WEEK 5

TEST YOUR MIGHT

EXPERIMENT: SOLAR SYSTEM HIGH STRIKER

Make your own high striker game just like at a carnival, then test your strength against gravity as you try to get a spaceship to reach the Sun!

MATERIALS

Dowel rod

Meter stick

Two milk jugs

Plastic container with a lid (such as yogurt, sour cream, etc.)

Two craft sticks

Straw

Tape

Nylon string (at least 8 feet)

Zip ties

Paper, Styrofoam or foil bowl

Paper shreds or confetti

Small, light weights (marbles, small toys, beans, etc.)

Heavy weights (cans, books, bricks, etc.)

Box cutter or drill

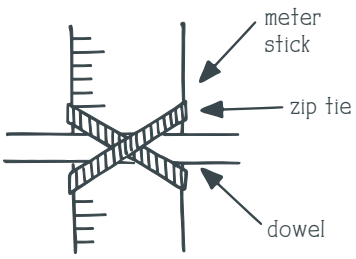
Scissors

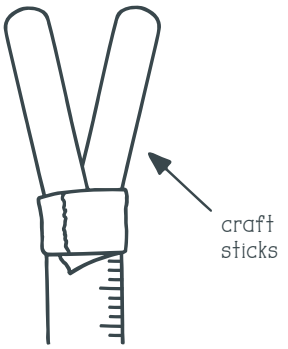
Paper, markers and other craft items

Solar system images (available at msichicago.org/summerbrain)

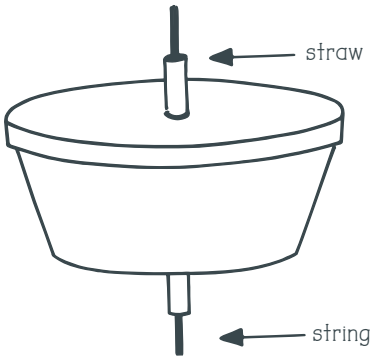
INSTRUCTIONS

Find a location near a wall or tree, somewhere with some height. Make a lever by attaching a meter stick perpendicular to the dowel rod using two zip ties in an X shape. Tape two craft sticks to one end of the meter stick so they extend out and form a V shape that will fit around the string. Fill the milk jugs with water, cap them and set them on the ground. Put the dowel rod through the handles of the milk jugs.



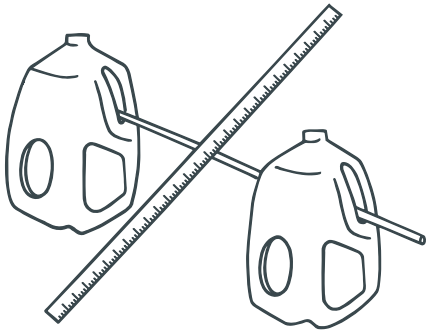


Make your spaceship by poking or drilling a hole in the top and bottom of the plastic container. Decorate the container to make it look like a spaceship! If the holes have rough edges, cut a length of straw that will extend through both holes and the center of your container and tape it into place. This will reduce friction. Thread the nylon string though the holes of your spaceship container. Make a launching pad base by holding down one end of the string with cans or other heavy weights.



Make the top of the high striker by poking a hole through the bottom of a bowl and threading the string through. The bowl is at the top of your high striker, so hold it in place by taping it to the

wall. Tape the top of the string to the wall above the bowl. Fill the bowl with confetti or paper shreds. Print the solar system game templates and tape them to the wall behind the string in this order, starting at the bottom: Neptune, Uranus, Saturn, Jupiter, Mars, Earth, Venus, Mercury and the Sun.

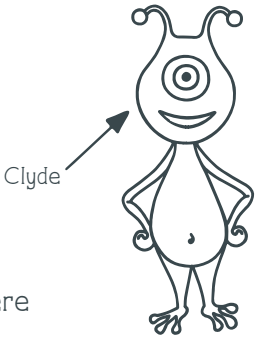


To play, put the spaceship container on the launching pad base and place the V-shaped lever arm under the container. Launch by hitting the other end with your hand or by pressing down. Can you make it all the way to the Sun?

GAME ON

Clyde the Alien (named for Clyde Tombaugh, the discoverer of Pluto) needs to gather resources from each of the planets in the solar system before delivering them all to the Sun. Make your spaceship stop at each planet to collect the resources below; each one is a significant compound found on each planet. At each stop, add one small item like a marble or bead to your container to represent the resources. Can Clyde get everything and reach the Sun?

NEPTUNE: Solid icy methane from the atmosphere
URANUS: Hydrogen from the atmosphere
SATURN: Icy water from Saturn's rings
JUPITER: Helium from the atmosphere
MARS: Iron oxide from the surface
EARTH: Silica from the outer crust
VENUS: Carbon dioxide from the atmosphere
MERCURY: Oxygen and sodium from the atmosphere



TIPS

Nylon string works best because its smooth surface creates less friction. You can use other string, but it may be more difficult for the spaceship to fly high.

Try raising the milk jugs up on a stack of books or a box to help your spaceship fly higher.

MORE WAYS TO PLAY WITH GRAVITY

Experience other forces at work in MSI's *Science Storms* exhibit. You can experiment with the movement of granular materials in the Avalanche Disk or change the angle and velocity of a tennis ball that you launch across the balcony.

LIKE THIS ACTIVITY?

You could be a ...

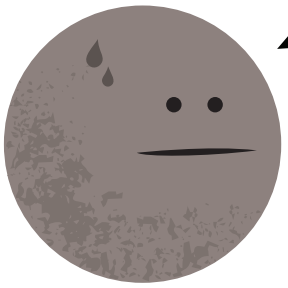
- Mechanical engineer
- Astronomer
- Planetary scientist
- Astronaut

WHAT'S HAPPENING?

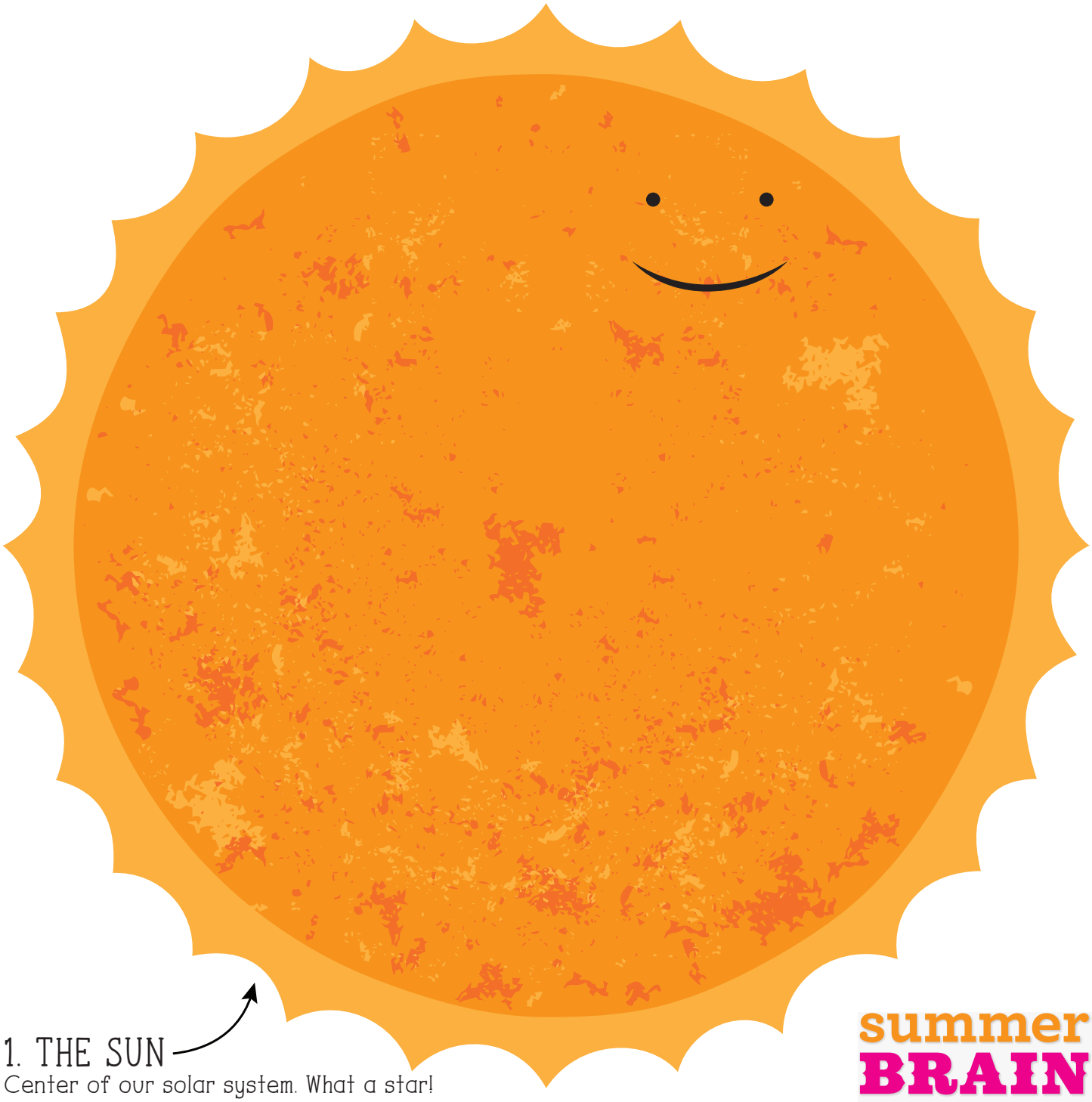
The high striker uses the weight of the container to measure how powerful you are. Weight is caused by gravity, a force of nature that pulls everything towards the Earth. Gravity pulls on mass, or how much "stuff" something is made of, which means it weighs more. Adding more mass to the spaceship container – by adding marbles or other weight – means that more force has to be used to send it up. Launching a container with a bunch of stuff inside to 5 feet takes more force than launching an empty container to the same height.

THE SOLAR SYSTEM

1. THE SUN
2. MERCURY
3. VENUS
4. EARTH
5. MARS
6. JUPITER
7. SATURN
8. URANUS
9. NEPTUNE

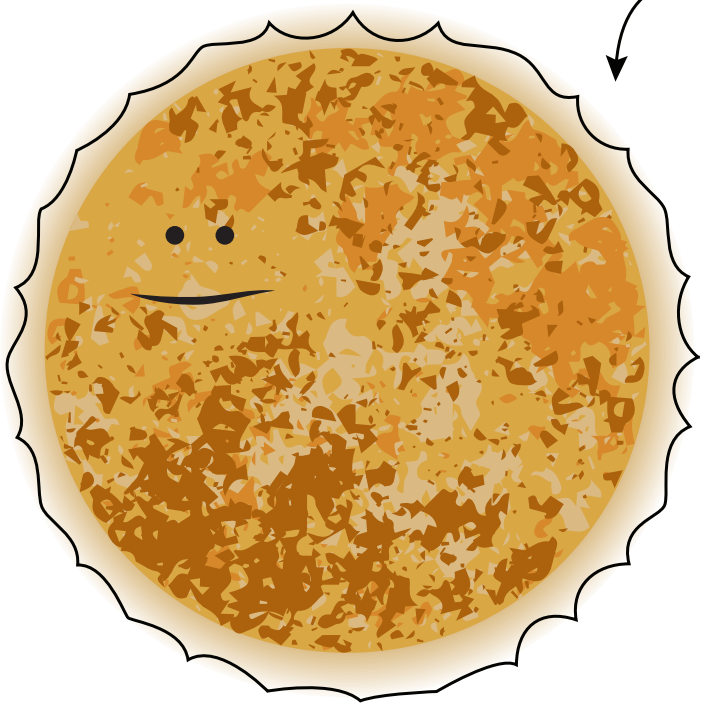


2. MERCURY
Closest planet to the sun. Small, gray and hot.



1. THE SUN
Center of our solar system. What a star!

summer BRAIN GAMES

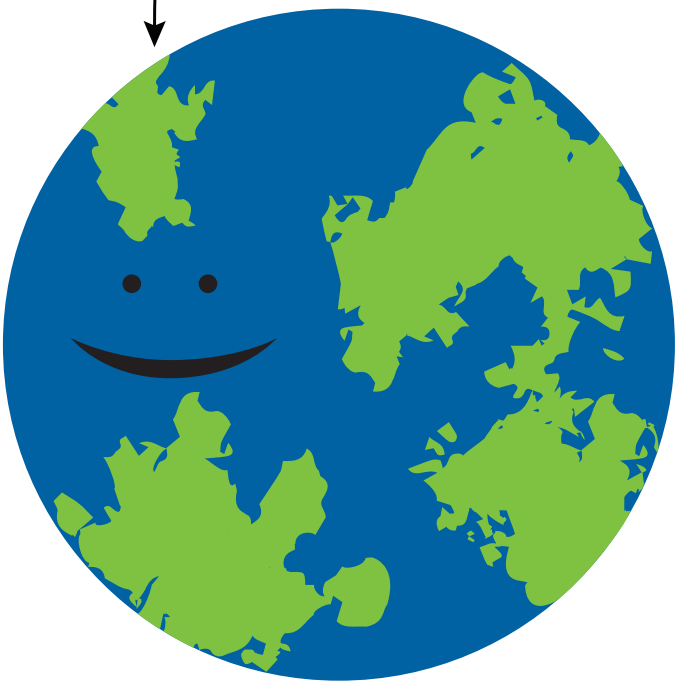


3. VENUS

Similar in size to Earth, but its gassy atmosphere makes it the hottest planet in the solar system.

4. EARTH

Home, sweet home.

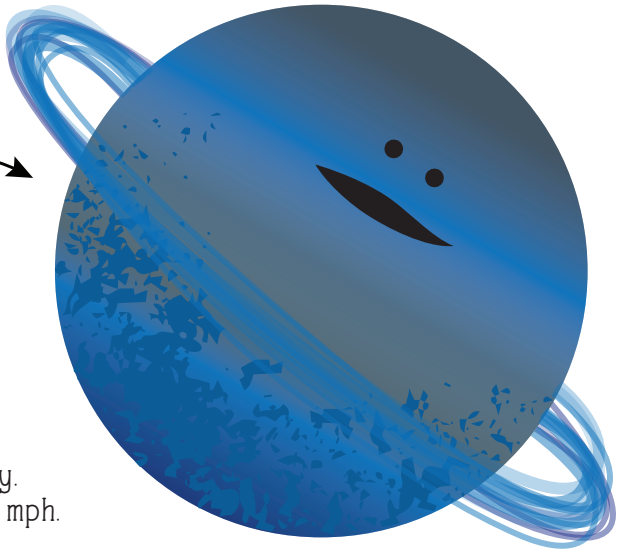


5. MARS

Known as the "red planet", and home to NASA rovers. No Martian sightings ... yet.

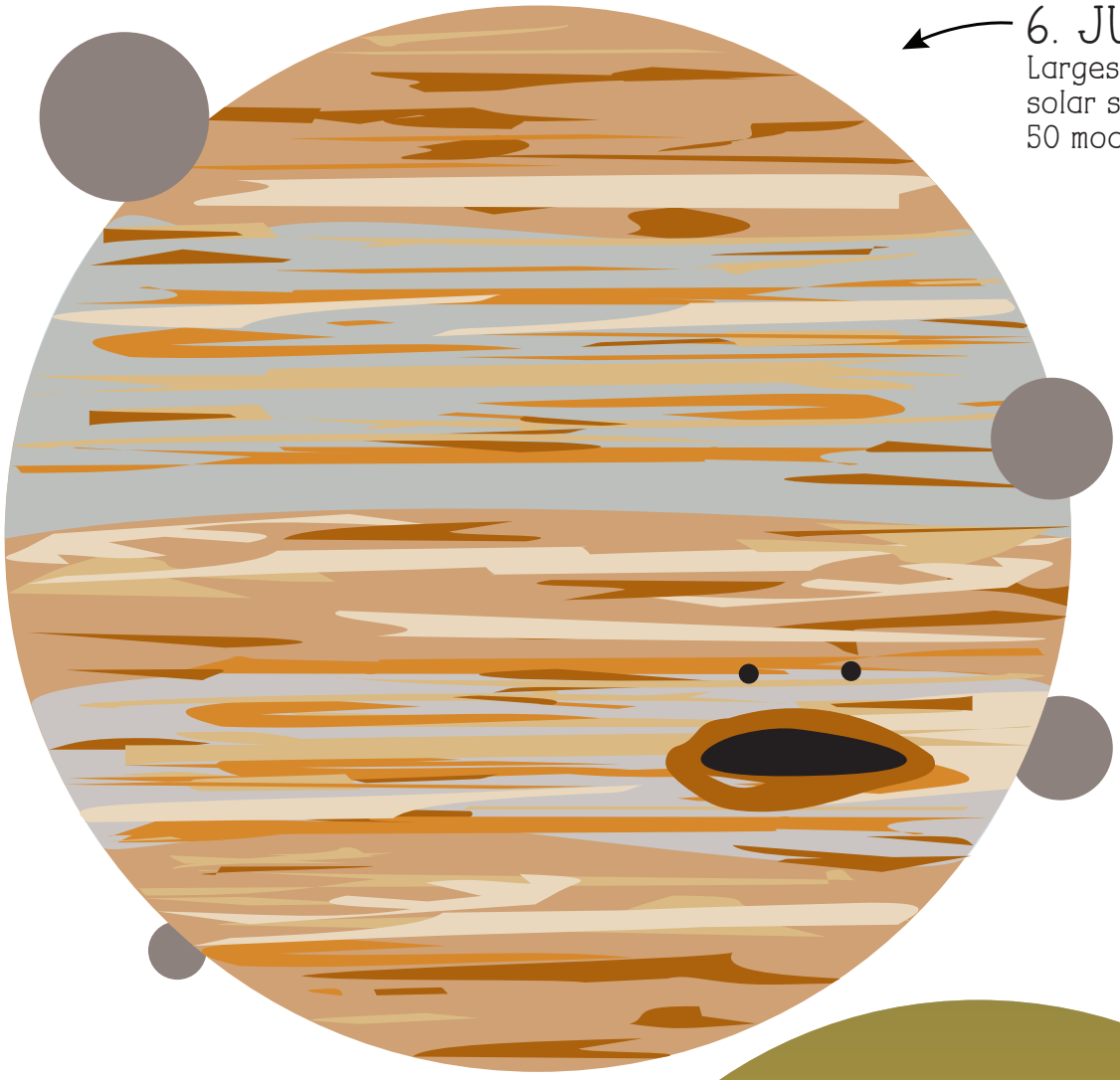
8. URANUS

Cold and far away from the sun. Frequently the butt of planetary jokes.



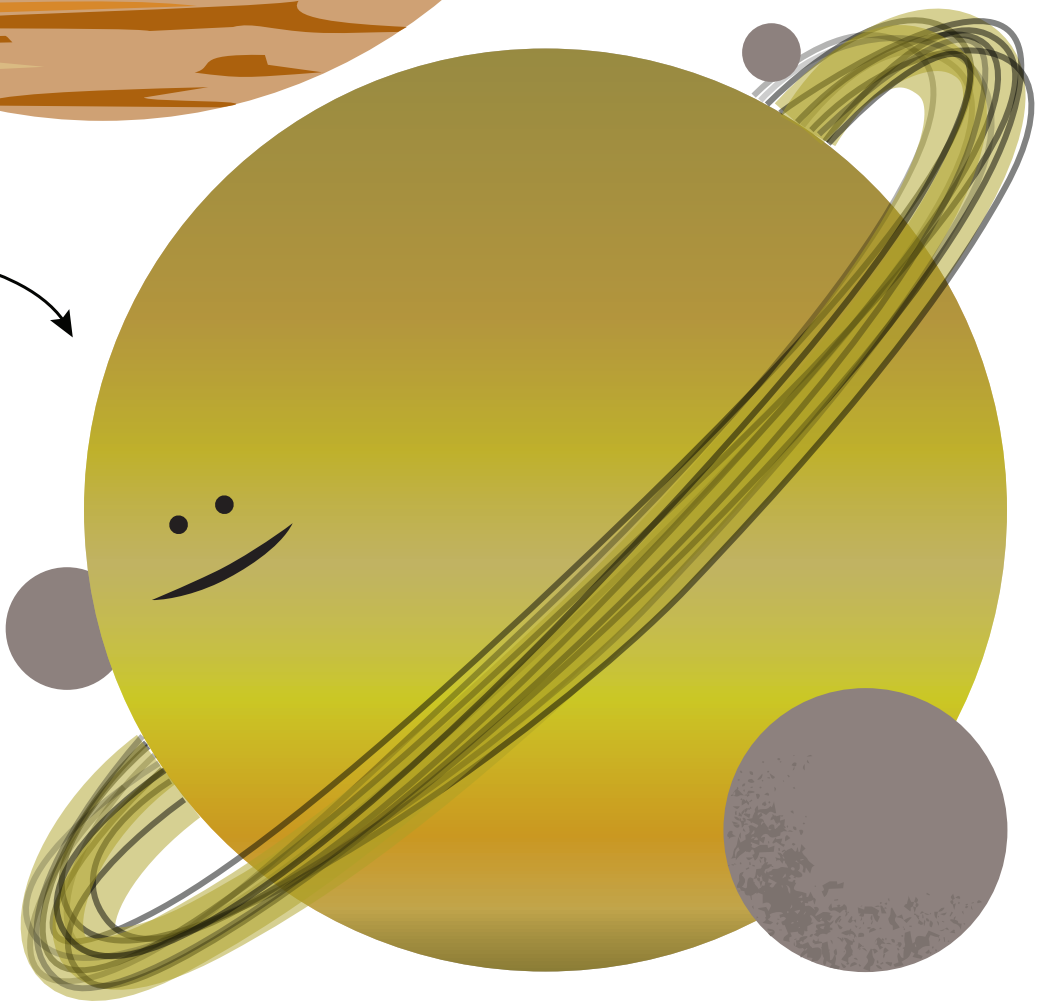
9. NEPTUNE

Very, very cold and blustery. Winds can reach over 1,250 mph.



6. JUPITER

Largest planet in the solar system with over 50 moons.



7. SATURN

Most known for its rings, which are composed of rocks and ice. Saturn also has lots of moons, including Titan, which is larger than Mercury!