

## Lesson 2: Invent an Alien

Lesson 1 provided students with an understanding of how astronomers use observations of Earth to infer information about other planets. In Lesson 2 students research and learn about the planets using language and art skills. They are asked to create a 3-D model of a creature that could live on one of the planets in our solar system. The scientific accuracy of their alien beings is not as important as the reasoning processes they go through to construct them.

### Concepts

Each planet in our solar system has unique characteristics. Creatures require specific adaptations to sustain life in their environment.

### Objectives

Students will:

- develop an in-depth understanding of one planet in our solar system, as well as a general overview of all the planets;
- use library and internet resources;
- construct a model of an alien being that could exist on another planet in our solar system; and,
- use divergent thinking skills and creativity.

### Materials

- Research materials (e.g. books, magazines, the Internet)
- Common items found around the house
- Small box or bag
- Planet name slips
- Astronomy Notebooks

### Procedure

#### *Advanced Preparation*

Write the name of each planet (except Earth) on separate slips of paper. It is desirable to have more than one slip for each planet so students can see that there may be different solutions to the same problem. Place the slips of paper in a bag or box.

Inform the school librarian that the students will be doing research on the planets in the solar system. The librarian may have materials other than books that students can use for their research—the more recent the publication, the more up-to-date the information. The Internet is also an excellent source of information, so a trip to the computer lab might be needed.

1. Have each student select a planet slip from the box or bag containing them. The students should not reveal to other members of the class which “world” they have.
2. Inform students that their goal is to construct a model of a creature that could live on the world they selected. These should be three-dimensional models made from any materials

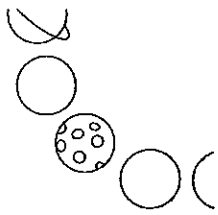
they can find around the house. Give students a week to 10 days to complete the task. Also ask them to write a half-page to full-page description of their alien being, stating why it has the characteristics they selected without revealing the name of the planet.

3. Discuss some of the requirements for a “being” to exist in any given world. Help students brainstorm a list of needs that creatures require for survival. They should record these in their Astronomy Notebooks for use while doing research and during construction of their alien. These could include:
  - A means to get food
  - A way to move
  - A way to breathe
  - A way to reproduce
  - A means to maintain proper body temperature
  - Other means to sense the environment (equivalent to our five senses)
  - Other suggestions they may have, such as the effects of a gravitational pull that is much larger or smaller than we experience

**Teacher Note:** You may find this is a good discussion to have again after they have researched the nature of their worlds, but before they actually start constructing their alien beings.

4. From their list of “needs” that aliens might have, students should produce a second list. This list should include the physical characteristics that they need to research about their planet so they can determine how their alien might meet the needs they have identified. This list might include:
  - Possible food sources (if plants probably could not grow, what is the alien going to eat?).
  - Moving around on the planet’s surface.
  - Breathing in the atmosphere.
  - Issues dealing with reproduction that might include availability of water, nest building materials, wind or intense solar radiation and population density constraints such as food.
  - Keeping warm or cool in a changing temperature environment.
  - If the planet spins on its axis, how the alien might sense changes in the environment, such as light and dark, temperature, atmosphere, etc.
  - How the planet’s size will affect the gravitational pull and how this will in turn affect the alien’s body structure.

This activity will require that the students use the resources available at the school, at home and in the community to determine the characteristics of the planets. If possible, you should examine what references the libraries in your area have. Good resources could include:



- Encyclopedias (preferably no more than three years old)
  - Odyssey Magazine, National Geographic, Astronomy Magazine, Mercury Magazine
  - Recent books and videos about the planets (less than five years old)
  - The Internet, especially NASA Web sites
5. On the day that the alien beings are due, have students put their models on display around the room with their description placed in front of their alien. Remind students that their descriptions should not name the planet of their creatures.
  6. Allow students the opportunity to examine each other's alien beings. Have them try to determine which planet they think each one comes from. This part of the activity can also be done as an oral presentation.
  7. After the alien beings are reviewed and their home worlds revealed, have students talk about the difficulties they experienced designing life for other worlds. Remind them that we have many different life forms on Earth, so there should be many possible creatures that could live on each of the planets. Discuss with the students some of the possible reasons why our space probes have not found evidence of life elsewhere in the solar system.

