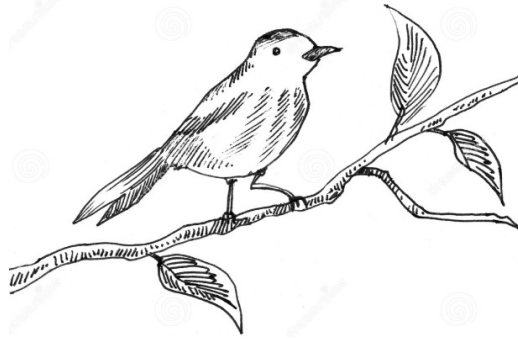


## Schoolyard Investigation

What do the living things in my  
schoolyard need to grow?

Kindergarten





## Schoolyard Investigation

# What do plants and animals need to survive?

### Overview

What do living things need to live? In this investigation, young students investigate the schoolgrounds to look for patterns about where they find living things. Afterward, they will conduct an experiment to determine the effect of sunlight (or lack thereof) on plant growth. They will compare and contrast the needs of plants and animals, understanding that while plants get their energy primarily from the sun, animals (like people) need to eat!

In this activity, you will need access to an outdoor learning space where some areas are populated by plants and some areas are without plants. This could be a school playground, with grassy areas and hard asphalt or concrete areas. Not all playgrounds have diverse plant communities for students to explore; if this is the case for your schoolyard, it is recommended that you plan a “neighborhood walk” outside the school fence. With our smallest learners, plan a safe journey by ensuring that you have enough adults to supervise, have a “walking procedure” and use tools (such as a buddy system, or a children’s walking rope), and plan a route that limits crossing busy roadways.

Prior to the Explore portion of the activity, you will want to sprout some bean seeds on a damp paper towel.

### Overview Statement

*Observe plants and animals* in the schoolyard and record *where plants are found related to water and light* and *where animals are found related to water and food*.

### Next Generation Science Standard

<b>K-LS1-1</b>	Use observations to describe patterns of what plants and animals (including humans) need to survive. [Clarification Statement: Examples of patterns could include that animals need to take in food, but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and, that all living things need water.]	
<b>Science and Engineering Practices</b> <b>Analyzing and Interpreting Data</b> Analyzing data in K-2 builds on prior experiences and progresses to collecting, recording, and sharing observations. <ul style="list-style-type: none"> <li>Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.</li> </ul>	<b>Disciplinary Core Ideas</b> <b>LS1.C: Organization for Matter and Energy Flow in Organisms</b> <ul style="list-style-type: none"> <li>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.</li> </ul>	<b>Crosscutting Concepts</b> <b>Patterns</b> <ul style="list-style-type: none"> <li>Patterns in the natural and human designed world can be observed and used as evidence.</li> </ul>

### *Connections to Nature of Science*

#### **Scientific Knowledge is Based on Empirical Evidence**

- Scientists look for patterns and order when making observations about the world.

#### *Common Core State Standards Connections:*

##### *ELA/Literacy –*

W.K.7 Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them).

##### *Mathematics –*

K.MD.A.2 Directly compare two objects with a measurable attribute in common, to see which object has “more of”/” less of” the attribute and describe the difference.

K.CC.C.6: Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.

## English Language Proficiency Standard Mathematics Common Core Standard

**ELP.K.2** Participate in grade appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions.

## Background

Kindergarteners should understand that living beings grow and change. This is an easy concept for them to comprehend because they know *they* have grown and changed. The concept of energy is not appropriate to introduce at this grade level; however, they should be able to understand that food is energy for living things. Students are capable of understanding that animals eat food, and plants make their food from sunlight.

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## Objectives

Students:

- Investigate patterns of where the living things are in or near their schoolyard.
- Identify that plants need light and water to live and grow, while animals need food and water to live and grow.

**Materials:** bean seeds, containers, cotton balls or soil (alternatively, small plants from a nursery), marker, water and watering can, paper, pencils, clipboards

**Timing:** Three lessons over 2–3 weeks

## Learning Experience

Through investigations, students will learn that plants need sun and water to grow and that animals, including humans, need water and food to grow.

## Engage

Prior to the start of this lesson: Prepare a map of the schoolyard that has two or three landmarks to orient the students and includes some areas that never receive sun as well as areas that do. Divide the map into four sections. Make copies for each student to use.

1. Students **observe** a plant growing such as a timelapse of a sprouting bean as in the video, "[Bean Time Lapse - 25 days | Soil cross section](#)"<sup>1</sup> or a plant growing in the schoolyard over a few days. Elicit students' explanations about **what plants need to grow and what animals need to grow**. Guide the discussion to include some of the **differences** students have observed between animals (themselves) and plants (example: Animals have a mouth and plants do not have a mouth.) Pose the statement to the students: "You and other animals need to eat food to grow but plants do not eat food and they grow."
2. Tell students they are going to learn about the plants and animals growing in their schoolyard. Prior to conducting the walk to map the school grounds, review your classroom rules and procedures for being outdoors. Ensure that each student knows the boundaries to explore and your signal to regroup as a class.
3. Distribute clipboards and maps (see note above). Students will need two different colored pencils to **collect data** about the plants and animals they might see.
4. Instruct students to color **how much space** within the section is covered in plants. For example, if the section is completely covered in plants, then the students would color in the whole section. If only a small part of the section was covered in plants, then the students would color in only a small part of the section on the map. In this way, the students create a map that shows the **relative number of plants** in different places in the schoolyard.
5. Once students have completed the plant mapping, students use a different colored pencil and put little symbols (X's) on the map to represent any animals they see. Encourage the students to look very closely at the ground so as not to miss small insects.
6. Bring students together to **share what they discovered** in their schoolyard and where. Guide students in the discussion. **Where are the plants? Where are there no plants?** What do you **notice** about the places where plants are growing that are different from the places where plants are NOT growing?

### Mapping in Kindergarten

David Sobel, author of *Mapmaking with Children*, writes that even students in early elementary are capable of sense-making with maps. Generally, they are developmentally able to map smaller areas and in three-dimensional models. Mapping grounds students, providing a tangible sense of the place they live and learn.

Start introducing the idea of maps by reading picture books like *Me on the Map* (Joan Sweeney) or *Henry's Map* (David Elliot). Use loose parts play to allow students to construct 3-dimensional maps of the classroom together to practice. Show how they can draw the map they made. Use the same procedure to make the map of the playground - from loose parts to drawing. Ask students to work together and build a consensus model!

## Explore

*Note: Sprout a batch of bean seeds (enough for each student plus some extras) by placing beans on a wet paper towel and rolling it up. Keep the towel moist for a few days.*

<sup>1</sup> YouTube user GPhase "Bean Time-Lapse - 25 days | Soil cross section". Retrieved from: <https://youtu.be/w77zPA+VTul>  
6/23/2023

1. Using their maps, students go to the place in the schoolyard where they observed the most plants. Using forks, or spoons, students dig into the soil to *observe* any more animals they may have missed on the surface. Students may *observe* that the soil feels wet (damp) or may see evidence of irrigation. Pose the question: "Do you think plants and animals need to live where there is water?" Have students discuss their thoughts.
2. Go to a section in the schoolyard where there are no plants living (that was also mapped). Students dig into the soil there OR *observe* that the soil may be covered by asphalt or some other covering that does not allow water to penetrate. Pose the question: "Why do you think we **don't** observe any plants and animals here?"
3. Provide each student with a plastic cup containing potting soil. Each student plants a sprouted bean seed (or seeds). Label half of the containers, "sunlight" and the other half "no sunlight."
4. Place the "sunlight" containers where they can receive sunlight, such as a windowsill, and the "no sunlight" containers in a place where there is no sunlight, and preferably no light at all, such as a cabinet, cupboard, or closet.
5. Guide the students to water their bean plants daily.
6. After 2-3 days, students *observe* the plants and *note that some plants are growing, and some are not*. Use a Wonder Wall strategy to record students' ideas of *why the plants in the sunlight are growing and the plants with no sunlight are not growing*. If students think the plants in "no sunlight" are not growing for reasons other than sunlight, brainstorm ways with the class to change that factor in the future (for example airflow or temperature may come up and could potentially be followed up with in a second investigation). Let students talk to each other about their ideas of what happened with the plants and why. Records their ideas.
7. *Observe* their schoolyard maps again. Encourage students to find *a pattern* that makes sense of the investigation. Pose questions such as "On our map where we found plants, did we also have sunlight and water? Was there sunlight and water in the places where no plants are growing?"
8. Students visit the schoolyard once again to the place where they dug into the soil. Students look for animals that live in the soil and *observe* that these *animals can live without sunlight*. Pose the question: "Do you see the *same pattern* with the animals that you found with the plants?" "Why do you think the pattern is not the same with animals as with plants?" and "What is one thing animals can do that plants cannot do?" (Animals can eat.)

*Note: Students may need support to understand that little to no light penetrates the soil surface. Animals can grow under the soil where there is no light.*

## Explain

1. Read the book What Plants Need, Mary Lindeen or any book that gives an age-appropriate explanation of what plants need to grow.
2. Revisit the same questions as posed in the Explore section. Students should be able to now articulate that *plants need sunlight and water to grow*.
3. Read a book about the need for animals to eat. You could use The Very Hungry Caterpillar by Eric Carle, or What Does an Animal Eat? by Lawrence Lowery.

4. Revisit the same questions as posed in the Explore section. Students should be able to now articulate that animals need food and water to grow.
5. Give each student a set of Plant and Animal Cards<sup>2</sup> that show the *needs of plants and the needs of animals*. The students follow the prompt of sorting the cards according to the *patterns* they notice.

## Elaborate

1. Review the schoolyard map or visit the schoolyard again pointing out the places where there are many plants and the places where there are only a few or no plants.
2. Students graph the relative number of plants by drawing different size bubbles on a map of the schoolyard. For example, an area of the schoolyard where there might have been 10 plants found will be represented with a bubble that is twice the size of an area that only has 5 plants. There would be no bubble where there were no plants.
3. Prompt students to draw ☀️ and 💧 on their maps where they observe sunlight and water. When they finish, their maps should clearly show a *pattern* of plants where there is sunlight and water present confirming their new learning that *plants need these resources to grow*.

## Evaluate

1. Work together with the class to finish the sentence stem, "Plants need \_\_\_\_\_ to grow and animals need \_\_\_\_\_ to grow."
2. Use the small plant and animal cards and the graphic organizer "Plant and Animal Needs" to assess student understanding. Students should place the cutout of each animal in the appropriate space.

*Note: Students may need multiple cutout names because plants and animals need more than one thing.*

## Extensions

1. As a class, graph the number of animals found in different locations of the schoolyard (places where they found animals and where they found less or did not find any).
2. As a class, graph the number of days it took for them to see their bean plants starting to grow.
3. Have students measure the bean plants and make a graph as a class.
4. Draw the schoolyard in a class map and have students correlate the map with the schoolyard.
5. Have students build the schoolyard map in 3D with art materials.

## Plant and Animal Cards

*Reprinted with permission from The Wonder of Science (<https://thewonderofscience.com/>).*

Directions: Give each student a copy of the cut-apart plant and animal cards. Ask students to sort the cards into different piles. What pattern did students use to sort the cards?

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<sup>2</sup> Plant and Animal Cards and Plant and Animal Needs, Designed by Paul Andersen for NGSS Kindergarten. This work is licensed under a Creative Commons Attribution-Noncommercial 4.0 International License. Retrieved from: <https://thewonderofscience.com/klsl>  
6/23/2023 Developed by Pacific Education Institute



## Humans



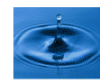
Needs: vegetables, eggs/meat, water



## Oak Tree



Needs: sunlight, water



## Black Bear



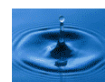
Needs: grass, berries, fish, water



## Red fox



Needs: birds, squirrels, water



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## Corn plant



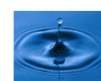
Needs: sunlight, water



## Elk



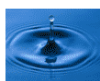
Needs: grass, shrubs, water



## Tomato plant



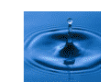
Needs: sunlight, water



## Kangaroo Rat



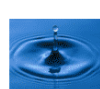
Needs: seeds, insects, water



## Great-Horned Owl



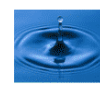
Needs: mice, squirrels, ducks, water



## Dandelions

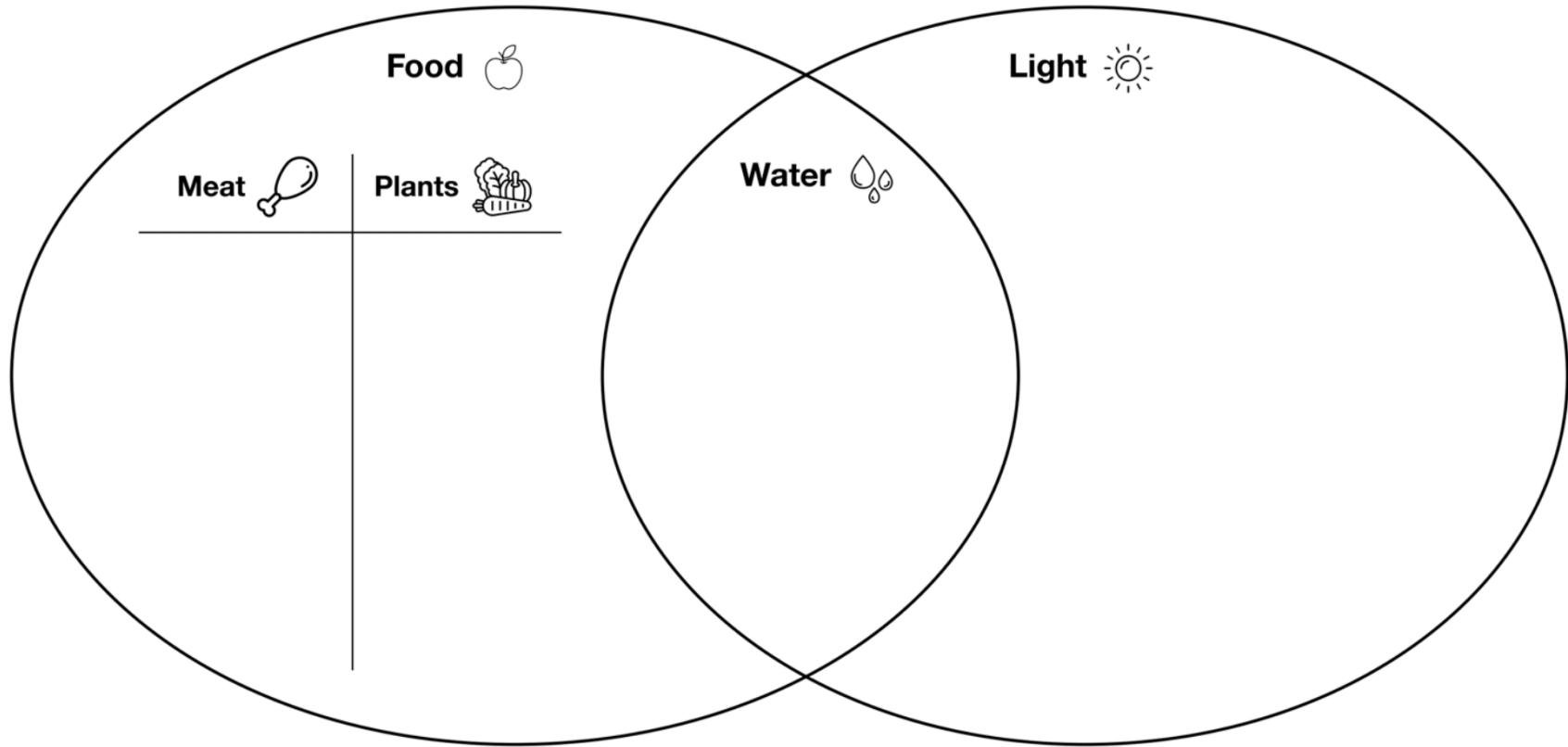


Needs: sunlight, water





# Plant and Animal Needs



Students: Sort the animals and plants. What does each need to grow and live



Humans



Humans



Humans



Humans



Oak Tree



Oak Tree



Oak Tree



Oak Tree



Black Bear



Black Bear



Black Bear



Black Bear



Red Fox



Red Fox



Red Fox



Red Fox



Corn Plant



Corn Plant



Corn Plant



Corn Plant



Elk



Elk



Elk



Elk



Tomato Plant



Tomato Plant



Tomato Plant



Tomato Plant



Kangaroo Rat



Kangaroo Rat



Kangaroo Rat



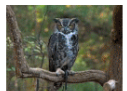
Kangaroo Rat



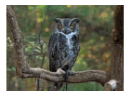
Great-Horned Owl



Great-Horned Owl



Great-Horned Owl



Great-Horned Owl



Dandelion



Dandelion



Dandelion



Dandelion



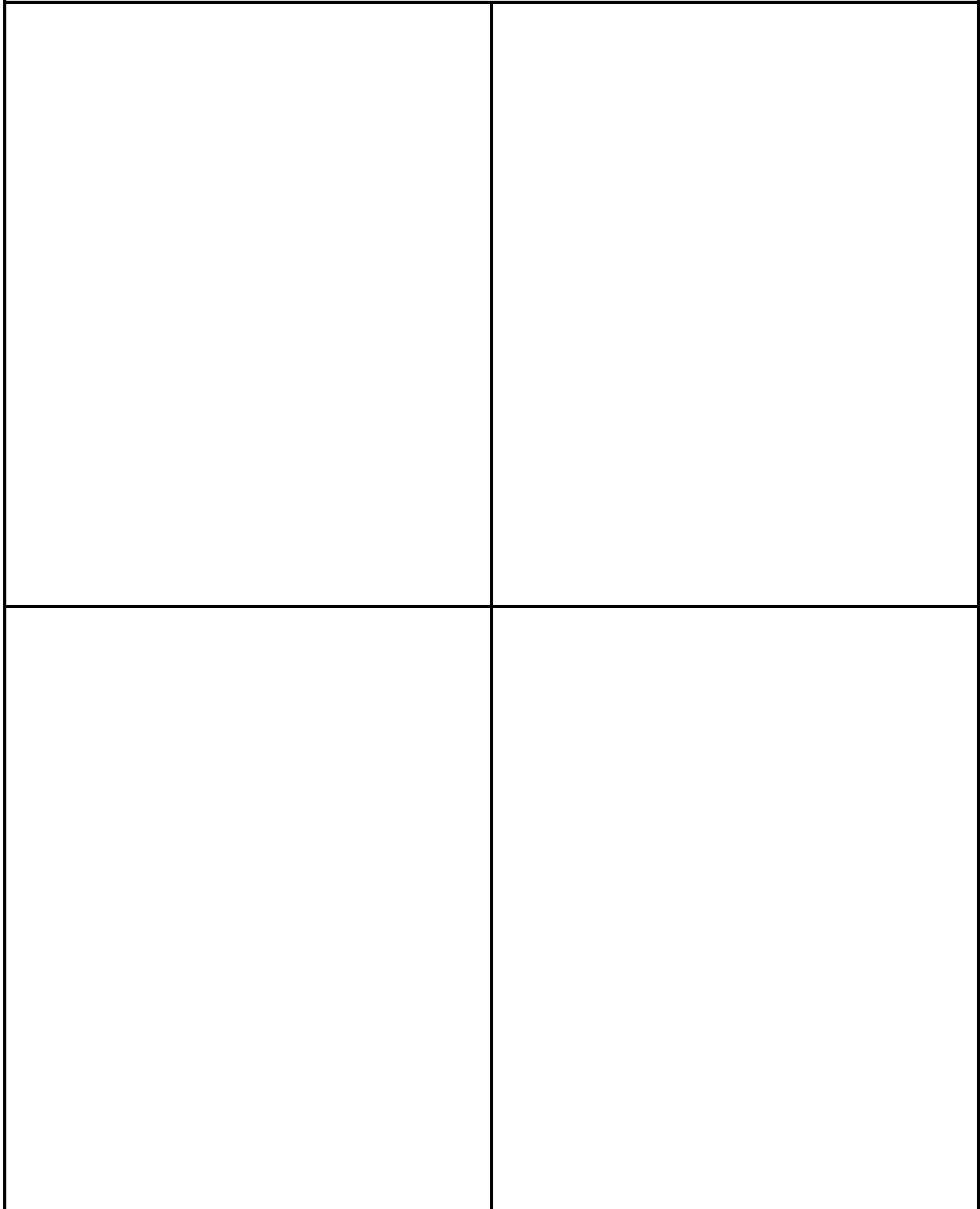


# What do the living things at my school need to grow?

Student Pages

**Name:** \_\_\_\_\_

# Map of My Schoolyard





# O-W-L

*(Teacher Sample Chart-not needed in student journal)*

<b>O - This is what I OBSERVE about living things in my schoolyard.</b>	<b>W - This is what I WONDER about living things in my schoolyard.</b>	<b>L - This is what I LEARNED about my schoolyard.</b>

# Reflection and Assessment

# Rubric for what plants and animals need to grow

*Standard: K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.*

\*This assessment is working towards meeting the full standard.

<b>Score of 4</b>	<b>Score of 3</b>	<b>Score of 2</b>	<b>Score of 1</b>
Student was able to sort all pictures correctly.	Student sorted all but one picture correctly.	Student was able to sort all but two to three pictures correctly.	Student sorted more than four pictures incorrectly.
<b>Notes:</b>			