

SCIENCE
Life Science
Grade 4
Classifying Objects

Overview:

This lesson will be used to teach students the skill of classifying objects. This skill will enable students to classify living things according to similarities and differences. Through guided and independent activities, students will be able to place objects into groups according to their characteristics. They will then make a poster or collage of living things classified into groups based on similarities and differences.

Lesson Duration:

This lesson will take 1-2 class periods to complete, depending upon the duration of a class period.

Benchmarks:

- | | |
|---------|--|
| LS-E-B2 | Observing, comparing, and grouping plants and animals according to likenesses and/or differences |
| SI-E-A1 | Asking appropriate questions about organisms and events in the environment |
| SI-E-A3 | Communicating that observations are made with one's senses |
| SI-E-A4 | Employing equipment and tools to gather data and extend the sensory observations |
| SI-E-A5 | Using data, including numbers and graphs, to explain observations and experiments |
| SI-E-A6 | Communicating observations and experiments in oral and written forms |
| SI-E-A7 | Utilizing safety procedures during experiments |

Teacher Preparation:

- *Prior to lesson:* For about two weeks before this lesson will be taught, have students cut out pictures of various living things from books or magazines to be used to make their poster. Be sure to have an assortment of plants and animals. These should be ready prior to beginning this lesson set.
- Gather the necessary materials listed below.
- Prepare to guide students through the “shoe classification” activity in exploration 1.

- Carefully monitor as students practice independently through exploration 2.
- You may allow students to make a poster/collage illustrating the similarities and differences in the pictures of the living things at their desks.

Teacher notes on content

Important terminology and ideas included in this lesson are:

1. **Classify**- to organize objects according to how they are alike and different
2. **Organism**- a living thing
3. **Cell**- the basic unit of an organism
4. **Bacteria**- organisms made of one cell that can be seen through a microscope
5. **Protists**- organisms that live in wet places and have one or more cells
6. **Fungus**- an organism, such as a mold or mushroom, that gets food from dead material or by growing on foods or living things
7. **Plant**- an organism made of many cells that can make its own food
8. **Animal**- an organism made of many cells that cannot make its own food
9. **Producers**- organisms that make their own food; plants
10. **Consumers**- organisms that must eat or consume their food
11. **Carnivores**- animals that eat other animals
12. **Herbivores**- animals that eat plants
13. **Omnivores**- animals that eat both plants and other animals
14. **Terrestrial**- organisms that live on land
15. **Aquatic**- organisms that live in water
16. **Vertebrates**- animals that have a backbone
17. **Invertebrates**- animals with no backbone
18. **Cold-blooded**- animals with a body temperature that changes
19. **Warm-blooded**- animals with a constant body temperature
20. All organisms are made of one or more cells.

21. All organisms have certain characteristics in common: growth and development, use of energy, and reproduction.
22. Because there are so many organisms on Earth, scientists have divided them into five groups based on their similarities and differences.
23. Scientists further classify plants and animals based on other characteristics, such as what they eat, where they live, how they get their food, and how their bodies are made.

Materials/Equipment:

Exploration 1

One shoe per student
Blank chart paper or chalkboard

Exploration 2

15 buttons of various size, shape, and appearance per group
Ziploc bags
Magnifying glasses or hand lens (optional)
Balances (optional)
Classification sheet
Microscopes (optional)
Prepared slides of cells (optional)

Activity 3

Pictures of various living things cut from magazines
Poster paper or chart paper
Ruler
Glue or paste

Set or Opener:

- Have students brainstorm a list of living things and record them on the board or overhead.
- Ask students why it would be helpful for scientist to put them into groups. Sample answers may include *organizing information, ease in identification, studying organisms in groups, or discovering which living things can live together.*
- Explain that we will come back to our list later to see if we can group these living things like scientists do.

Body of Lesson:

Exploration 1

1. Have each student remove one of his or her shoes and place it in the pile in the middle of the floor. Tell them to make observations about the different shoes and to record them on a sheet of paper.
2. Have one student volunteer to pick a characteristic of the shoes and divide them into two groups. Ask that student to explain how he or she decided which shoes would go in which group.
3. Ask for another volunteer to take one of the two groups that student one created and to separate those shoes into two groups based on a selected characteristic. Have this student explain what criteria he or she used to separate the shoes.
4. Continue to call on volunteers and have them separate the shoes into groups until every shoe is in its own group.
Possible basis for classification may include, but are not limited to:
 - shoes with laces and shoes without
 - left shoes and right shoes
 - tennis shoes and other shoes
 - white shoes and colored shoes
5. As a whole group, record how many shoes are in each group in a blank concept map/ dichotomous key on the board or overhead. Introduce the word **classify** at this point and ask students how they classify things in their everyday life. Accept answers (CD's, classes at school, food groups, etc.).

Exploration 2

1. Give each group of students a Ziploc bag containing 15 buttons of various size, shape, and appearance. Explain to the students that they will classify these buttons just like they did with the shoes.
2. Have them select a characteristic and divide the buttons into two groups based on that trait. Instruct them to record the two groups and how many buttons are in each on their data sheets. Then, they are to take each group and subdivide it into two groups based on a particular characteristic and record it until each button is in its own group. Record the number of buttons on their observation sheets.
3. Allow time for questions, and continuously walk around and monitor student group work. Have magnifying glasses and balances available for students to gather data about their buttons.

4. When all groups are finished, ask students what difficulties they may have encountered while they were classifying. Possible answers may include differences of opinion among group members, terminology to use, etc. Explain that scientists also have to deal with a lot of these same issues when they classify living things.

Teacher Explanation:

All living things are called **organisms**. Sometimes you cannot easily tell what is alive and what is not. In order to determine if something is alive, you can look at certain ways that all organisms are alike.

All organisms:

- grow and/or develop,
- use energy – need food,
- reproduce - make more organisms like themselves, and
- are made of one or more **cells**.

Cells are the basic units of an organism. The same way bricks make up a building, cells make up an organism. Most cells are so tiny you need to use a microscope to see them. (If available, you may have microscopes and prepared slides available for students to see cells at this point.) Pictures from a textbook or transparencies can also be used to illustrate.

Explain to students that there are millions of different kinds of organisms living on Earth. Because of this, scientists have divided these organisms into five groups based on their differences. These groups, called kingdoms, include **bacteria, protists, fungus, plants, and animals**. Reemphasize that all of these living things have certain things in common. It may not be necessary to go into great detail about the bacteria, protists, and fungi at this point, but students should be introduced to the terms. Explain that the class will focus on plants and animals.

One way that scientists classify organisms is based on how they get their food. Plants can make their own food and are called **producers** or **autotrophs**. Animals cannot make their own food. They have to get food from somewhere else. Animals are called **consumers** or **heterotrophs**.

Consumers are further divided into groups based on what they eat.

- Consumers that eat only other animals are called **carnivores**. Examples include hawks and tigers.
- Consumers that eat only plants are called **herbivores**. Examples include deer and rabbits.
- Consumers that eat both plants and other animals are called **omnivores**. Examples include monkeys and humans.

Another way that scientists classify organisms is based on where they live.

- Plants and animals that live on the land are called **terrestrial**. Examples include oak trees, dogs, and cats.
- Organisms that live in the water are called **aquatic**. Examples include water lilies and fish.

Plants can further be classified based on how they reproduce (flowers, seeds, cones), whether they make flowers, or whether they lose their leaves (deciduous/evergreen). Deciduous plants lose their leaves in the fall.

Scientists also divide animals into groups based on the presence or absence of a backbone. Animals without backbones are called **invertebrates**. Ask students for examples (worms, jellyfish, sponges, etc.) Animals with backbones are called **vertebrates**. Ask students for examples (bears, fish, gorillas, horses, etc.). Vertebrates are further divided into groups based on body temperature. **Warm-blooded** vertebrates, like humans, have a body temperature that remains constant. **Cold-blooded** vertebrates, like fish, have a body temperature that changes with its surroundings.

Activity 3 - Poster

1. Have students take out their pictures of living things.
2. On a poster board or chart paper, have them divide the page into the categories listed on the poster guide using a ruler.
3. Use the attached poster guide to help them organize their poster. Then, have them paste or glue their pictures onto their poster in the correct classification categories.

Closure:

Return to the list of organisms on the board that the students brainstormed at the beginning of class. Use the poster guide hand out and have them classify the living things into categories based on what they've learned about the classification of living things.

Data sheets, Lab sheets, Assessment: attached

Reference Links:

<http://www.ars.usda.gov/is/kids/>

<http://www.perspective.com/nature/animalia/index.html>

http://www.yahooligans.com/Science_and_Nature/

Assessment:

1. Scientists classify organisms in all of the following ways except:
 - A. where they live
 - B. whether or not they grow
 - C. how they get food
 - D. what they eat

2. Birds and fish are sometimes classified together because they both:
 - A. fly
 - B. live underwater
 - C. make their own food
 - D. have backbones

Constructed response: 4 pts

Name two ways that plants can be classified into groups and two ways that animals can be classified into groups.

Answer Key: Assessment on page 77

1. B
2. D
3. *KEY of possible correct answers:*

Plants

Flowering plants/non-flowering plants
Aquatic/terrestrial
Deciduous/nondeciduous
Cones/seeds
Number of seed parts
Root types
Stems types
Leaf shapes

Animals

Vertebrates/invertebrates
Warm-blooded/cold-blooded
Herbivores/carnivores/omnivores
Predators/prey
Body Covering