# What's a Planet?

The definition of a "planet" is being debated by the planetary science community, in part, because of newly discovered celestial bodies in the outer parts of our solar system and celestial bodies in orbit around distant stars.

In 2006 the International Astronomical Union defined a planet as "a celestial body that: (a) **is in orbit around the Sun**; (b) has sufficient mass for its gravity to overcome rigid body forces so that it **has a nearly round shape**; and (c) **has cleared the neighborhood around its orbit** (there are no other bodies of similar size in its orbit).

Upsetting to many small children the world over, the new definition caused Pluto to be booted out of the planet category and into the category of "dwarf planet." It also resulted in further debate among planetary scientists. Stay tuned, the definition is being revisited!

In the mean time, this activity will familiarize your child with what makes a planet a planet!

What You Need:

- 6 cardboard boxes with lids (shoeboxes will work for small groups of children, Xerox paper boxes are appropriate for larger groups)
- Scissors
- Paper or foil to cover boxes (optional)
- Tape
- Index cards
- Markers
- Box 1: 1 4 to 8 inch rubber ball or other seamless ball
- Box 2: thin smooth string or fishing line, one large yellow pom-pom or a cut out of the Sun, two small, dark-colored pom-poms or other representatives of smaller planets, two 2-inch pieces of drinking straw
- Box 3: strong flashlight, thin string or fishing line, dark-colored pom-pom
- Box 4: tennis-ball sized lump of modeling clay (the stiffer the better)
- Box 5: soft-ball sized lump of modeling clay.
- Box 6: cardboard plate, 2-3 cans of play-doh or modeling clay
- Box 7: flashlight, thin string or fishing line, dark-colored pom-pom, one 2-inch piece of drinking straw

Preparation:

Cut a three-sided flap in the side of each box that is large enough for an adult hand to easily pass through. Alternatively, cut a square or circle large enough for an adult hand to pass through

If you wish, cover the boxes in foil or paper to give them a uniform look.

- Box 1 Place a seamless ball such as child's rubber ball. Place a card on the outside of the box that says *No Peeking! Use your hands to feel the shape of the object inside.*
- Box 2.
  - Attach a large yellow pom-pom or a cut out of the Sun to a five inch string. Attach the other end with tape to the center of the top of the box, so that the Sun hangs down into the box when the lid is closed.
  - Cut a thin almost-complete circle, about 5 inches in diameter into the top of the box. The circle should be centered around the hanging yellow pom-pom. Leave the last three inches uncut so that the cardboard circle is firmly attached to the box. Repeat for a ~7 inch diameter circle (diameters can vary depending on the box size). The cuts need to be fairly smooth.
  - Attach a small dark pom-pom to the end of a 5 inch string. Repeat with a second pom-pom. Stick the opposite end of one of the strings through the 5 inch diameter "circle" and knot it around one of the straws at the box top so that the string does not pull through when tugged on from the inside of the lid. Repeat with the other string and straw for the second "circle." When the lid is placed on the box, the pom-poms should hang down in the box, at about the same level as the Sun. They should be able to be pulled along the circle from the top, simulating planets going around the Sun when looking into the box. You may need to adjust the size of the cuts or the attachment of the string.
  - Place a card on the outside of the box that says *Look in here! What do you see?*
- Box 3. Cut a hole on the side of the box opposite the viewing flap that will tightly fit the lighted end of the flashlight. Suspend a dark pom-pom on a string from the center of the top of the box. Place a card on the outside of the box that says *Look in here! What do you see?*
- Box 4 set-up: Shape the modeling clay into a very irregularly shaped asteroid. Place a card on the outside of the box that says *No Peeking! Use your hands to feel the shape of the object inside.*
- Box 5 set-up: Shape the modeling clay into a relatively smooth sphere. Make a second shape, using about a quarter-sized amount of modeling clay, into a smaller irregularly shaped asteroid. Place a card on the outside of the box that says *No Peeking! Use your hands to feel the shape of the object inside.*

- Box 6 set-up: Place a half-inch layer of clay on the plate. With your fingers, create a "Mercury" landscape of large and small craters that are obvious enough for a child to recognize by touch. Place a card on the outside of the box that says *No Peeking! Use your hands to feel the shape of the object inside.*
- Box 7 set-up: Cut a hole on the side of the box opposite the viewing flap that will tightly fit the lighted end of the flashlight.
  - Cut a thin semi-circle, about 6 to 8 inches in diameter into the top of the box, leaving the uncut part on the side *closest to the flashlight*. (Diameters can vary depending on box size.)
  - Attach a small dark pom-pom to the end of a string. Stick the opposite end of one of the string through the semi-circle cut and knot it around a straw at the box top so that the string does not pull through when tugged on from the inside of the lid. When the lid is placed on the box, the pom-pom should hang down in the box in front of the flashlight. It should be able to be pulled along the semi-circle from the top, simulating partial orbit of a planet when looking into the box. You may need to adjust the size of the cut or the attachment of the string. Suspend a dark pom-pom on a string from the center of the top of the box. Place a card on the outside of the box that says *Look in here! What do you see?*

What to Do:

- Invite your child to imagine they are in a spacecraft adventuring far, far, from our own solar system. Suddenly they see a something in their spacecraft window. Is it a planet?

  *Ask your child What makes a planet a planet?*
  *What do you think the characteristics of a planet are?* (Answers will vary, but you can prompt discussion by asking them to name some planets, or by asking how a planet and a moon and a star are different.)
- Invite your child to explore the mystery boxes with you to unravel the characteristics of planets. At each station, help your child to follow the directions to either look inside or to not look, but feel the shape of what is inside.
- At each station, answer the questions on the "What's a Planet?" sheet.
- After you have visited all of the boxes, invite your child to share what they have learned.

  *What makes a planet a planet?*
  *What is its shape?*
  *Does it make light?*
  *How is a planet different from an asteroid?*

# Parent Guide - What's a Planet? - Parent Guide

Explore each of the boxes around the room with your child. Each box has instructions to follow. Have your child write their response on their card – or write their answer below. The answer to each question is beside the question in parentheses.

**Box #1**
Reach into the box. What shape is the object that you feel? In general, planets are also this shape.

Planets tend to be _____ in shape (spherical or round).

**Box #2**
Looking into the box – what is the name of the object that the planets are circling or orbiting?

To be a planet, it must orbit a _____ (star).

**Box #3**
Looking at what is in the box, do you think that a planet makes its own light?

What provides light to a planet? A _____! (star)

Our star, the _____ gives our planet Earth its light (Sun). *No planet makes its own visible light.*

**Box #4**
Reach into the box what shape is the object you're feeling? – Would this represent an asteroid or a planet? Why?

Unlike planets, asteroids have a shape that is _____ (irregular / not round). *While there is not formally part of the definition of a planet, planets tend to be large and round and asteroids tend to be small and irregular.*

**Box #5**
Feel both objects in the box, which one might best represent a planet (small and slightly irregular or the larger, round object)

Planets tend to be _____ and _____. (large and round). *While not part of the definition of a planet, this describes the planets in our solar system.*

**Box #6**
Feel the surface in the box. It is a model of the surface of Mercury. Describe the features you feel – what is the surface of Mercury like? _____
_____(children may mention rocky, round, craters, bumpy….)

**Box #7**
How have scientists found planets orbiting other stars? _____

*Sometimes planets are found when they move between our telescopes on Earth (and in space!) and the star they are orbiting. The light from the star dims just a bit – and scientists detect this light change. (Most astronomers detect planets by observing very small "wobbles" in stars caused by the gravitational pull of planets as the whole system moves around a common center of gravity).*

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