props**	**Bin**
1	Projection of Forest Pictures (summer and winter)	Classroom Teacher

1 set	**Winter Tale scenario cards**	**Bin**

Lesson 4

Quantity	Item	Source
1	Live plant	Classroom Teacher
1	Foss Science Stories: New Plants (FOSS p. 1-3)	Binder
1	**Investigation 1 Brassica Seeds (FOSS p. 1-31)**	**Bin**
Class set	**Small plastic cups with holes for seeds**	**Bin**
1 bag	Potting soil	Bin
1	**Tray (to place under the seeds)**	**Bin**
1	**Grow light set-up**	**Bin**
1	**Basin for distributing the soil**	**Bin**
Class set	Labels for planter cups	Bin
1	Paper towel roll	Classroom Teacher
6	**Plastic cups for carrying soil or water**	**Bin**

1 vial	*Brassica* seeds	Bin
Class set	***"New Plants"* science stories (What Do Plants Need: p. 3-7)**	**Bin**
1	Chart paper to record brainstorm/ learning	Classroom Teacher

Lesson 5

Quantity	**Item**	**Source**
1 or more	Computers to access on-line habitats game http://www.abpischools.org.uk/page/modules/human_animal_habitats/activity.cfm?age=Age%20range%205-7&subject=Science	Classroom Teacher
Class set	***New Plants* Books (Plants and Animals Around the World p. 22-39)**	**Bin**
1	*Plants and Animals Around the World*: FOSS lesson plan (p. 10-12)	Binder

Lesson 6

Quantity	**Item**	**Source**
1	**Tri-fold board (with sheet) for puppet show**	**Provided with Bin**
1	Forest Floor puppet show script/background information (Hands	Binder

	on Nature p. 73-79)	
1	**Forest Floor puppet set (locate the required puppets)**	**Bin**
8-12	**Hand lenses**	**Bin**
13	Paper plates	Bin
1 roll	Paper towels	Classroom Teacher
8-12	**Flashlights**	**Bin**
13	Oak Tag for shading the earthworm habitat	Bin
1 bag	Maple leaves	Classroom Teacher
1 bag	Pine needles	Classroom Teacher
30	**Earthworms**	**Sue Beauchamp (Contact 4 days before lesson is taught)**
1	Instructions for worm habitat construction	Binder
1	Earthworm illustrations (labeled and unlabeled)	Binder
6	**Quart container with mesh lids**	**Bin**
1 bag	Shredded newspaper	Bin

1 bag	Soil – enough for a handful for each habitat	Bin
8-12	**Cups to carry water and soil**	**Bin**
2 cups	Vegetable scraps chopped fine	Classroom Teacher or Cafeteria

Lesson 7

Quantity	**Item**	**Source**
1	Opaque box to depriving some of the plants of light (a copy paper box turned upside down works well)	Classroom Teacher
ALL	**Materials from Lesson 4 including grow light set, plant trays, cups for watering, and *Brassica* plants**	**Bin**
4-6 sets	**Condition labels (ALL NEEDS, NO LIGHT, NO WATER, NO NUTRIENTS)**	**Bin**
3	**Pie tins**	**Bin**

Lesson 8

Quantity	Item	Source
1 container	Lima Beans	Bin
8-12	**Hand Lenses**	**Bin**
1	**Tri-fold board (with sheet) for puppet show**	**Provided with Bin**
1	Seed Dispersal puppet show script (Hands on Nature p. 139-140)	Binder
1	**Seed Dispersal puppet set – locate the required puppets**	**Bin**
1 bag	**Assorted Seeds**	**Bin**
	Fruits with seeds – to supplement the assorted dried seeds, if desired	Classroom Teacher/Sue Beauchamp
1 pod	**Milkweed seeds**	**Bin**