A Bunny's Life

Structure, Function and Information Processing

BOCES 4 Science

Teacher's Guide

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Written by teachers and administrators from public school districts within the borders of the NYS Midwest Joint Management Team in conjunction with the BOCES 4 Science Educators

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12/18

Foreword

BOCES 4 Science is a collaboration between four New York State BOCES (Board of Cooperative Educational Services). This collaborative of science educators came together to respond to the need for instructional resources based on the New York State pK-12 Science Learning Standards (NYSSLS). The research behind the Next Generation Science Standards (NGSS) and the NRC publication, A Framework for K-12 Science Education is the basis for the NYSSLS.

We believe that the future health and well-being of our world depends on scientifically literate people making informed decisions. The development of literacy in science begins at the earliest grades. Elementary children must have concrete experiences upon which to hook their understanding and new vocabulary – this is especially true in the discipline of science. We embrace the notion that students should experience phenomena and solve real problems to learn about the world. We strive to present lessons and materials that will make high quality science instruction available for all students through cost-effective resources for teachers.

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About this Unit

Overview

The unit, "A Bunny's Life" has been developed for **first** grade. This unit deals with the topics covered under the Grade 1 heading of "Structure, Function, and Information Processing" in the New York State Science Learning Standards (NYSSLS). The main topics covered in this unit include: how offspring are similar to but not exactly like their parents, how parents and offspring behave to insure the survival of the offspring; how animals use their senses and external body parts to survive; and how humans look to nature for inspiration when engineering solutions to human problems. The unit culminates in a design challenge where students design and build a prototype of a product that solves a problem they face but is inspired by nature. As these topics are covered in lessons, the rabbit is used as the example but other animals are also referenced. The BOCES 4 Science team chose the rabbit because it is an animal familiar to most children. Children can see a rabbit in their neighborhood regardless of whether they live in the city, suburbs or country. Some children may even have a pet rabbit or a stuffed animal that serves as a surrogate pet. The rabbit is popular in the children books of Beatrix Potter and Rabbit is one of Christopher Robin's friends in the Winnie the Pooh books. Then there is the rascal Bugs Bunny of cartoons.

Scheduling

This unit is scheduled to be in the classroom for 10 to 12 weeks. Scheduling is based the premise that science is taught in 30-40 minutes sessions, twice-a-week. There is guidance provided in an online scheduling document and within the lessons as to how this unit can be taught in less time. There is the hope that a couple lessons will be taught during ELA time.

Please return the unit promptly or to request an extension, call your contact person at BOCES 4 Science.

Materials to Obtain Locally

Some lessons require materials that are not supplied in the kit. These materials can be easily obtained by the teacher or the students. Materials that will need to be provided are indicated with an asterisk in the materials list within the lesson and are also listed below. A number of these items are optional. If the teacher or students can provide any of these, that will add to the learning but the lesson can still be successfully taught without them.

- Chart paper, blackboard, or Whiteboard (All)
- Projector or an Interactive Whiteboard (All)
- Internet Access (All)
- Crayons or markers (L2, L5, L6, L7, L10)
- Computers or iPads (L6, L7)
- Clear tape or glue stick (L2, L7)
- Rulers (L9)
- Resource books on different Animals (L7)
- Scissors (L2, L7, L10)
- Water (L1, L8)
- Bird's nest - a real one (optional)(L5)
- Blindfold (optional) (L6)
- Down jacket or padded winter jacket (optional) (L8)
- Flippers (optional) (L9)
- Hole punch (optional) (L10)
- String or yarn (optional) (L10)
- Recycled items for the design challenge (optional): bubble wrap, paper towel rolls, cleaned juice, milk containers and/or yogurt containers, egg cartoons, small boxes (shoe boxes, empty tissue boxes, shipping boxes) (L10)

A Bunny's Life

Three Dimensions

Each of the BOCES 4 Science lessons includes at least one element from each of the three dimensions identified in the NYSSLS. The lesson page identifies the specific elements targeted; the NYSSLS topic page is included on pages 8-10 of the Teacher's Guide.

Science and Engineering Practices (SEP) – These are the major practices that scientists employ as they investigate and build models of their understanding of the world. They also include key practices used by engineers as they design and build systems.

Disciplinary Core Ideas (DCI) – Selected to represent four major domains: the physical sciences; the life sciences; the earth and space sciences: and engineering technology, and the applications of sciences.

Crosscutting Concepts (CCC) – These big ideas have application across all domains of science and provide one way of linking across the domains of the DCI's. In addition, they link to ideas that are parts of other elementary subjects.

NYSSLS Shifts in Instruction

It is the intention of BOCES 4 Science that this unit provides lessons that demonstrate the following shifts in instruction:

- **Explaining Phenomena or Designing Solutions to Problems:** The unit focuses on supporting students to make sense of a phenomenon or design solutions to a problem.
- **Three Dimensions:** The unit helps students develop and use multiple grade-appropriate elements of the SEPs, CCCs, and DCIs which are deliberately selected to make sense of phenomena or design a solution to a problem.
- **Integrating the Three Dimensions for Instruction and Assessment:** The unit will elicit student artifacts that show direct, observable evidence of three dimensional learning.
- **Relevance and Authenticity:** By taking advantage of student questions and experiences in the context of their homes, neighborhood and community, the lessons in this unit will motivate student sense-making or problem-solving.
- **Student Ideas:** This unit provides opportunities for students to express clarify, justify, interpret or represent their ideas and to respond to peer and teacher feedback.
- **Building on Students' Prior Knowledge:** Since student understanding grows over time, this unit identifies and builds on students' prior learning in three dimensions in such a way as it is explicit to both students and teachers.

Assessment:

Providing opportunities for assessment of learning and feedback to students is an important step in the educational process. This unit includes formative assessments and summative assessments. The teacher is encouraged to use a variety of informal or anecdotal assessment strategies.

Additional Features of this Unit

This unit, "A Bunny's Life", includes a Student Science Journal. A digital version of the Student Science Journal is available online at the BOCES 4 Science website. (A web address and password are located on a color insert in the Teacher's Guide.)

Additional resources for the teacher, such as the specific assessments, rubrics, direct links to videos or websites mentioned in the Teacher's Guide, can also be found on the BOCES 4 Science website.

Features that Support 3-D Learning

Look for these features in the Teacher's Guide:

NYS pK – 12 Science Learning Standards within each lesson provide the teacher with specific information about the Performance Expectation and the 3-Dimensions that are targeted by the instruction in this lesson.

Performance Expectations:

1-LS1-1 – Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow and meet their needs. [Clarification statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells and animal scales; stabilizing structures by mimicking animal tails and roots on plants, keeping out intruders by mimicking thorns on branches and animal quills and detecting intruders by mimicking eyes and ears.]

Science and Engineering Practices

Asking Questions and Defining Problems

- Define a simple problem that can be solved through the development of a new or improved object or tool.

Developing and Using Model

- Develop a simple model based on evidence to represent a proposed object or tool.

Disciplinary Core Ideas

LS1.A: Structure and Function

- All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place and seek, find and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.

Crosscutting Concepts

Connections to Engineering, Technology and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- Every humanmade product is designed by applying some knowledge of the natural world and is built by using materials derived from the natural world.

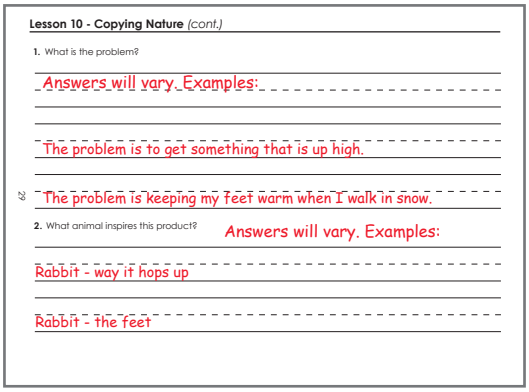
ELA/Math/Social Studies Connections:

ELA: 1SL1, 1SL5

Math: MP1, MP5

Throughout the Teacher's Guide, the 3-Dimensional Domains are color coded within the text so that teachers know to emphasize or explicitly point out to students this connection to either the **Science and Engineering Practices (SEPs)** or the **Crosscutting Concepts (CCCs)**. In addition, small boxes on both sides of the Procedure pages in the green columns (see example to the right) serve as a visual reminder, as well.

In addition, a small picture of the page(s) of the Student Science Journal (with answers) that students are using for each lesson has been included on the appropriate pages in the Teacher's Guide (see box to the right). This keeps the teacher from needing to go back and forth between various documents pertaining to a particular lesson.



Lesson 10 - Copying Nature *(cont.)*

1. What is the problem?

Answers will vary. Examples:

The problem is to get something that is up high.

The problem is keeping my feet warm when I walk in snow.

2. What animal inspires this product? Answers will vary. Examples:

Rabbit - way it hops up

Rabbit - the feet

SEP: Science and Engineering Practice(s):

Developing and Using Models:

Develop a simple model based on evidence to represent a proposed object or tool.

New York State P-12 Science Learning Standards

Structure, Function, and Information Processing

Students who demonstrate understanding can:

1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.* [Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and, detecting intruders by mimicking eyes and ears.]

1-LS1-2. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. [Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).]

1-LS3-1. Make observations to construct an evidence-based account that some young plants and animals are similar to, but not exactly like, their parents. [Clarification Statement: Examples of patterns could include features plants or animals share. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size; and, a particular breed of dog looks like its parents but is not exactly the same.] [Assessment Boundary: Assessment does not include inheritance or animals that undergo metamorphosis or hybrids.]

A Bunny's Life

The performance expectations above were developed using the following elements from the NRC document *A Framework for K-12 Science Education:*

Science and Engineering Practices

Constructing Explanations and Designing Solutions

Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-LS3-1)
- Use materials to design a device that solves a specific problem or a solution to a specific problem. (1-LS1-1)

Obtaining, Evaluating, and Communicating Information

Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.

- Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2)

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Scientists look for patterns and order when making observations about the world. (1-LS1-2)

Disciplinary Core Ideas

LS1.A: Structure and Function

- All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1)

LS1.B: Growth and Development of Organisms

- Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2)

LS1.D: Information Processing

- Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1)

LS3.A: Inheritance of Traits

- (NYSED) Some young animals are similar to, but not exactly, like their parents. Some young plants are also similar to, but not exactly, like their parents. (1-LS3-1)

LS3.B: Variation of Traits

- Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (1-LS3-1)

Crosscutting Concepts

Patterns

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2),(1-LS31)

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1)

Connections to Engineering, Technology and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World

- Every humanmade product is designed by applying some knowledge of the natural world and is built by using materials derived from the natural world. (1-LS1-1)

New York State P-12 Science Learning Standards

Connections to other DCIs in first grade: N/A

Articulation of DCIs across grade-levels: **K.ETS1.A** (1-LS1-1); **3.LS2.D** (1-LS1-2) **3.LS3.A** (1-LS3-1); **3.LS3.B** (1-LS3-1); **4.LS1.A** (1-LS1-1); **4.LS1.D** (1-LS1-1); **4.ETS1.A** (1-LS1-1)

Common Core State Standards Connections:

ELA/Literacy –

1R1 Develop and answer questions about key ideas and details in a text. (1-LS1-2),(1-LS3-1)

1R2 Identify a main topic or idea in a text and retell important details. (1-LS1-2)

1W6 Develop questions and participate in shared research and explorations to answer questions and to build knowledge. (1-PS4-1),(1-PS4-2),(1-PS4-3),(1-PS4-4)

1W7 Recall and represent information from experiences or gather information from provided sources to answer a question. (1-LS3-1)

Mathematics –

MP.2 Reason abstractly and quantitatively. (1-LS3-1)

MP.5 Use appropriate tools strategically. (1-LS3-1)

NY-1.NBT.3 Compare two two-digit numbers based on the meanings of the tens and one digits, recording the results of comparisons with the symbols >, =, and <. (1-LS1-2)

NY-1.NBT.4 Add within 100, including adding a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10. Use concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction. Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten. Relate the strategy to a written method and explain the reasoning uses. (1LS1- 2)

NY-1.NBT.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used. (1-LS1-2)

NY-1.NBT.6 Subtract multiples of 10 from the range 10-90 from multiples of 10 in the range 10-90 using concrete models or drawings, and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction. Relate the strategy to a written method and explain the reasoning used. (1-LS1-2)

NY-1.MD.1 Order three objects by length; compare the lengths of two objects indirectly by using a third object. (1-LS3-1)

*Connection boxes updated as of September 2018

Lesson 1

Start at the Beginning

Focus Question:
How are babies like their parents?

Vocabulary:
adult
seed
seed coat
species
survive

Lesson Synopsis

Learning Target(s):
I can sort pictures by using patterns

I can describe how babies are like their mothers.

Lesson Description:
This lesson begins with the class looking at a picture of a 2-day old baby rabbit. Students then work in small groups to sort cards. Each card shows either an adult of a given species or its offspring. Students are not given guidelines as to how to sort these pictures but instead students engage in an open sort where they discover **patterns** within the pictures that are provided. Students end this lesson by returning to the opening picture of the baby rabbit. They also look at a picture of the mother. Students then ask **questions** about these pictures. These pictures represent the anchoring phenomenon of this unit which is the incredible journey an animal makes from birth to adulthood.

Students in Kindergarten have been asked to observe animals and plants from the perspective of what living things need to survive. Additionally, many children have been exposed to books, movies and videos about animals. They recognize that a pig is different from a bird and even that a chicken is different than a robin. They may not be able to tell that a robin is different from a sparrow, but they are not being asked to be that specific in this lesson.

Management

Materials

For the class:

These files are available on the BOCES 4 Science website:

1) picture of the baby animal
2) presentation of the cards of living things where offspring are paired with the adult
3) link to a Smartboard activity of a sort similar to the one done with the cards in class
4) additional copies of the cards
5) diagram of the inside of a lima bean seed

Chart paper* or interactive Whiteboard

Plastic tumblers (for filling with water to soak lima beans)

Water*

For each small group:

Day 1: Cards to sort

Day 2: 1 soaked lima bean, 1 dry lima bean, 1 magnifier, paper towel

For each student:

Student Science Journal Page 4

*teacher or students to provide water

Preparation:

Day 1 - Find the cards labeled "Lesson 1". Shuffle each group of cards to make sure the cards are mixed up. Eight sets of these cards are provided in the kit. Should you prefer to have students work in pairs to sort cards instead of in small groups, additional sets of cards can be printed.

Day 2 - Find the lima beans. Soak half the lima beans in water 4 hours to 24 hours before class. The length of time depends on the size of the lima bean seed. If seed is small, soak for 24 hours; if seed is large, 4 hours is usually sufficient.

Teacher Background:

General Notes for the Unit

The instructional shift presented by the New York State Science Learning Standards is for students to drive the learning by asking questions about a phenomenon and then students use the science and engineering practices to find the answers to these questions. Lesson 1 starts with a photo of a 2-day old baby rabbit. At the end of the lesson, this picture is shown again along with a picture of the bunny's mother. The picture of the baby bunny with the picture of the mother are the anchoring phenomenon of this unit. The phenomenon is the incredible journey a living organism makes from birth to adulthood.

At the end of lesson 1, students are asked to come up with as many questions as they can about the photo of the baby bunny and the photo of the mother. The intent is that student questions will touch on the key topics for this unit. For example, students will probably ask questions related to, "What will this baby look like when it grows up?" This is the topic of lesson 2. (Performance Expectation 1-LS3-2).

Students will probably ask questions related to "How does the mother take care of her babies?" This is the topic of lessons 3, 4, and 6. (Performance Expectation 1-LS1-2)

Students may ask, "Where does this bunny live?" This is the topic of lesson 5.

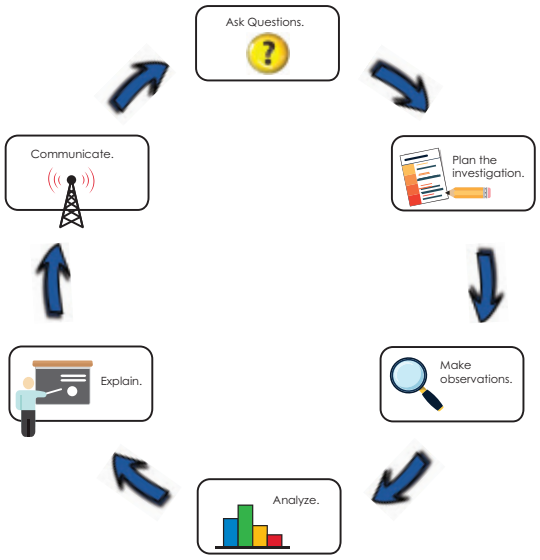
Students may ask the following questions. "When will the baby open its eyes?" "When will its hair grow in?" "When will it be able to feed on its own?" These questions have answers, which the class can research (see the last paragraph of this section) but these speak to a broader topic of how do animals, including humans, survive to adulthood.

With your guidance, help students develop the broader questions of how animals use their senses to survive and how animals use other parts of their body to find food, water, shelter and to protect themselves. These are the topics of lessons 6, 7, 8 and 9. (Disciplinary core ideas LS1.A and LS1.D) The examples of how living things survive provide the inspiration for the design challenge in lessons 10 and 11. (Performance Expectation 1-LS1-1).

At the end of Lesson 1, the class should put together the guiding questions for this unit. Then at the end of each lesson, the class should return to these questions to see which ones they can answer. This is why **it is important to do the "Close the Lesson" section in each lesson** in this unit. In lesson 1, students may have answers to some of the questions they pose. Write down those answers. As the unit progresses, check the answers. Are the answers correct? Can the class add to answers that they originally wrote down.

With the Lesson Description for Lessons 2-9, there will be a diagram titled "What Scientists Do". This diagram appears on page 3 of the Student Science Journal. In lessons 10 and 11 is a similar diagram titled "The Engineering Design Process". Circled on this diagram are the key science practices which will be used in the lesson. The diagram reinforces the Science and Engineering Practices (SEPs) and speaks to the broader theme for first grade science of learning to be scientists and engineers. You can choose to use this or not.

What Scientists Do



Notes for Lesson 1

Within the cards that students sort in this lesson, is a picture of a lima bean sprout and a full-grown lima bean plant. There are also cards showing a picture of a mature pine tree and a small, still growing, pine tree. While the Performance Expectation refers to both plants and animals, the focus of this unit is on the rabbit and other animals. Only in Lessons 1 and 10, are plants discussed.

As background information to the picture of the newborn bunny, baby rabbits are called kits. They are born blind and without fur. For the first week of life, they sleep nearly all the time. After the first week, the babies have fur and have doubled in weight. Within 10 days of being born, their eyes open and after 14 days their fur is thick and they are active. Within 3 weeks of being born, the young bunnies are exploring outside the nest and within 4 weeks of being born, they are weaned and are caring for themselves.

Standards

Performance Expectations:

1-LS3-1 – Make observations to construct an evidence-based account that some young plants and animals are similar to, but not exactly like, their parents. [Clarification Statement: Examples of patterns could include features plants or animals share. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size; and, a particular breed of dog looks like its parents but is not exactly the same.] [Assessment Boundary: Assessment does not include inheritance or animals that undergo metamorphosis or hybrids.]

Science and Engineering Practices

Constructing Explanations and Designing Solutions

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-LS3-1)

Ask Questions

- Ask questions based on observations about the natural and designed world.

Disciplinary Core Ideas

LS3.A: Inheritance of Traits

- Some young animals are similar to, but not exactly, like their parents. Some young plants are also similar to, but not exactly, like their parents. (1-LS3-1)

LS3.B: Variation of Traits

- Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (1-LS3-1)

Crosscutting Concepts

Patterns

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.

ELA/Math/Social Studies Connections:

ELA: 1SL1, ISL5

Math: MP8

Vocabulary:

- **adult** - grown up
- **seed** - a baby plant inside a protective covering
- **seed coat** - covering around a seed
- **species** - group of living things that look a lot like each other
- **survive** - to keep living (even though danger is all around)

Misconceptions:

The expectation is that students will recognize that bears are a different group of animals than rabbits, which are a different group of animals than pigs. If you wish, use the word **species** to identify these different groups of animals. In the context of this unit, species is a general term for a group of animals that look like each other. At this age, students are not ready for the scientific meaning of this word.

Procedure

Day 1

Phenomenon:

The birth of a rabbit - the journey from birth to adulthood of a rabbit is the phenomenon that drives this unit.

Show students the picture of the newborn rabbit. Ask students, "What do they think the picture shows? Why do they think this? "

1. Explain to students that you found this picture in a group of pictures. You are not sure what these cards are all about but hopefully the students can come up with some ideas.
2. Organize students into groups of two or three students. Give each group a set of pictures. Ask students to look through the cards. Do they see any **pattern** or **patterns** to the pictures on the card? Can students sort the pictures into groups? Can they match the picture on one card with a picture on another card?
3. Wander the room asking students for their thinking on how they are doing their sort- what **pattern(s)** are they noticing in the pictures.
4. After groups have sorted, have each group present their sort. Honor each group's sort but direct the class' attention to the sorts where groups have sorted cards into either two groups with one group being adults and the other young organisms or where students have sorted cards matching parent with babies of the same type.
5. If possible, project pictures of the babies next to the parent or do the Smartboard sort otherwise hold up the card of a parent and a card of the baby/babies so students can find the same cards from their own sort. For each pair of pictures, ask students to explain how they know that these cards go together. What is their **evidence**? What features do they **observe** on both the parent/**adult** and babies that lets the students know that they belong together? What differences do students see between adults/parents and the babies? (Typically size and in some cases, coloring.)
    a. If students did not know before the picture sort that the lesson started with a baby bunny, they should know that now. One of the cards shows an adult rabbit.

Day 2

6. Pass out the dry lima bean seeds- giving one **seed** to every two students. Do not tell students that these are seeds but instead ask students what is this "thing" that has been passed out.

CCC: Crosscutting Concept(s):

Patterns:

Patterns in the designed and natural world can be observed, used to describe phenomena, and used as evidence.

SEP: Science and Engineering Practice(s):

Constructing Explanations and Designing Solutions:

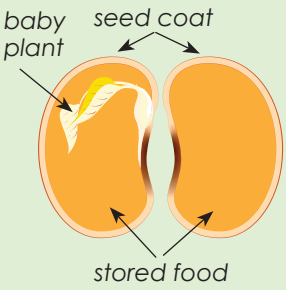
Use information from observations (firsthand and form media) to construct an evidence based account for natural phenomena.

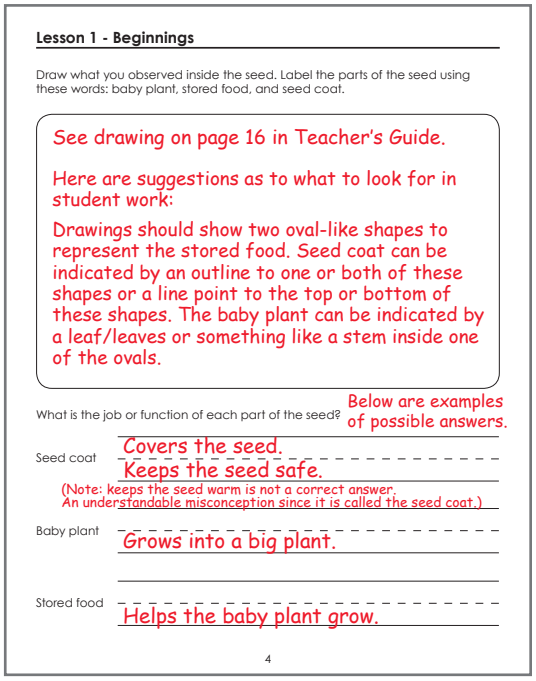
7. If students do not know what they are holding, let them discover by looking inside the **seed**. To look inside the seed, they will need to have a lima bean that has been soaking. Pass out to each pair of students a lima bean that has been soaking in water. Also, pass out paper towels and magnifiers. (Student pairs may need to share the magnifiers).
   a. Students should be able to easily remove the **seed coat** from the soaked bean.
   b. Students should be able to easily split the seed along the "seam" into two halves.
   c. Once students have pulled the bean apart, have students observe the inside of the seed with the magnifier. They should see a tiny plant- white in color. The inside of the lima bean is stored food to keep this tiny plant alive until its roots are firmly growing in soil and its leaves are receiving light and turning green.
   d. Show students the diagram of the seed available on the BOCES 4 Science website. Go over the parts of the seed. The seed coat protects the seed. The stored food gives the baby plant energy so it can grow. After the seedling grows roots and leaves, then the baby plant can take care of itself (make its own food).
   e. Ask students to draw what they see on page 4 of their Science Journal
8. Among the cards is a picture of a sprouting lima bean seed and a grown lima bean plant. Again, show students these two pictures. (These will be in the presentation or in the Smartboard sort.)
9. In Kindergarten, students learned about what plants and animals need to **survive**. Check student prior knowledge by asking them how plants are different than animals. Possible answers might include: plants do not move while animals do. Plants need light and water to grow. Animals need food and water to grow.)

Using Magnifiers

A student should hold the magnifying lens over the seed. While looking through the lens, the student should raise up the magnifier until they get an enlarged but clear view of the seed. If they raise the magnifier up too far, the view starts to become blurry.

Seed





Lesson 1 - Beginnings

Draw what you observed inside the seed. Label the parts of the seed using these words: baby plant, stored food, and seed coat.

See drawing on page 16 in Teacher's Guide.

Here are suggestions as to what to look for in student work:

Drawings should show two oval-like shapes to represent the stored food. Seed coat can be indicated by an outline to one or both of these shapes or a line point to the top or bottom of these shapes. The baby plant can be indicated by a leaf/leaves or something like a stem inside one of the ovals.

What is the job or function of each part of the seed? Below are examples of possible answers.

Seed coat: Covers the seed. Keeps the seed safe.
(Note: keeps the seed warm is not a correct answer. An understandable misconception since it is called the seed coat.)

Baby plant: Grows into a big plant.

Stored food: Helps the baby plant grow.

4

Closing the lesson

Go back to the picture of baby bunny that students looked at in the beginning of the lesson. This time also show the picture of the mother rabbit. Ask students to work with a partner. Together they should come up with as many **questions** as they can about baby bunny and its mother. Go to each partner and ask for one of his or her questions. Continue to go from partner to partner getting a different question from each. Make it a game. How many questions can the class ask? Write and number each different questions on chart paper or on an interactive white board.

With student help, organize the questions into topic areas. Look for **patterns** in the types of questions being asked. (See Teacher Background.) Perhaps you can circle with one color marker all the questions related to what the baby will look like. Use a different color to circle questions related to how the mother will take care of the baby. Use yet another color to circle questions related to how the baby will grow and develop, etc. Students may offer answers or partial answers to some of the questions they propose. Write down these answers.

Later re-write related questions so they appear together under the same heading.

Assessment

The questions posed during the closing provide some insight into the class's prior knowledge. In kindergarten, students looked for patterns in what plants and animals (including humans) need to survive. Therefore, students may have answers to some the questions. These answers will also provide insight into a students' prior knowledge. Be aware of who is talking and who is not talking during this whole class discussion. Try to include those not participating in the conversation or make time to talk with them privately so you can assess their prior knowledge.

As students are sorting cards, check for the **patterns** students use to sort pictures. One common sort that students have done is wild animals versus animals humans care for (domesticated). Another sort is animals and plants. Yet another sort is plants, animals that lay eggs and animals that don't lay eggs. Regardless of how they sorted the cards, individual groups should be able to explain the reasoning behind their sort.

Connections

Differentiation:

Aid students who are having difficulty sorting the cards. Suggest to them specific topics that are visual and clear for sorting such as color, size, baby and adult.

For students, who wish to go further, ask them to plant a couple soaked lima beans in a plastic cup filled with soil and to plant a couple dry lima beans in another plastic cup filled with soil. Which one do they think will sprout first and why they think this? Instead of planting these in soil, students can place them

SEP: Science and Engineering Practice(s):

Asking Questions and Defining Problems:

Ask questions based on observations about the natural and designed worlds.

CCC: Crosscutting Concept(s):

Patterns:

Patterns in the designed and natural world can be observed, used to describe phenomena, and used as evidence.

in a plastic bag as described in the extension activity.

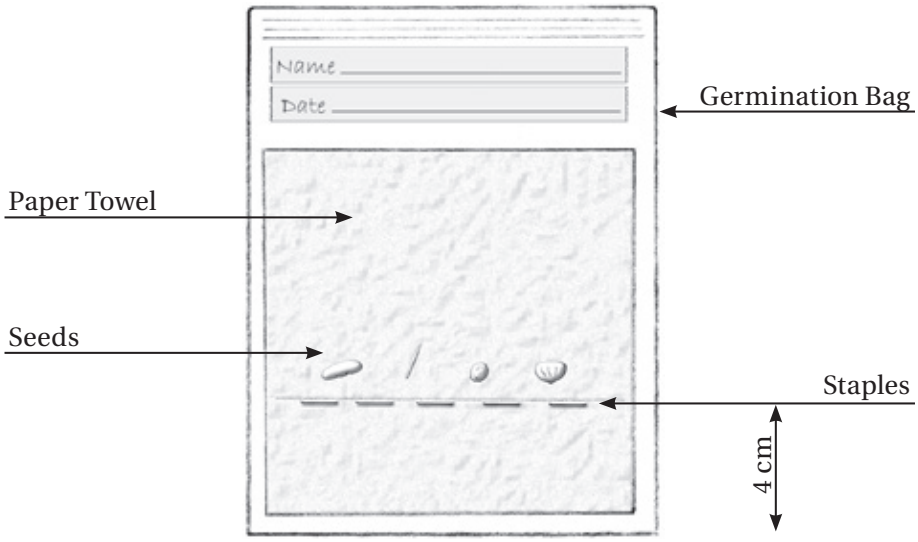
Kindergarten - In the New York State Science Learning Standards for Kindergarten, students study what plants and animals need to survive. Reference this knowledge, throughout this First Grade unit.

Cross-Discipline Extensions:

ELA: Consider reading aloud the following book: Whose Baby? By Masayuki Yabuuchi.

Math Extension: Practice counting skills. Have students look at the card of the baby pigs- how many pigs do they see? Look at the card of the baby birds; how many baby birds are there? Look at the card of the baby foxes; how many baby foxes are there?

Extension Activity: Prepare 2 germination bags. In the kit are 6 x 8 plastic bags. Place a paper towel in the bag. Measure 4 cm up from the bottom of the bag and mark that spot. Put 4 to 5 staples across the base 4 cm up from the bottom.



Take several of the extra soaked beans that students have not split open. Place four lima beans in each of the germination bags. Have student volunteers place six teaspoons (2 tablespoons) of water into each bag.

Hang the germination bags in the class by tacking them to a bulletin board or by using a clothespin to hang them from a string.

Next Lesson Preparation

Review the scheduling guide available online. Consider the amount of time available to teach this unit, and which, if any lessons, can be taught in ELA time. The Scheduling Guide provides information on lessons and parts of lessons that can be omitted if time is limited. The guide also indicates the must-teach lessons.