

Blast Off! **Explore the Solar System and Beyond**

This program includes a book and a joint activity to begin followed by a series of stations and activities through which children can rotate without a fixed schedule. The activities work for K through Grade 5, but are especially suited to Grades 3 – 5. I like to start

Before program: Play music while everyone gathers – Holst “Planets Suite” or Theme from 2001: A Space Odyssey.

Book: Begin by reading a book to the group. *Lucky 13: Survival in Space* by Richard Hilliard or *Boy, Were We Wrong About the Solar System* by Kathleen Kudlinski.

Group Activity: Fun With Solar System Sizes

From *Out of This World Astronomy: 50 Amazing Activities & Projects* by Joe Rhatigan and Rain Newcomb, p. 90

Demonstrate relative distances in the solar system using a roll of toilet paper.

Preparation: Let 1 A. U. (astronomical unit – the average distance between the Earth and the Sun) equal 10 sheets of toilet paper. In this scale, Mercury will be on the 4th sheet, Venus on the 7th, Earth on the 10th, Mars on the 15th, Jupiter on the 52nd, Saturn the 96th, Uranus the 192nd, Neptune the 301st, and Pluto on the 394th sheet. Mark the planets on the appropriate sheet of the roll of TP and roll it back up.

Activity: Explain the A. U. and the activity. You’ll need a long, straight space. Simply walk out the distance as you unroll the toilet paper. You could have one person stand at each planet as you go to make it easier to see the relative distances.

Variation: Pace out the distances. One person is the sun. Everybody else starts counting steps as they move away from the sun. Leave one person standing at the space for each planet.

Mercury: 10 paces from sun

Venus: Additional 9 paces

Earth: Additional 7 paces

Mars: 14 more paces

Jupiter: Additional 95 paces

Saturn: Additional 112 paces

Uranus: Additional 249 paces

Neptune: Additional 281 paces

Pluto: Additional 242 paces

Total paces: 1019! From:

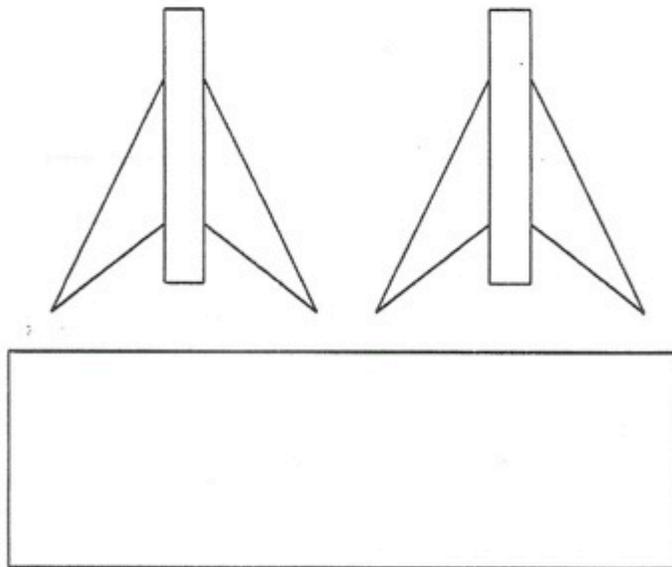
(<http://www.noao.edu/education/peppercorn/pcmain.html>)

Station #1: Soda Straw Rocket

I copy two sets of templates to a sheet of paper and set out the directions separately. After they make the rocket, they can try to hit a target (a picture of the moon?) Explore trajectory, force of propulsion, etc.

Soda-Straw Rocket Template

1. Carefully cut out the rectangle. This will be the body tube of the rocket. Wrap the rectangle around a pencil length-wise and tape the rectangle so that it forms a tube.
2. Carefully cut out the two fin units. Align the rectangle that extends between the two fins with the end of your body tube and tape it to the body tube. Nothing should stick out past the body tube! Do the same thing for the other fin unit, but tape it on the other side of the pencil, so you have a "fin sandwich".
3. Bend the one fin on each fin unit 90 degrees so that each fin is at a right angle to its neighbor. When you look along the back of the rocket, the fins should form a "+" mark.
4. Using the sharpened end of your pencil, twist the top of the body tube into a nose cone. Measure your nose cone from its base to its tip and record the length on your Data Log and on the rocket itself.
5. Remove the pencil and replace it with a soda straw. Blow into the straw to launch your rocket! Record the distance it travels on your Data Log.



Courtesy...John Callas (JPL)

Station #2: Solar System Scavenger Hunt

Post pictures of the sun and planets throughout the children's area of the library with small stickers nearby. Give participants a list of planets with facts about each. They search for the pictures to match their list, taking a sticker to mark on their sheet as they find them. (We used extra small round stickers in various colors.)

Information for sheet:

- **The Sun:** The Sun is our closest star. It is the largest object in the solar system and all eight planets revolve around it. If it were hollow, it would be able to hold 1.3 million Earths. The Sun's energy is responsible for life on Earth.
- **Mercury:** The temperature on Mercury ranges from 750 F during the day to -300 F at night.
- **Venus:** Sometimes Venus is called the Evening Star or the Morning Star because it can be easily seen during those times, but it is actually a planet. Venus is covered in clouds, but those clouds are made up of poisonous sulfuric acid rather than water.
- **Earth:** Earth is the only planet in our solar system that has water on its surface and in its sky. It is located 93 million miles from the sun, making it perfect for sustaining life.
- **Mars:** Like Earth, Mars has ice caps on its north and south poles. We believe that liquid water used to flow on Mars' surface, just like our lakes and rivers.
- **Jupiter:** Jupiter is the largest planet in the solar system. It is made up of hydrogen and helium gas rather than soil and rock. All of the four furthest planets from the Sun are called "gas giants". Jupiter is currently known to have 66 moons.
- **Saturn:** Saturn is known for its large rings, which are made of many chunks of ice and rock. The chunks range in size from a grain of sand to as big as a house.
- **Uranus:** This gas giant is turned on its side. Its south pole is currently experiencing 42 years of constant sunlight while the north pole has 42 years of complete darkness.
- **Neptune:** Neptune is too far away from Earth to be seen without a telescope. Though Galileo first saw it nearly 400 years ago, he thought it was a star. Two centuries passed before it was discovered to be a planet.

Station #3: Constellation Identification

Materials needed:

cardboard tubes (from wrapping paper, foil wrap, etc.)

rubber band

1 piece of black construction paper for each tube

additional paper in your choice of colors

star and other stickers/or crayons

glue

Angela Critics – Stem Made Simple Assignment 3

Directions:

1. Cover the outside of the tube with the paper color of your choice and decorate with stickers or crayons.
2. Using the black construction paper, cut out a circle with a 6-8 inch Diameter for each constellation.
3. In the center of the black circles, draw the points (stars) of the constellations (i.e. the “Big Dipper” or any interesting constellation).
4. Use a pin or the point of a sharpened pencil to punch a small hole through each of the drawn points.
5. Wrap the circle over the tube and secure it with a rubber band.
6. Look through the tube at a light to see your constellation.

Have available answer keys showing each constellation with its name. Participants look through the tube and match what they see to the constellations on the key.

Station #4: Create An Alien

Materials: Wide variety of potential building materials including newspaper, plastic bottles, boxes, cans, feathers, fabric scraps, netting, dowels, straws. The goal is to have a variety of strengths, weights, etc. Tape (scotch tape, masking, duct), glue, twist ties and any other kind of fastener you can think of.

Index cards with planet characteristics:

- 1.
- 2.
- 3.
- 4.

Participants draw a card with a description of a planet. They design and build an alien suited to that environment.

(Allow time at the end of the program for them to share their creatures if they would like.)