

TAKE & MAKE KIT

Solar System

TIME: 1 hour | Contains small pieces

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What's in this kit?

The solar system is a collection of planets, moons, asteroids and other amazing celestial objects that orbit the sun. We live on the planet Earth, one of the 8 main planets in our solar system. Twice a year, as the Earth is traveling around the sun, it spins and faces the sun closer than any other time of year. In the summer this is known as the Summer Solstice and it happens around the month of June. Let's make a model of the solar system and learn more about the summer solstice.

You will learn:

- Solar system
- Summer solstice
- Planets
- Orbits

Let's Get Started!

Materials

Cardboard
Bamboo skewers
Toothpicks
Paper clips
Planet labels
Black string
Paper lantern

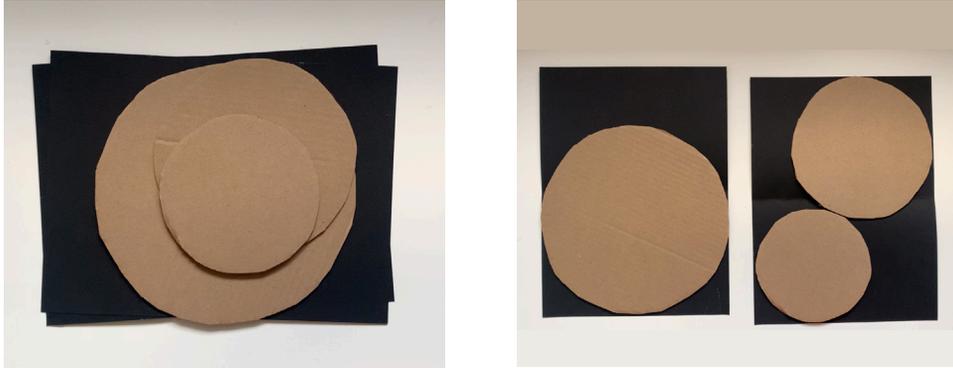
Pom poms
Pipe cleaner
Bamboo chopstick
Push pin
LED light
Sidewalk chalk

Tools

Scissors
Glue/Tape

Step 1 - Create the base for the solar system

Take the three cardboard circles and trace them onto the black paper. Cut out the circles and glue or tape them onto the cardboard.

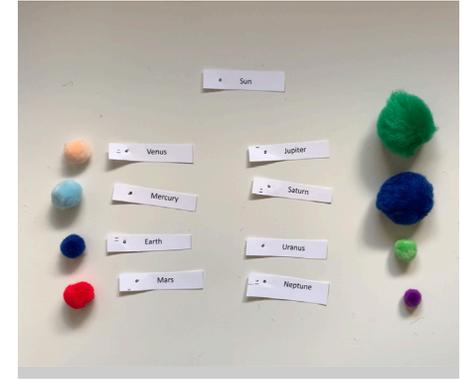


Draw stars and constellations using the chalk to create the feeling of outer space.



Step 2 - Assign the planets

There are 8 main planets in our solar system. There are a few smaller dwarf planets like Pluto in our solar system too! We will use a variety of craft pom pom balls to represent the planets.

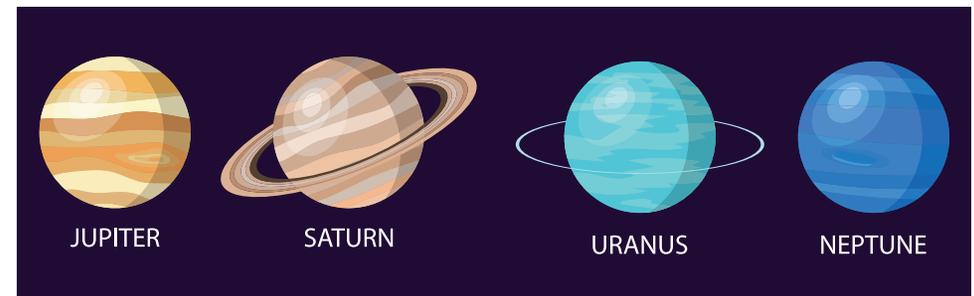


Use the chart below to help decide what size and color you want to use for each planet.

The rocky planets:

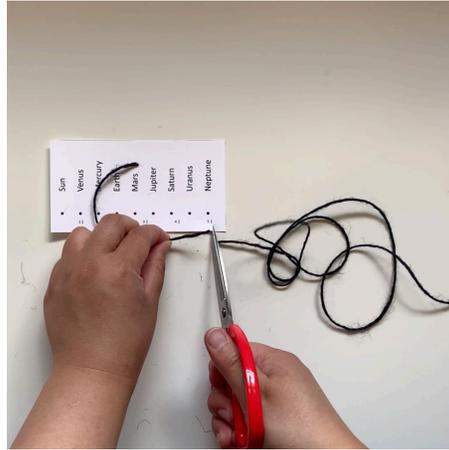
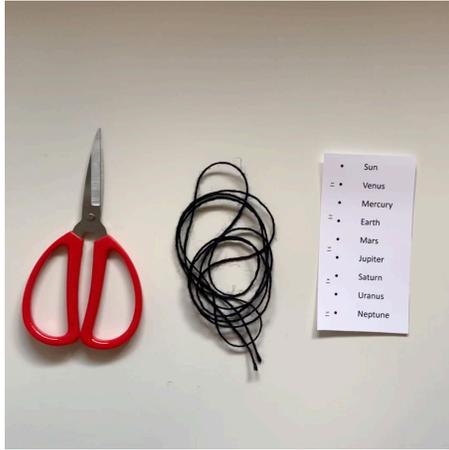


The gas giants:

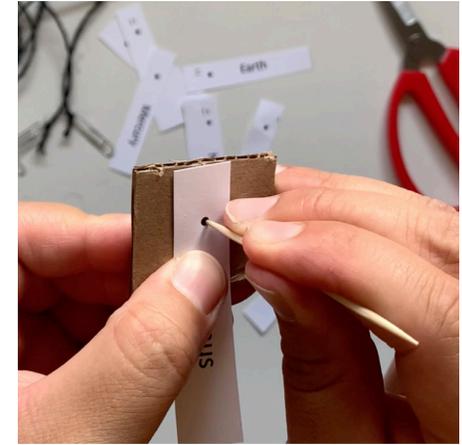
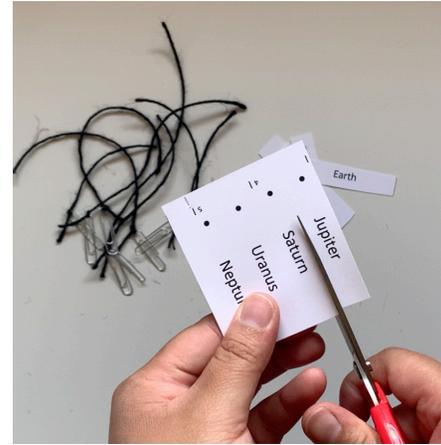


Step 3 - Design and label the planets

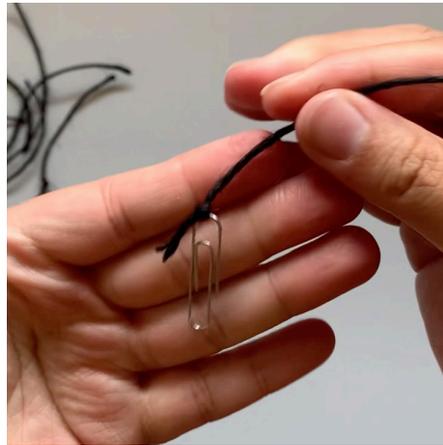
Cut your string into 2 four inch pieces, 2 five inch pieces, 3 six inch pieces and 1 seven inch piece. There is a ruler on the edge of the planet labels if you do not have a ruler available. It is marked at 1 inch increments.



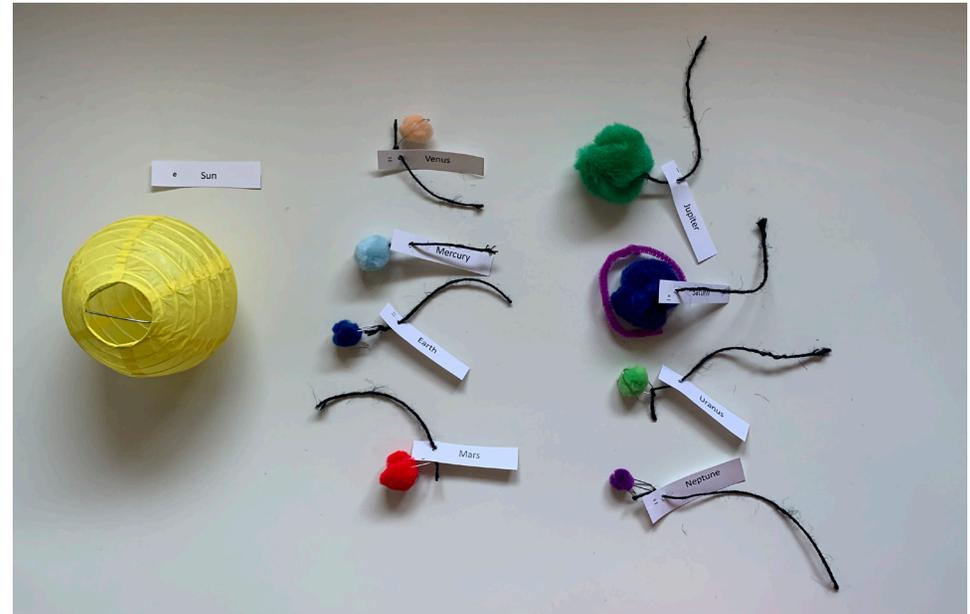
Cut out each planet label and use a skewer or toothpick to pierce a hole into the designated spot.



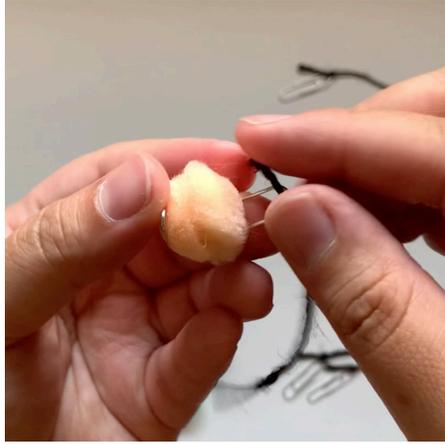
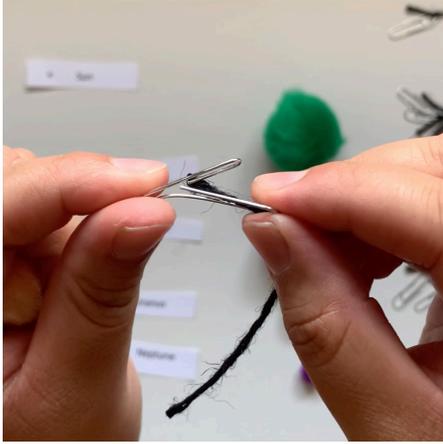
Tie each string onto a paperclip.



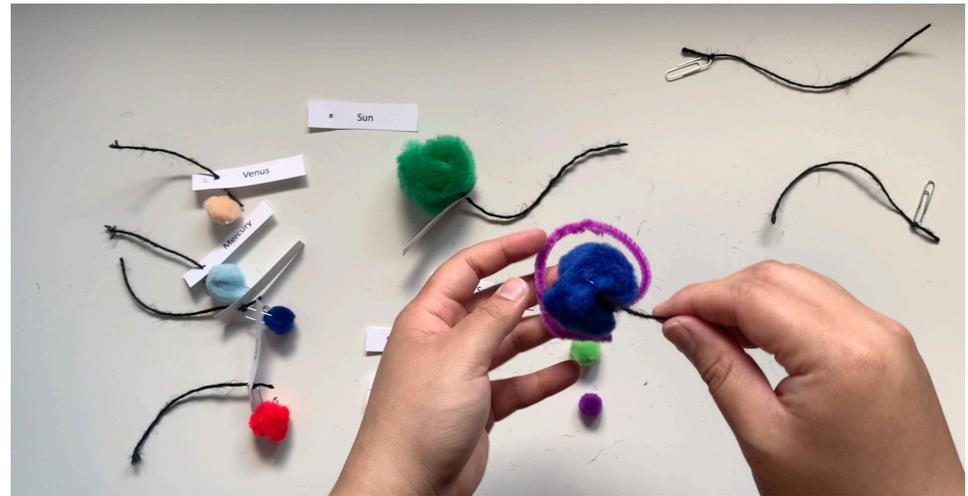
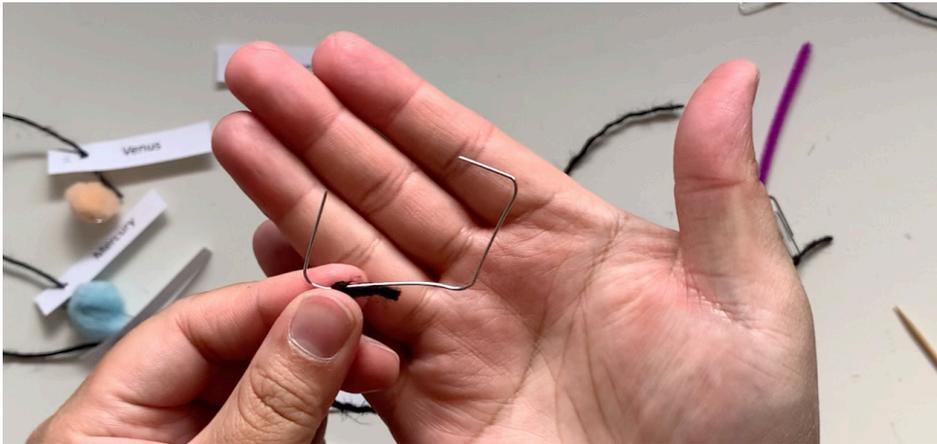
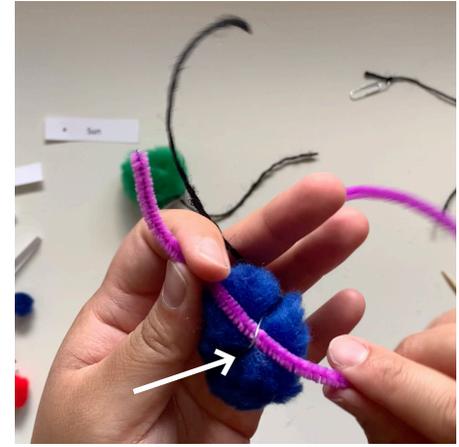
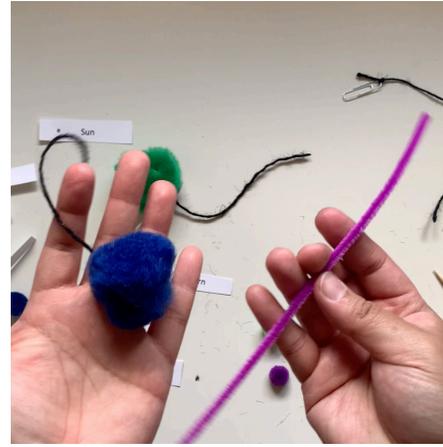
Add Venus and Mercury to the 4 inch strings, Earth and Mars to the 5 inch strings, Jupiter, Saturn, and Neptune to the 6 inch strings, and Uranus to the 7 inch string.



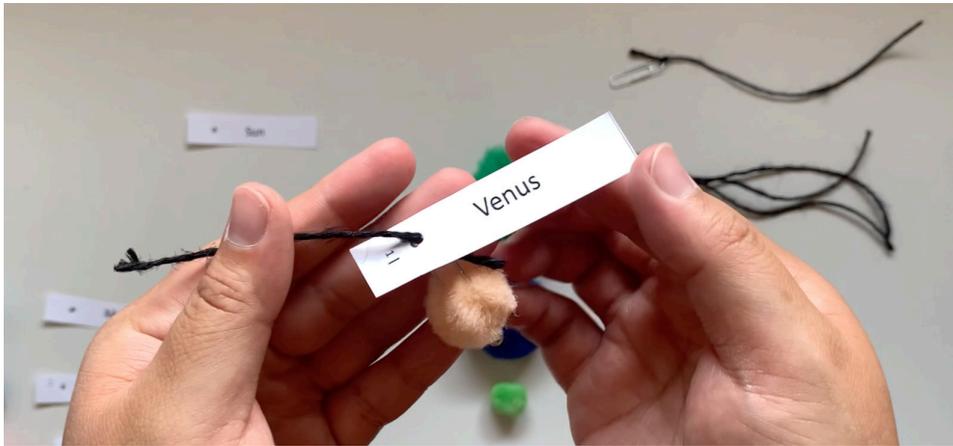
Take a paperclip and bend it to create a clamp which helps secure the pom pom. Place the pom pom in the center and then squeeze the paperclip to hold the pom pom in place. For the larger pom poms you can bend an extra arm of the paperclip to give you more to work with.



Although all four gas giants have rings, Saturn's rings are most visible. Use the pipe cleaner to create the rings of Saturn. Secure it to the paper clip and bend and wrap it around the pom pom.



Add the labels onto the planets.

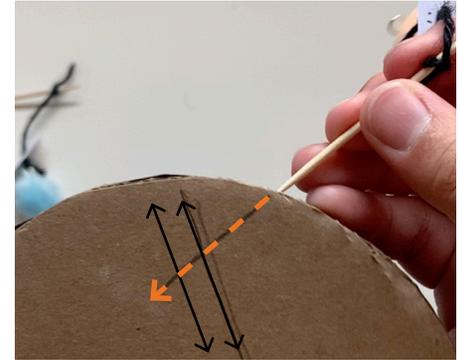
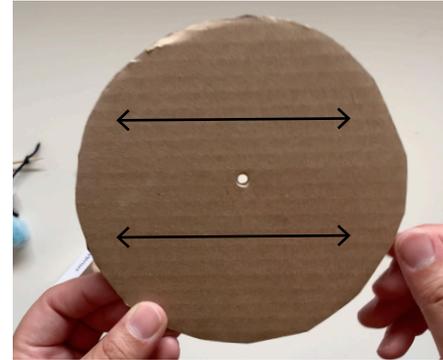


Tie the other end of the string to a toothpick except for Neptune. Tie Neptune onto a skewer.

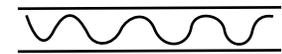


Step 4 - Arrange the planets

You may want to ask an adult for help on this step. Carefully insert the toothpicks into the cardboard. For best results go across the flutes of the cardboard so the toothpicks are piercing through the layers.



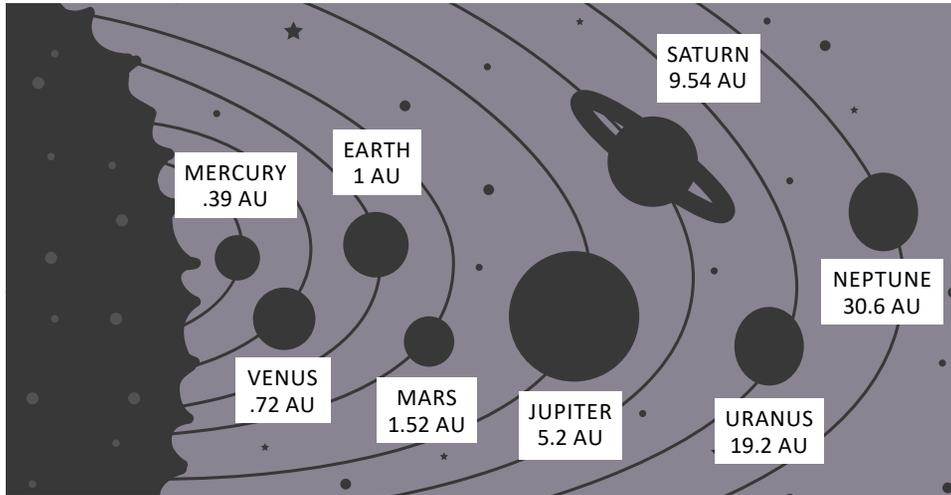
Cardboard is made with structural channels called flutes which create this wavy shape in between layers.



Add Venus and Mercury to the smallest cardboard circle. Add Earth and Mars to the middle cardboard circle. Add Jupiter, Saturn, Uranus and Neptune to the largest cardboard circle. For Neptune you can insert the skewer in between the flutes and adjust how far out Neptune will float.



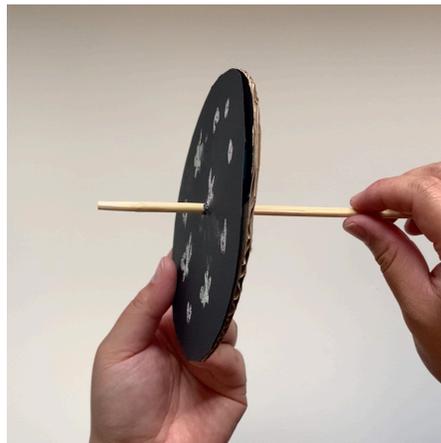
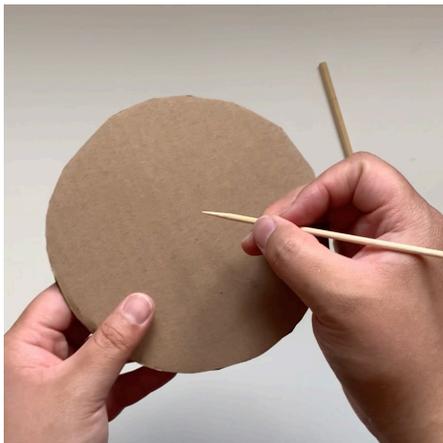
Refer to this chart to find out more about the actual distances of the planets from the sun in astronomical units.



Step 5 - Prepare the layers

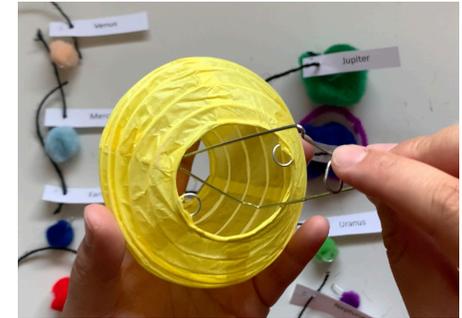
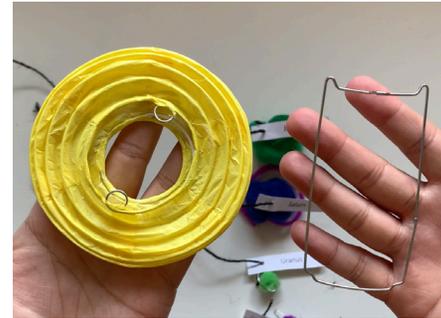
Take a skewer and pierce pilot holes through the center of all the pieces of cardboard. This includes the small square cardboard pieces. Be careful, the skewer is sharp! You can protect yourself and your work surface with a cutting mat or bath towel for this part.

Take your chopstick and make all the holes wider. Set these layers aside for assembly.

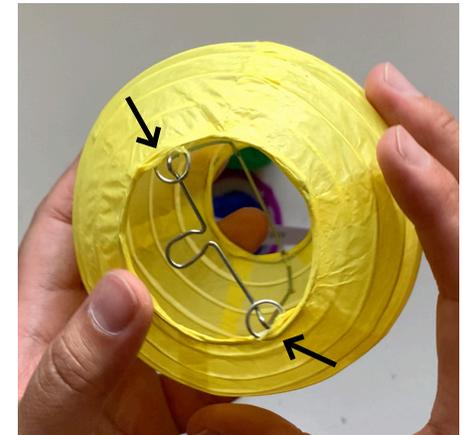
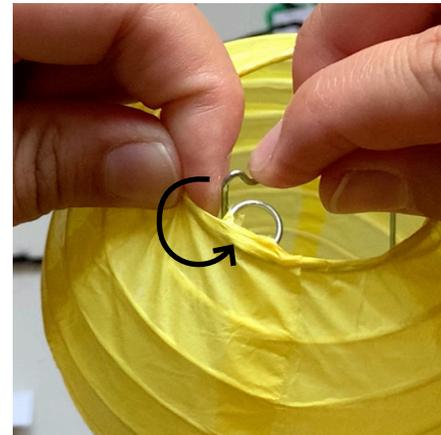


Step 6 - The planets orbit the sun

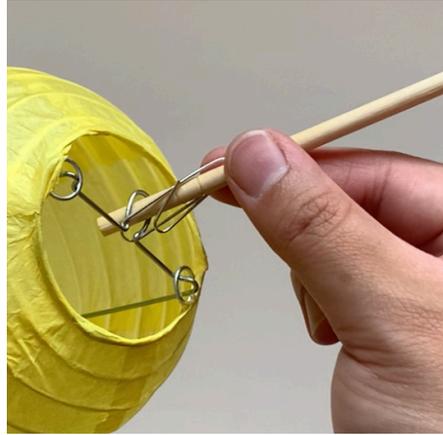
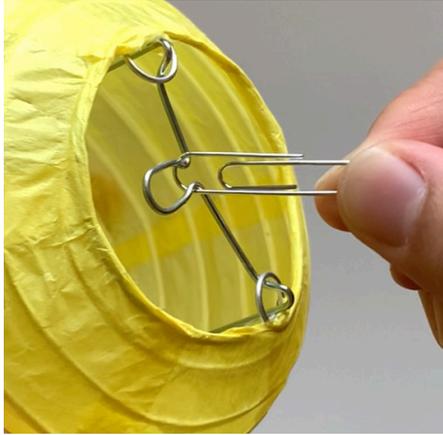
Open the yellow paper lantern that represents the sun. Insert the rectangle wire frame into the paper lantern with the hook facing the top where the prongs are.



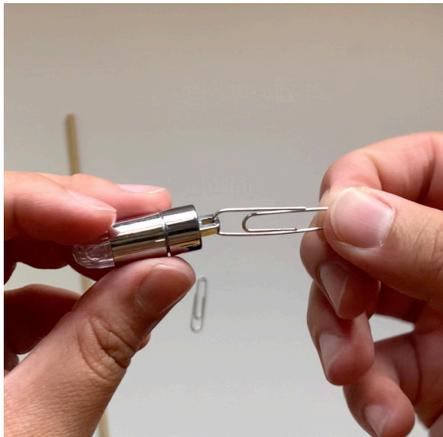
You may need to squeeze the frame to help it fit through the hole. Insert the tips of the frame through the prongs.



Slide a paperclip through the hook of the lantern frame. Twist the paperclip around the tip of the chopstick. If you have tape handy, secure this with some tape - or skip the bending and tape the paperclip onto the chopstick.



Take another paperclip and slip it into the top of the LED light.



Wait until you're ready to turn it on before you slip it onto the hook of the paper lantern.

Step 7 - Assemble your model

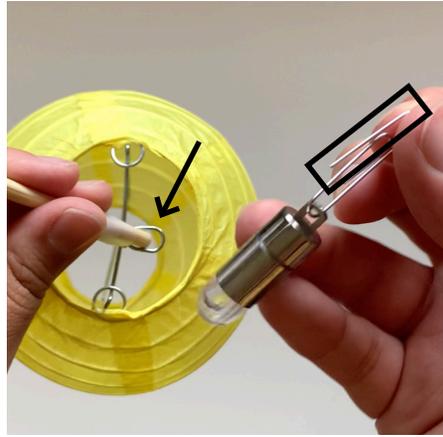
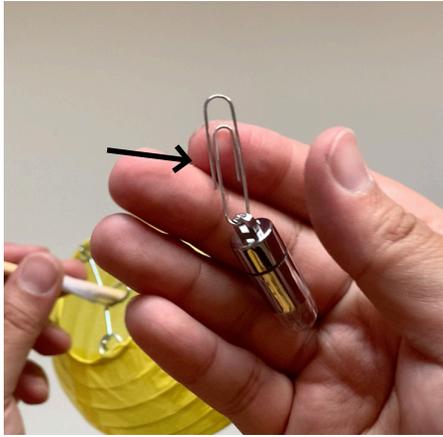
With the sun securely at the bottom of the chopstick you can now slide on the smallest cardboard circle, decorated side down. Add two of the square cardboard pieces to act as spacers between each layer.



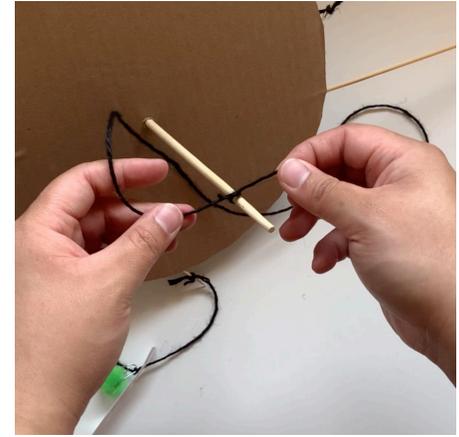
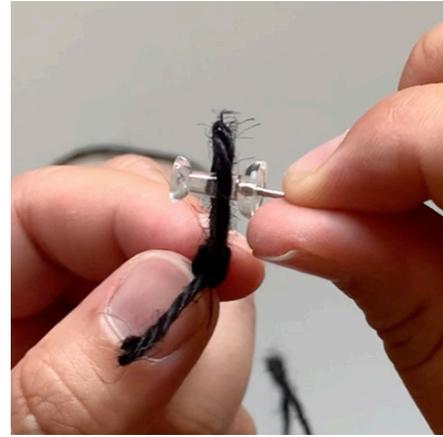
Slide on the middle layer. Add two more square spacers. Then add the final layer.

Just like the planets that orbit around the sun, you can rotate each layer and experiment with how your model planets orbit the sun.

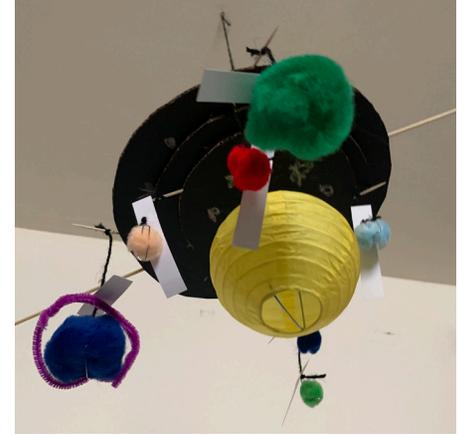
Remove the plastic band around the LED light. Screw it tight to activate the light and then slide it onto the hook of the paper lantern.



Tie one end of the remaining black string you have onto the push pin and the other to the top of the chopstick. Secure with tape if necessary.



You did it! You created a model of the solar system. Have an adult help you hang your solar system model from a high place to get the full effect.



Did you know?

Our solar system used to have 9 planets but over time the planet Pluto, which was once a full planet, was re-classified as a dwarf planet. A dwarf planet is different from a regular planet because it has not cleared its orbit. We currently have 6 dwarf planets in our solar system.

Challenge!

Our solar system is full of many celestial objects. How many more can you add to your solar system model? What about an asteroid belt? How about comets, moons or more dwarf planets like Pluto. What can you use to represent them in your model?

Go Beyond - Summer Solstice

Notice how the light hits the round planets at different angles. Because Earth is rotating on an axis as it orbits around the sun there will be times when parts of the planet will get more (or less) light during its journey around the sun. The longest day on Earth this year is June 20, 2021. This is called the Summer Solstice. On this day of the year, Earth's axis is tilted the closest it will ever be towards the sun. It happens twice a year in each hemisphere of the Earth.

See how the Summer Solstice works by observing shadows.



On sunny summer day, track how far shadows can grow. At the beginning of the day pick a spot outside and have a friend trace your shadow with a piece of chalk. Do this for every hour and watch how your shadow grows throughout the day. You can also pick an object's shadow to trace.

HANG OUT,
MESS
AROUND,
GEEK OUT.



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