Overview: This activity focuses on how we distinguish things that are living from things that are not living. Students are encouraged to imagine a new species and to use the six characteristics of life to justify that the organism that they imagine is alive.

Science Standards

LS1 – All living organisms have identifiable structures and characteristics that allow for survival

Focus Question

What are the characteristics of life and how are they demonstrated by your organism?

Objectives

Through this lesson, students will:

- Think about how they know that something is alive
- Increase their familiarity with the characteristics of life
- Think about what tests or evidence would be necessary to demonstrate that an organism possess each of the criteria of life

Background

Although it is easy to name things that are living and things that are not living, it is harder to articulate the criteria that we use to make these distinctions. However, we must be able to recognize life in order to search for life on other planets or to understand whether the disease that is killing people is caused by an infectious organism or by a toxin in the environment. If we know the characteristics of life, we can make predictions about the behavior and properties of organisms that we have never seen.

The six characteristics that have been used to identify life are:

1. Acquires energy
2. Homeostasis (ability to sense and respond to environment)
3. Growth
4. Reproduction
5. Cells
6. DNA
Materials
11x17 paper
Markers, crayons, etc.

Preparation
Have the students block out areas in their poster that discuss each of the six characteristics, as well as a space to illustrate their organism and label the important features. Possible formats include having the illustration in the center and boxes for the characteristics around the outside or having the photo on one side of the poster and a grid of boxes for the characteristics on the other side.

Procedure
Encourage the students to imagine an organism and think about where it would live, how it would interact with its environment, and what characteristics they would need to see to conclude that it is alive. The attached sheet (student guide) provides a list of thought questions to prompt students to create additional detail for their organism. The thought questions are divided into questions pertaining to each of the characteristics of life in case students need additional guidance in specific areas.

Assessment
Assessment can be done by the instructor, but can be facilitated by peers. Have the student present their organism to the class or to a small group of students and demonstrate that their organism is, in fact, alive. By the completion of the activity, students should be able to articulate the six characteristics of life. Ideally, they will be able to articulate how the characteristics of life are demonstrated by the organism that they have created. A variety of assessments are possible, from a point-based scoring system based on the poster to qualitative feedback on their presentation.

Extensions
This activity is a natural set-up for talking about the differences between species. How do students know that their organism is a different species? What are the characteristics that separate one species from another?