

## Kindergarten Spring School Garden Lessons & Next Generation Science Standards

Lawrence Hall of Science Ladybugs teaches lady bug anatomy and life cycle through observation, art and play.

Below is a table of suggested Kindergarten lessons to enhance current curriculum with expanded focus on other insect life cycles and plant life cycles, using senses to make observations about our surroundings, recognizing patterns and categorizing creatures in the environment.

LL- Life Lab Science Curriculum; GC – Growing Classroom (also by Life Lab); SGP – School Garden Project of Lane County; ETG – Eat-Think-Grow

<b>Kinder Lessons</b>			
<b>Lesson # and Date</b>	<b>Lessons</b>	<b>Source</b>	<b>NGSS</b>
1) late March - Mid April	A) Five senses – Burma Shave Hike - Growing Classroom pg. 71	GC – pg 66	
	B) Seeds Sort – using categorization skills – Life Lab science	LL-K.4.c	<b>K-LS1-1</b> <b>K-L-5-a</b>
	C) Plant peas – Suzanne lesson what a plant needs to grow and planting	Local Lesson	<b>K-LS1-1</b>
2) Late April	A) Make your own insect with stamps and book called <u>Build your own Bugs</u>	Local lesson	
	B) Am I an insect? - Game	SGP	<b>K-L-5-a</b>
	C) Little Munchkins – use careful observation skills pretending to be miniature people on a 100 inch hike	GC pg 69	<b>K-ESS3-1</b> <b>K-LS1-1</b>
3) Early May	A) Seed investigation – Plants start from Seeds- Eat. Think. Grow	ETG -Kinder	<b>K-LS1-1</b>
	B) Planting station –plant flower seeds into the garden		
	C) Check on pea plants and measure their growth – Discuss the plant parts and plant life cycle		<b>K-LS1-1</b>
4) Mid May	A) Good Creatures and pest creatures in our garden		<b>K-LS1-1</b> <b>K-ESS3-3</b>
	B) Animal Antics – Students observe and mime animal behavior	LL-K.5.c pg 199	<b>K-L-5-a</b>
	C) Plant some flower starts (or other available plant starts) into the garden to attract good insects		<b>K-LS1-1</b>
5) Late May	A) Animal Art – Drawing live garden animals	LL – K.5.e pg 205	
	B) Animal Math – Students determine the shape of garden animals and count body parts and colors and graph results	LL – K.5.d Pg 202 & 278	
	C) Peas are ready to eat. Did our plant go through the whole life cycle? Let's take a look and taste		<b>K-LS1-1</b> <b>K-ESS2-2</b>

Standard Code	Performance Expectation or Standard Description
<b>K-L-5-a language</b>	Sort Common objects into categories (e.g. shapes, foods) to gain a sense of the concepts the categories represent. – English Language Arts
<b>K-L-5-b language</b>	Demonstrate understanding of frequently occurring verbs and adjectives by relating them to their opposites.- English Language Arts
<b>K-PS3-1</b>	Make observations to determine the effect of sunlight on Earth’s surface
<b>K-LS1-1</b>	Use observations to describe patterns of what plants and animals (including humans) need to survive
<b>K-ESS2-1</b>	Use and share observations of local weather conditions to describe patterns over time.
<b>K-ESS2-2</b>	Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs
<b>K-ESS3-1</b>	Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live
<b>K-ESS3-3</b>	Communicate solutions that will reduce the impact of humans on the land, water, air and or other living things in the local environment

## **Kinder Spring Lessons**

Visit # 1 Mid April – just after spring break – 50minutes – 3 -15 minutes rotations
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### **Station 1: Burma Shave Hike Growing Classroom pg. 71 – small group – 12 minutes**

#### Objectives:

1) To develop awareness and observation skills while reinforcing an understanding of the 5 senses.

#### Preparation:

- Scout the area of the garden where you will place the cards along a trail, noting specific clues that Kinder students will be able to find and which relate to their senses.
- Prepare 5 or 6 3”x5” cards with challenging instructions and questions as described in the lesson. Number the cards. Attaching bright colored yarn or flagging can help station leaders and students find the cards.
- Place the cards along the trail where students will see them and place a rock to hold it if necessary. Write the questions and answers on a separate paper for the station leader, along with lesson extension ideas.

Action: Lead a discussion as described in the lesson focusing on using senses and making observations like a scientist. Describe where the trail starts and ends and the process that will be taken. The group must stay together so as not to disturb the other groups. Teacher will read the cards. If finished before other stations, review the cards with the students. Ask about the senses they used for each answer. Could you have done this without your senses?

### **Station 2: Seed Sort – Life Lab Science Curriculum – small group – 12 minutes**

#### Objectives:

Students practice using observation skills to sort and categorize seeds.

#### Preparation:

- Gather 2 cups of a mixture of dried seeds (corn, sunflower, variety of beans, maple or other tree seed, and one type of aromatic seed like cumin, coriander, anise, dill or fennel
- Gather plastic lids and 4-6 plastic containers such as yogurt containers and a tray or pie plate
- Gather some seed containing food items such as apple, lemon, and winter squash.

#### Action:

1. Give each student two lids and a handful of seeds. The seeds can go in one of the lids. Ask them each to choose one seed to put on their empty lid. Now ask students to notice how the seed they chose is the same or different from their neighbor's seed. Put the seed back with the others.
2. Start with one student choosing any one seed to put on their lid. Ask that student what is special about that seed
3. Ask the others if any of their seeds have the same special property. Let students, one at a time, place one of their seeds with the same property in the first student's lid. Check to see if everyone agrees the seed has that property
4. Repeat the sequence.
5. Continue with seeds not yet categorized.
6. If time remains. Have two students work together to agree on one or two seed properties and to separate a container of seeds based on the properties and have students report to the others how they sorted

### **Station 3: Planting peas into the garden and talking about what a plant needs to grow.**

Objective: Students learn how to plant a seed into the garden and also consider what the seed will need to grow into a plant.

#### Preparation:

- Prepare the garden where peas will be planted. Weed the area, loosen the soil and mark the area where peas will be planted.
- Gather pea seeds, trowels, a ruler, a watering can w/a little water or bucket of water with rain makers (plastic yogurt container with holes punctured in the bottom), which are easy for small children to use for watering.
- Gather and have in an envelope: picture of the sun, picture of water a ziplock bag with air.
- Copy and cut up and have in an envelope pictures of sequence of seed planting - (dig a hole 2 x the size of the seed, place seed in the hole, cover up the seed, water the soil containing the planted seed )

#### Action:

1. Show the small group the sequence cards for planting a seed into the garden (out of order). Ask a pair to put them in order. Does everyone agree with the order?
2. Although the cards show a trowel, what else could be used to make a hole that is 2 times the size of the seed? (*a stick, a finger*). In fact, this may work better. Use a seed and/or the ruler, to see where 2 times the seed size would measure to on a student's finger - about the first knuckle?
3. Have students take turns making a hole with their finger, planting a seed, covering the seed and watering.
4. Talk with students about what a plant needs to grow and use your pictures and props to reinforce the plant needs (sun, water, nutrients (from soil), space and air). They have much the same needs we do to live however – *Plants can make their own food and are the only living organisms that can do that.* Can animals make their own food? No! We, and other animals, rely on plants that take energy from the sun and water from the soil and carbon from the air to make their own food! It's amazing!

#### NGSS:

Students are expected to develop understanding of what plants and animals (including humans) need to survive and the relationship between their needs and where they live.

All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.

Students search for and recognize patterns in the natural world.

Visit # 2 Late April – 55 Minutes with 3- 15 minutes rotations

**Station 1 - Make your own insect with stamps and a book called Build your own Bugs**

Objectives: Students think creatively about what makes an insect compared with other garden creatures, while they use stamps and ink pads to make one insect and one make believe creature.

Preparation:

- Pick up the Build your own Bugs book, stamps and ink pads from Farm to School. Ensure ink pads have ink
- Gather paper and pencils or suggest teachers have students bring their science journals.
- Read over the lesson and prepare as described.

Action: Follow the instructions on the lesson outline.

**Station 2 - Am I an insect? – Game included in the School Garden Project Insect lesson plan – page 1.**

Objective: Students identify key insect body parts.

Preparation:

- Gather Am I an Insect? Cards; an insect field guide and/or the laminated guide page of beneficial and pest insects; and the diagram of an insect.

Action:

1. Give each student an “am I an Insect? Card and give them time to decide if it is an insect or not. Have them place the card in an insect pile or a non-insect pile and repeat until all cards have been seen.
2. Show them the diagram of an insect – pointing out the 3 body parts and 6 legs.
3. Go through the pile of insect cards and see if everyone agrees that they are insects. Point out why or why not and repeat with the non-insect pile.
4. If time permits introduce the idea of beneficial and pest insects and look at the laminated guide page. Take a look at the garden for examples if it is convenient to your station location.

**Station 3 Little Munchkins – use careful observation skills pretending to be miniature people on a 3 foot hike**Objective: To develop observation and recording skills

Preparation:

- Read full lesson
- Gather 4 pieces of 3 foot string, clip board, paper (or request teacher bring student’s science journals) and pencils, and hand lenses

Action:

Have students kneel or sit around the area they will be using for the hike. Ask students to imagine that they are very small, like the size of an ant. What would it be like to hike through the garden? What would the plants look like? Would you notice things you don’t notice now?

Follow action steps described in the lesson except, you will lay the bright colored string out beforehand – one per pair of students. Make sure to leave space in the garden for other station activities.

Have them observe everything including the shape and texture of leaves on the plants and shape and color of other creatures they encounter and the texture of the soil. You may just have time to guide them in their discovery as they travel along the route making observations. If time allows, have pairs decide how they want to share recording their findings by drawing what they see. Help them draw to the best of their ability, what their path looks like and some details of the plants, soil and creatures.

NGSS:

Students search for and recognize patterns in the natural world while developing strong observational skills.

Visit # 3 Early May – 55 minutes with 3- 15 minutes rotations
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**Station 1 Seed investigation – Plants start from seeds**

Objective: Students identify the inside parts of a seed and understand germination

Preparation:

- 1-2 days before the lesson, gather and pre soak large bean seeds– enough for every student to have one seed plus a few extra. Also bring some other seed examples, un-soaked, like corn, sunflower, squash etc. and a picture of that corresponding fruit/flower.
- Copy and laminate the bean seed diagram with parts labeled and the bean growth illustration.
- Gather magnifying glasses – see if classroom has these available.
- Review the eat.think.grow lesson on seeds for great background information and bean growth illustration

Action:

1. Show students the bean and ask what kind of plant will this grow? Explain that it can only grow a bean plant.
2. Show students some of the other seeds and ask what plants they will grow. Use pictures to help if needed.
3. Ask students how does a seed grow into a new plant? Take all answers. They will germinate when they get wet from water and have a warm enough temperature.
4. Show the picture of the progression of a seed growing. How can a seed do all of that? Have you ever looked inside a seed?
5. Show the students the diagram of the seed and name the differ parts (embryo or baby plant, endosperm or food for the baby plant and seed coat). Let's look inside this bean and see how it can start to grow. Open up the bean and show the embryo and the endosperm. Explain what each part does and how the seed uses the endosperm as food or energy to get its roots in the ground and stem and leaves up to the sun to start producing its own food.
6. Give each student their own bean to open and view with the magnifying glass. Help them identify the seed coat, the embryo or baby plant and endosperm or food for the baby plant.
7. Ask students if anything about the seeds surprised them? What was inside the seed? Are all seeds the same inside? Will all bean seeds become bean plants? What do the seeds need to grow into adult plants?

**Station 2 Plant flower seeds into cups to be transplanted at a later date into the garden or at home**

Objective: for students to learn to plant their own seeds and consider what plants need to survive.

Preparation:

- Gather flower seeds, planting containers (recycled yogurt containers, or saved small pots or planting tray, a tray to hold the planted containers and prevent water from seeping out on to the counter, potting soil, a water spray bottle and a ruler.
- Gather pictures of flowers, bees and butterflies and beneficial insects that eat pest insects.
- Set up the station for student to fill a container with soil, make a hole, get a seed and place in the hole and cover with soil and place on a tray.

Action:

1. Ask students if they remember planting pea seeds into the garden? What do you do first to plant a seed? How big should you make the hole to plant a seed? Use the ruler to show what twice the size of the seed looks like – pretty small!
2. Explain that today you are planting flower seeds. Why do we love flowers? They are beautiful to us and also to bees and butterflies, which pollinate our fruit and vegetable flowers. Some flowers also attract other good insects, like ladybugs and lacewings, which eat pest insects like aphids. Show the pictures

Have students form a line and take turns filling a container with soil, making a hole, placing a flower seed and covering it up. Have them place them on the tray and give the 3-6 squirts from a water bottle.

### **Station 3 Check on pea plants and measure their growth – Discuss the plant parts and plant life cycle**

Objective: Students make observations about their pea plants and reinforce vocabulary words – germination, seed coat, baby plant food or endosperm, baby plant or embryo and sprout. Students use a ruler to measure their pea plants. Students consider what a plant needs to grow.

Preparation:

— Gather rulers, water can or water bucket and rain makers (old yogurt container with holes in the bottom to scoop up water and gently water plants). Optional – clipboards and pencils or science journals to draw the plant and number of leaves etc.

Action:

1. Have students remind you where they planted the peas. Can they find the pea plants? What happened? The pea seeds felt water and warmth and germinated. The roots in the embryo or baby plant pushed out of the seed coat and into the soil. The leaves sprouted up to see the sun.
2. Have a pair of students work together to measure a pea plant to see how tall it is and count the number of leaves. Draw the pea plant on paper or into science journals.
3. Reinforce what a plant needs to grow. Once the leaves have sunlight, they use the water from the ground, air and sunlight to create their own food. They are the only living things that make their own food. It's amazing!

Visit # 4 – Mid May – 55 Minutes with 3 - 15 minute rotations
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### **Station 1 Beneficial and Pest Creatures in our garden –**

Objective: This lesson introduces/reinforces the concept that many creatures live around us in a web of life. This lesson will also reinforce the knowledge of what puts a creature in the insect category.

Preparation:

— Gather pictures or live examples of common creatures in the garden such as: worms, ladybugs, lacewings, praying mantis, roly-polly bugs, hover flies, ants, aphids, squash bugs, stink bugs, slugs. Research characteristics

Action:

1. Ask students if they've seen a ladybug before? What other kinds of creatures have they seen in the garden? Take all answers. Are all of these creatures good for our garden? Do you think all of these creatures eat the same types of food? No – if all creatures ate the same food, there would not be enough of that food and an imbalance would be created. Discuss the ladybug food chain Sun – plant – aphid – ladybug – bird – fox – wolf.

2. Show pictures of different creatures and ask if they are good or bad for our garden. Briefly discuss how each is a benefit or detriment to the garden.
3. As you look at the creatures, discuss whether they are an insect or not. How can we tell?
4. Emphasize that all of these creatures and much more live together in our small garden. They all have the same basic needs. (water, food, shelter).
5. You may also discuss the fact that having creatures keeping each other in balance is better for our garden than spraying chemical pesticides, which can harm our beneficial insects.

## **Station 2 Animal Antics – observe and mime animal behavior**

Objective: This lesson encourages strong observation skills and considering similarities and differences in animals.

### Preparation:

- Read the full lesson – Animal Antics Life Lab Science Kindergarten pg. 199
- Gather the animal(s) to be investigated into 4-5 containers. Use either small bug boxes or clear plastic containers like old mayonnaise jars or spice jars. Collect two of the same creature per container.
- Gather twigs and leaves for students to use.

### Action:

1. Let students know that they will be making observations about animals and that it is important to keep hands on their laps to start. This way they see how the animal acts when left alone. After observations, they will be choosing a behavior to mimic.
2. Before looking at an animal, ask students what they know about the particular animal? What kinds of things does it do? How do you know? How can we learn more about what it does?
3. Remind them to keep their hands on their laps. Give each pair of students a container with animals.
4. As students watch, encourage them to share observations with each other. What is the animal doing that you could do?
5. Discuss what the animals do when close to each other or when flipped on their back? Give each student a twig to gently nudge the animal. You may first demonstrate this.
6. Place the containers in the center of the table to minimize distraction and now ask each pair to select one behavior of the animal to mimic.
7. Ask them to each mimic a behavior and challenge to provide a new behavior if it has already been demonstrated.
8. Do animals act like people? How? Do they act differently? How?

## **Station 3 Plant flower starts into the garden to attract good insects**

Objective: to learn how to transplant a seedling into the garden. To reinforce knowledge about what a plant needs to grow and that certain plants will attract beneficial insects.

### Preparation:

- Prepare area of the garden to receive the transplanted seedlings – mark the space to prevent confusion
- Gather the seedlings to be transplanted to the garden (some were planted for students to take home), a watering can or bucket and rain makers and trowels to make the holes
- Optional – bring pictures of beneficial insects that may be attracted to your flowers – bees, hover flies, lacewing

### Action:

1. Ask students if they remember what type of seeds they planted into containers? Why do we want to plant flowers into our garden? They attract beneficial insects into our garden.

2. We are ready to give the seedlings a new home. What will be important to consider? (space, good nutritious soil, water and sun). We also need to make sure to be careful when handling these baby plants. The roots are fragile.
3. Have students dig a hole a little bigger than the soil in the container.
4. Demonstrate how to gently remove the seedling from the container (or remove it for the student and hand it to them).
5. Help each student plant their seedling by gently holding it at the stem, having the roots fall straight down, gently covering the roots with dirt up to the first set of leaves and pressing the soil firmly around the plant
6. Water the seedlings well and label them.

NGSS: reinforce an understanding that living things need water, air and resources from the land, and they live in places that have the things they need. Rather than relying on chemicals to reduce pests in our garden, humans can change their environment to attract beneficial insects.

Visit # 5 Late May - 55 Minutes with 3 -15 minute rotations

### **Station 1 – Animal Art – Drawing live garden animals**

Objective: Student practice recording observations through drawing

Preparation:

- Gather 8-10 garden creatures into bug boxes or clear plastic jars like mayonnaise or spice jars– they can all be the same garden creature or different types – one sample for each student in a small group
- Gather magnifying lenses, clip boards, paper, (or science journal), crayons, pencils or markers
- Read the Animal Art lesson Life Lab Kindergarten Science pg 205

Action:

1. Before looking at creatures, ask students what parts of the animals they could show in the drawing? Would you draw legs big or small? Would you draw the body big or small? Would you have to look very carefully?
2. Ask students to put hands on laps and give each student an animal to look at carefully. Remind them not to touch the container. Ask them to share one thing they notice about it with the student next to them.
3. Demonstrate how to make a big picture of the animal so you can show details. Model how to look at the animal as you draw. Point out, then draw where the different parts of the animal connect to the main body.
4. Give students paper (or science journals), crayons and markers and have them sketch as many pictures as they want.
5. Students can investigate their animal with magnifying glass
6. Did students notice anything new about their animal as they were drawing it? What?

### **Station 2 – Animal Math - determining the shape and color of garden animals and counting body parts and graphing the results**

Objective: Students become aware of animal body parts while practicing math skills.

Preparation:

- Remember to accept different interpretations of numbers of legs, colors, and shapes and naming of body parts. Accurate naming of parts is not key to this lesson, but directed exploration and careful observation is.
- Read the lesson Animal Math Life Lab Science Kindergarten pg. 202



- Copy the animal graph to provide two per group – pg 278
- Gather clip board to hold the graph paper and a pencils for recording
- Gather 3 types of creatures in 6 separate containers. Keep them in a paper bag to limit distractions. Each group will make observations about one of the creatures –to compare 3 creatures at the end. Each group will have two examples to observe.

Action:

1. Place two containers of the same animal on the table and explain to the student that you will be making observations and graphing what you find.
2. Ask the student what colors the animal is? Label a column on the graph grid with each color stated. Count up the number of students who claim each color. Alternatively, if time permits, have each student shade the block themselves.
3. Continue as described in the lesson for shapes and for number of legs
4. Challenge students to count other body parts, such as antennae and body segments.
5. At the end of the visit during wrap up - compare the 3 graphs about 3 different creatures. See if the class can tell the type of animal based on the graphs.

**Station 3 – Pick and taste peas in the garden while observing the lifecycle of a plant.**

Objective: Student learn to pick and taste fresh peas while reinforcing their knowledge of the life cycle of a plant and what a plant needs to grow

Preparation:

- Gather a ruler

Action:

1. Ask students to point out where the pea plants are. Once at the plants, ask where the peas are? They are inside the fruit, or the pod of the plant.
2. Use the ruler to have students measure how tall their pea plants grew. You might also point out the tendrils that help peas climb. Why might they want to climb? (to get out of shade and into the sun)
3. Let students know that they will be tasting pea plants. Remind students that if they don't like what they taste, they should not "yuck other people's yum" by making noise about it.
4. Demonstrate to the student how to pick a pod with two hands. One hand holds onto the stem so you don't accidentally pull out the plant when you pull off the pod.
5. If there aren't enough pods for everyone to try, have students share so everyone can try a pea. If there are no peas to try, students can still taste the tender tendrils of the plant. This is a green that many fancy restaurants use.
6. Ask students if they can remember planting the peas? Help students name the 6 parts of the plant. And describe the plant life cycle that it has gone through so far and remaining stages if any.

Who likes to eat peas? Are they good for our bodies? Why are they good? Any fresh fruit or vegetable has vitamins and minerals that our bodies need to be strong.