K-2 Living Things Activity

South Carolina Aquarium

Overview

Focus Question
What makes something a living thing? What makes something a non-living thing?

Activity Synopsis
Students classify a collection of living and non-living objects common to South Carolina to learn some of the characteristics of living things.

Time Frame
60 minutes

Objectives
The learner will be able to:

- Demonstrate knowledge of the characteristics of living things by observing a collection of objects and classifying them as living or non-living things.

Student Key Terms

- alive
- living
- non-living

Teacher Key Terms

- organism
- stimulus

Standards

South Carolina College- and Career-Ready Science Standards 2021

Kindergarten: K-LS1-1, K-ESS2-2, K-ESS3-1
1st Grade: 1-LS1-1
2nd Grade: 2-LS2-1, 2-LS4-1

*** Bold standards are the main standards addressed in this activity**

Kindergarten Performance Expectations
K-LS1-1 Use observations to describe patterns of what plants and animals (including humans) need to survive.
K-ESS2-2 Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.
K-ESS3-1 Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

First Grade 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.

Second Grade Performance Expectations
2-LS2-1 Plan and conduct an investigation to determine what plants need to grow.
2-LS4-1 Make observations of plants and animals to compare patterns of diversity within different habitats.

K-2 Living Things Activity

Cross Curricular Standards

South Carolina College and Career Ready Standards for Math
K.DPSR.1, K.MGSR.1, K.MR.3, 1.DPSR.1, 2.DPSR.1

South Carolina College and Career Ready Standards for ELA
ELA.K.AOR.7.1, ELA.K.R.1.1, ELA.K.C.8.1, ELA.K.C.9.1
ELA.1.R.1.1, ELA.1.C.7.1, ELA.1.C.8.1, ELA.1.C.9.1
ELA.2.C.8.1

South Carolina College and Career Ready Standards for Social Studies
K.H.1, K.E.1

Common Core Math Standards
K.MD.3, 1.MD.4, 2.MD.10

Common Core ELA Standards
Informational Text – K.1, K.2, K.3, K.4, K.8, K.10, 1.1, 1.2, 1.3, 1.4, 1.9, 1.10, 2.1, 2.3, 2.4, 2.8, 2.10
Foundational Skills – K.1, K.2bcde, K.3, K.4, 1.1, 1.2abcde, 1.3, 1.4, 2.1, 2.2, 2.3, 2.4
Speaking/Listening – K.1, K.2, K.3, K.4, K.6, 1.1, 1.2, 1.3, 1.4, 1.6, 2.1, 2.2, 2.3, 2.4, 2.6
Language – K.1, K.4ab, K.5ac, K.6, 1.1, 1.4abc, 1.5abc, 1.6, 2.1, 2.3, 2.4abcd, 2.5a, 2.6

Background

Key Points
Key Points will give you the main information you should know to teach the activity.

- A thing or an object is considered **alive** if it exhibits all of these characteristics together:
  - the ability to reproduce
  - the ability to grow and develop
  - the ability to take nutrients and energy from the environment and convert it into a usable form
  - the ability to interact with and respond to the environment
  - the possession of a complex and highly organized structure
- More simple terms (and maybe more appropriate to describe these characteristic would be:
  - can have babies
  - can grow
  - need energy
  - can react
  - has many parts to make a whole
- Things taken from **living** things such as twigs, seeds, leaves, bones, teeth and shells are not characterized as living things because separate from the **organism** they were taken from, they do not have all of the characteristics that define something as being alive. For this same reason, a dead organism cannot be classified as a living thing because it can no longer reproduce, grow and develop, take nutrients and energy from its environment or otherwise interact with its environment.
- An organism's habitat contains both things that are living and things that are not living.

Detailed Information
Detailed Information gives more in-depth background to increase your own knowledge, in case you want to expand upon the activity or you are asked detailed questions by students.

K-2 Living Things Activity

South Carolina Aquarium

Living things depend on things that are not **alive** in order to survive. Living things need air, water, the warmth of the sun, the nutrients from the ground, the solid earth that gives us the foundation for life and many other things that are not alive. A habitat is the place where an **organism** can successfully get the things it needs in order to survive. Since a habitat consists both of things that are alive and things that are not alive, students should be able to differentiate between things that are living and things that are not living.

What is the difference between something that is alive and something that is not alive? Though the answer may seem obvious, the definition of a living thing is not a simple one. There is not one lone characteristic that defines being alive. All living things possess certain characteristics that are not shared collectively by **non-living** things. For this reason, when classifying objects as living, characteristics must be considered collectively. The scientific name for something that is alive is an organism. This activity will focus on the more easily observable characteristics of living things that will be recognizable to young children. In brief these characteristics are:

1. the ability to reproduce
2. the ability to grow and develop
3. the ability to take nutrients and energy from the environment and convert it into a usable form
4. the ability to interact with and respond to the environment
5. the possession of a complex and highly organized structure

These characteristics are a mouthful to a young child. Using simpler terms might be needed for some students to understand. Then you can work up to the more complex wording. A simpler way to describe these would be:

1. can have babies
2. can grow
3. need energy
4. can react
5. has many parts to make a whole

This background information will explain these observable characteristics and provide examples that will make the information relevant to a young child.

1. All living things can reproduce, meaning they can produce independent members of their species from their bodies. There are an incredibly large amount of different reproductive strategies used by living organisms. Amoebas and many other organisms reproduce by cell division. Many fungi reproduce through spores. Plants reproduce through seeds. Most birds, reptiles, amphibians and invertebrates reproduce through eggs. Most mammals and sharks reproduce through live birth. In the varieties of reproduction, organisms can be male and female (sexual, meaning one needs to find the other to reproduce), neither (asexual, can reproduce without a partner) or both (hermaphroditic, meaning an individual can be both sexes at the same time or can change its sex). Despite the varied means of reproduction, all living organisms can replicate their species.

Probably the best way to explain this concept to young elementary students is that all living things produce babies that will eventually become adults. A younger brother or sister who was recently born, an aunt who had a child, a pet that had puppies or kittens or a seed that was planted and eventually sprouted can all be used to show how this characteristic applies to living things. Students can also be asked if they have ever heard of any buildings or cars or rocks having babies to reinforce the concept that this is a characteristic of living things.

2. All living things grow and develop. Many living things start off life as a single living cell known as a zygote (fertilized egg). Fish, grasshoppers, tulips, humans and various other organisms all start as zygotes and eventually develop into adults. Development is observable in the changes in size and structure an organism undergoes from fertilization to adulthood. This is observable even in single-celled organisms, which grow in size before they divide during asexual reproduction.

Young children can see how growth and development have occurred by thinking about how they have changed since they were born. By comparing pictures of them as newborns with pictures of themselves at ages one, two, three (etc.) the students can see how they have grown and developed. They can also compare themselves to their parents to consider how they will continue to grow. Examples can also be observed in the classroom by planting seeds and watching the plant grow, or watching how tadpoles, chicken eggs or butterfly larvae grow and develop.

3. Living things take energy and nutrients from the environment and convert them into a usable form. Through digestion and respiration, an organism converts (or in the case of plants creates) organic compounds (carbohydrates, fats and proteins) in ways that either allow it to use the energy at that moment or to store it for future use. Nutrients used in this process can be drawn from the soil, the water, the atmosphere or other organisms. Energy can come from the sun, chemicals or other organisms. Every time a person eats and every time a person breathes he or she is performing the functions that allow them to make energy from the environment. This gives him or her fuel he or she needs to live.

Young kids can understand this, since every time they eat they are giving themselves more fuel or energy. This is the same reason they must feed their pets and give their plants sunlight and fertilizer.

4. Living things can react to **stimuli** and respond to and interact with their environment. Living things respond to sights, sounds, smells, tastes and sensations. A spider knows a fly is on its web by feeling the vibrations the fly is making. An osprey sees a fish swimming in the water from sixty feet up in the air, and dives to catch it. A sunflower bends toward the sun as the sun travels across the sky. Living things also interact with their environment. Rabbits dig holes. Birds build nests. The roots of trees hold soil in place that otherwise would be washed away by rain. Bacteria break down organic materials into nutrients that replenish the soil. Non-living things may be manipulated by natural forces, but they cannot interact of their own accord with their environment. For example water may be pulled down a mountain by gravity and erode soil particles, and air molecules may be moved by air pressure differences and cause trees to be blown over, but neither the water nor the air molecule could do anything to the environment without being acted upon by physical forces. An earthworm can move soil and a beaver can cut down a tree of their own action, both showing a characteristic of a living thing.

Students can understand how living things react by imagining some of the examples described above. Ask them questions to get them thinking about interactions and reactions with the environment.

5. Living things possess a complex and highly organized structure, meaning they have many parts to them that allow them to function. People, such as students, have hearts and lungs and many other organs, as well as eyes, ears, feet, arms and various other parts that keep them moving and surviving. So do dogs, cats, fish, birds, insects and even bacteria with their cell organelles. Plants have leaves, roots, branches, flowers and other less visible structures. These structures are easily observable to any student. A rock may be composed of many different minerals, but if you break it in half, it will still function as a rock. This is not the case if you break the classroom gerbil in half. Rocks have very simple structures, and therefore are not classified as living things.

Students may be tempted to think that the ability to move is a characteristic of living things. Students should be reminded that wind is air moving and streams and ocean waves are water moving. Neither of these is a living thing, though, because they do not have any of the characteristics listed above. On the other hand, trees and sponges do not move but they have the characteristics above and so are classified as living things.

When doing this activity, choose items that are fairly easy for students to identify as living or non-living. Although it may seem like a fairly simple concept, it can become quite confusing rather quickly. For example, it can be very confusing for students to try to classify a whelk shell that once housed a living organism as living or non-living. A better example to use would be a living whelk. It can be very confusing for students to classify a twig from a tree as a living thing. Even a seed with the potential to become a living thing is not a living thing until it begins to sprout and can grow and change, take food and energy from the environment, etc. A better example to use would a small potted plant. Having once been alive also does not make something a living thing. A carcass cannot reproduce nor does is exhibit most other characteristics of living things. Because of this potential for student confusion, some teachers have

suggested adding a third category of "once was alive" or "comes from living things" that can be included in the circle of objects that are not living things. These confusing objects, though, can offer a wonderful opportunity for discussion.

Procedure

Materials

- Collection of living things such as living plants, jars containing live insects or worms, any small animals (fish, lizards, birds, mice), a person (student, teacher, etc.), photographs of any plants or animals
- Collection of objects that are not alive, such as rocks, dirt, coins, water, a wind-up toy (to show that not all moving things are alive)
- Two hula hoops (or two large pieces of paper with circles drawn on them or some other means of marking two spaces)
- A living and a non-living label for each group and a set for the teacher
- Characteristics of Living Things handouts (optional)
    - More complex terms (Poster)
    - Simple terms (Poster)
- Magnifying glasses (optional)

The teacher should collect all of the materials and create the labels the day before. If having a collection for each group is not feasible, place one collection on a table for children to explore in small groups, which they can later discuss as a class.

Procedure

1. Show the students an object that is a living thing. Ask the students whether they think it is alive or not. How they can tell? Ask the students to look at some of the other students in the class and explain how they can tell that the other students are living things. Find out if any of them have pets. Have them explain why their pets are living by describing similar characteristics to themselves.

2. Make a list of the characteristics they have observed that are shared by all living things on the board. Use the 'Living Things' handouts from the materials list above if you would like.

3. Break the class into small groups and give each group a collection of objects, some living and some non-living, that are common to their experience of living in South Carolina, or photographs of some of these objects. Try to use as many real tactile objects as possible (plants, insects, pets, toys, coins, rocks, etc). Let the children spend some time examining the materials. Encourage the children to use the senses of touch, sight, hearing and smell to observe the differences in the objects.

4. After the students have had a chance to examine the collection of objects, ask them to sort the objects as to whether they are living or non-living at their tables. Have the students place the living things next to the living things label and the non-living things next to the non-living label. Encourage children to discuss why they classified each object as living or non-living.

5. When they have finished, place two hula-hoops on the floor side by side. Inside each hula-hoop place a label "living" and "non-living".

6. Ask a volunteer from each group to bring an object from their collection and place the object in the correct hula-hoop. Have the student explain why they classified the object as they did. What characteristics did they look for when sorting the objects?

7. When complete, have all the students look at the results of the sorting and make sure all of them agree.

8. Review the characteristics of living things with them and make sure they understand that any living this is called an organism.

Follow-up Questions

- Have students examine a drop of pond water under a microscope and then pose the question, "Are there living things in the water?"
- Are fossils living things? Have students use plaster of Paris to create imprints of their hands or of rubber animal tracks (if available) to consider how fossils are the imprints of living things, but are not actually living things. If you have a fossil, show it to them and ask if they have ever found one.

At-home Learning and Virtual Modifications

At-home Learning: Have students draw a picture of a living thing and a picture of a non-living thing. Have them write 1 reason their picture is living and 1 reason the other picture is non-living. You can send this worksheet home to help guide them if you want or they could just use a piece of paper.

Living and Non-living Worksheet

Virtual: Hold up a living thing in front of the webcam (plant, pet, insect, yourself). Ask the students, “Is this a living thing or a non-living thing?” Go through the reasons why it is living (can have babies, can grow, needs energy, can react, and has many parts to make a whole). Now, hold up a non-living thing ask the question again (rock, book, paper, pillow). Go over why it is non-living. Do a couple more examples to make sure they understand. Tell them to go find something in their house that is living and another object that is non-living (Set a time limit of 5 minutes so they aren’t rushing too fast.) Have each student share their objects and make sure they are correct.

Assessments

Assessment #1: Scavenger Hunt

After the activity, bring students out to the school ground with paper and pencil to observe things they find. On paper, ask the students to write the names of or draw three organisms they see that are living and three objects they see that are non-living. (Another option for this assessment is to have students bring three objects from around their home that are alive and three objects from home that are not alive.)

Scoring rubric out of 100 points

Correctly identified living organisms (10 points each):	30 points
Correctly identified non-living things (10 points each):	30 points
Can write or tell why something is living:	20 points
Can write or tell why something is non-living:	20 points

Assessment #2: Living and Nonliving Sorting Assessment

Materials: Print Living and Nonliving Sorting Assessments and Answer Keys. This assessment has two versions. One version gives students the pictures to cut out. The other version allows them to pick pictures from magazines. Choose the one you like best.

After the activity, pass out Living and Nonliving Sorting Assessment. Have students cut out pictures, sort pictures, and paste pictures into the living or non-living box. (Another option is to have students go through magazines and find 5 living organisms and 5 non-living things to paste into the sorting rectangles.)

Scoring rubric out of 100 points

Correctly identify living organisms (10 points each, 5 images):	50 points

Correctly identify non-living things (10 points each, 5 images):	50 points
Can write out why something is living or non-living:	bonus points

Cross Curricular Extensions

STEM Extension
Have students use recyclable materials to design a model of a living thing. Then, using the model, they should explain how it exhibits each of the characteristics of living things.

STEAM Extension
Have students collect a few living things (or used to be living) from around the school (leaves, stems, acorns,…). Allow them to paint the objects and stamp them to design an art piece. You could also allow them to pick some nonliving things to use in their design and then have them label which is from a living and which is from a nonliving thing.

Math Extension
Have students look around the classroom. How many objects in the room are living? How many objects in the room are non-living? Have students make simple bar graphs to demonstrate these numbers for comparison. (It will probably be necessary to limit how many objects in the classroom are looked at).

English and Art Extension
Have students make an alphabet book in which they name and/or picture an object that is living and an object that is non-living for each letter of the alphabet.

Social Studies Extension
Have students list some of the living things and things that are non-living that their family uses every day. Have the students think about some of the other people in the community, such as teachers or police officers. What are some of the things that are living and the things that are non-living that they use every day?

First and Second Grade Math Extension by SCA Master teacher, Christie Kittrell

- Symmetry Data Sheet (for Math extension)

First Grade Language Arts Extension by SCA Master teacher, Christie Kittrell

Resources

Teacher Reference Books

Audesirk, Gerald and Teresa Audesirk. Biology: Life on Earth, Macmillan Publishing Company, New York, 1993.
This college textbook explains the importance of water to life and the reasons why it has this importance.

Kovacik, Charles F. and John J. Winberry. South Carolina: the Making of a Landscape, University of South Carolina Press, Columbia, 1989.
This wonderful reference book provides information on the abiotic factors that determine the habitats of South Carolina.

Teacher Reference Websites

Project WET: Water Education for Teachers
http://www.projectwet.org/
This is the home page for Project WET. Visit this site for on-line information and activities.

South Carolina Department of Health and Environmental Control: Bureau of Water
www.scdhec.net/water
This site offers information on drinking water, water pollution control, watersheds plus much more.

Student Reference Books

Cone, Molly. Come Back, Salmon, Sierra Club Books for Children, San Francisco, 1992.
Learn how the students of Jackson Elementary School in Everett, Washington, cleaned a nearby stream, stocked it with salmon and protected it from pollution.

Curricula

JASON Science: Education through Exploration
JASON Science is an interdisciplinary curriculum for K-12 teachers focusing on the geology, climate, biology and biodiversity of specific regions in the world. The activities cover a broad range of topics.
For more information click on: www.jasonproject.org