

Living, Nonliving or Once Living

Summary

Students investigate what it means to be alive. Students sort items into three categories: living, nonliving, or once living. Yeast and cornmeal are similar looking powders and students will conduct an experiment to see if either powder is alive. A terrarium is used to demonstrate to students that living, nonliving, and once living materials all interact in an ecosystem.

Time Frame

1 class periods of 60 minutes each

Group Size

Small Groups

Materials

- [Living Terrarium Student sheet](#)
- [Sorting sheets](#)

Living, nonliving, and once living sorting sheets

Items for the sorting activity. There are many possibilities for items to sort. Try and have at least 5 -- 6 items for each category. Examples of living items are: a mealworm, a plant with roots, soil with microorganisms, and pond water with microorganisms and/or insect larvae. Examples for once living items are: piece of bark, dead grass, a dead insect, flour, wood, pine cone, bird feather, sea shell, and an apple. Examples for nonliving items are: rock, plastic animal, sand, spoon, pen, glass cup, penny, and bouncy ball.

1 tsp. of cornmeal in a Ziploc bag marked 'unknown 1', one per group

1 tsp. of fast acting yeast in a Ziploc bag marked 'unknown 2', one per group

2 tsps. of sugar per group

Warm water -- usually hot water from the tap will be the correct temperature (about 70 -- 80 degrees Fahrenheit)

Measuring spoons

Make a living/nonliving environment. Set up a terrarium or aquarium with a variety of living, once living, and nonliving items. For the living component you can have plants, crickets, worms, a frog, and/or fish. For the nonliving component you can have rocks, gravel or a plastic dish for water.

For the once living component you can have sticks, pinecones, or dead grass.

Background for Teachers

To be classified as a living organism, an object must be able to do all of the following activities: grow and change, organization (composed of cells), metabolism, homeostasis, response to stimuli, reproduction and adaptation. Be able to use energy by eating and/or, responding to its environment. For an organism to be classified as once living, an object must have been part of a living organism or is now dead. When a flower is plucked from a plant it is hard to distinguish between when it is considered alive and when it is now considered once living. An example of a nonliving object is an apple or a dead leaf.

A nonliving object may have some characteristics of living things but does not have all 5 of the characteristics. A car can move and use energy, which makes it seem alive, but a car cannot reproduce. An object needs to have all 5 characteristics of life in order to be classified as live. Examples of nonliving objects are cars, water, fire, and mountains.

Intended Learning Outcomes

- 1b. Sort and sequence data according to a given criterion.
- 1c. Make simple predictions and inferences based upon observations.
- 1d. Compare things and events.
- 3a. Know science information specified for their grade level.
- 3b. Distinguish between examples and non-examples of science concepts taught.
- 3c. Explain science concepts and principles using their own words and explanations.
- 4a. Record data accurately when given the appropriate form and format.
- 4b. Report observation with pictures, sentences, and models.
- 4c. Use scientific language appropriate to grade level in oral and written communication.

Instructional Procedures

Pre-lab discussion:

Show students a rock, a stick, and a mealworm. Ask the students which one is living, nonliving, and once alive. Ask students what it means to be alive. Have them come up with the five characteristics and write them on the board. Show the students the bags of yeast and cornmeal and have them predict if one, either, or both are alive. Have students make a prediction and discuss a way to experiment on their prediction.

Instructional Procedures:

I. Sorting Living, Once Living or Nonliving Objects

Take turns handing each student an item on the table. Have them decide if they should place the item on the living, once living or nonliving paper. Be sure and remind them we are making a hypothesis and that we might need to change their placements after we think some more.

After all the items are placed go through the following checklist and be sure that each item was placed in the correct group. Correct any wrong placements. Remember:

Does it breathe?

Does it eat?

Does it respond?

Does it reproduce?

Does it grow?

Is it living, once living or nonliving? It is important to realize that there is controversy over where to put such items as an apple or seed. Let the kids decide where it should go and realize there is no absolute correct answer on this.

II. Which One is Alive?

Have the students look at the two bags on the table and describe the powder that is inside each. (The powders are #1 corn meal and #2 yeast but don't tell them.) Ask the students if they think the powders are alive.

Add a teaspoon of sugar to each bag. Tell them that if the powder is alive, it needs to eat.

Add 2 tablespoons of warm to slightly hot water to the two bags. Tell them that if they are alive, they will need to have water.

Close up the bag and make sure there is some air left in the bag because if they are alive, they need to breathe.

Close the bag and observe the solutions for 5 minutes.

While they are waiting, discuss their observations and decide if they think either powder is alive. How will they know? Notice that bag #2 begins to have bubbles given off. The yeast is eating the sugar and giving off carbon dioxide as a waste product.

After the 5 minutes tell them what the two solutions are and which one is alive. Explain how each one fits into its own living vs. nonliving category. Yeast is alive but it was dormant until sugar and water were added. Cornmeal is not alive but was once part of a living corn plant.

III. Living and Nonliving Interactions in an Ecosystem

Look at the terrarium with a plant, frog, cricket, water, dirt, rocks etc. Discuss how the objects interact with each other. Things to discuss: Animals give off carbon dioxide which plants need; plants give off oxygen which animals need. Dirt, rocks and other structures provide food and shelter for the living organisms. Who eats who or what in this aquarium? Do we need nonliving items? Do nonliving items need us???

Make some predictions. If water dried up in the aquarium what would happen to the frog and plant? What would happen to the rocks? What if our environment got very cold or hot? What if there was no more light shining in the terrarium? How does this terrarium compare to a forest? For everything in the aquarium, decide if it is living, nonliving, or was once living.

Bibliography

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