THINK ABOUT: HOW THE SUN APPEARS IN DIFFERENT PLACES IN THE SKY DURING DIFFERENT TIMES OF THE DAY AND YEAR.

The earth revolves around the sun. This, along with the tilt of the Earth, causes the sun to appear in various locations in the sky. The result is shadows having different lengths and casting in different directions.

Go to the Cosmic Juke Box and select the video about the temple in Chichen Itza.

What special shadow can be seen on the steps of this temple during the Spring and Autumnal Equinox?

How did this relate to the Mayan culture?

Draw how you think the shadow will look in the following two scenarios. Do you think the shadow is different? If so, why would that be since the tree and the sun are the same size in both scenarios?

THINK ABOUT: WHAT HAPPENS IF A STAR RUNS OUT OF MATERIAL TO "BURN"?

In a star, atoms are combined together in a process called fusion. Smaller atoms like hydrogen and helium fuse to form larger atoms. Huge amounts of energy are given off in this process causing the star to be in a state of matter called plasma. In this state the electrons wander around freely. This will continue until all of the hydrogen and helium are used up. What happens then?

Find the station that explores supernovas. Read about what causes a star to become a supernova. At this station you will find a model that represents how mass and potential energy translate into kinetic energy during a chemical reaction.

> How does the amount of mass and potential energy in a chemical reaction relate to the output of energy? In a supernova, the energy from the collapsing star is translated into a shock wave.

THINK ABOUT: WHAT HAPPENS IF A STAR RUNS OUT OF MATERIAL TO "BURN"?

Question: How high will the red ball bounce? Experiment with the colored balls at the Astro Blaster to see how energy is transferred in the reaction.

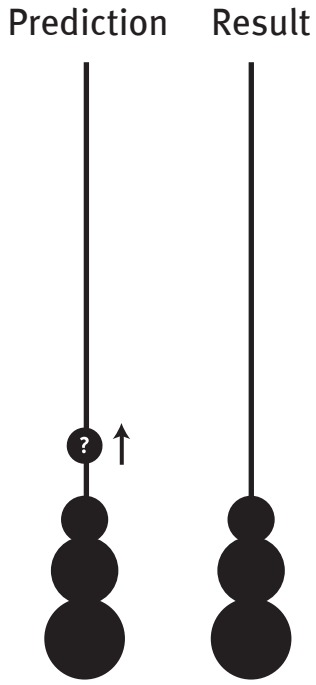
Procedure: Before each experiment mark a point on the prediction diagram to represent how high you think the smallest red ball will bounce. After each experiment record what you observed on the result diagram. Compare this with your prediction.

1. Lift only the red ball and drop it onto the stack of other balls.

2. Lift the red and orange balls and drop them onto the stack of other balls.

3. Lift the red, orange, and green balls and drop onto the stackof other balls.

4. Lift all the balls and drop on to the table.



Design another experiment using this model to help understand how energy is transferred. Describe your experiment, including predictions and results here.

What do these experiments tell you about what happens when a star runs out of material to burn?

THINK ABOUT: HOW GRAVITY AFFECTS OBJECTS MOVING THROUGH SPACE

Gravity directs the motion of the stars, planets, asteroids, satellites, and even space craft.

Find the station that explores gravity assist motion. Sit at the rotating table and read the directions about how to run the simulation. This table simulates the gravitational pull of a large rotating object in space.

How do you think the ping pong ball will move in this same situation?

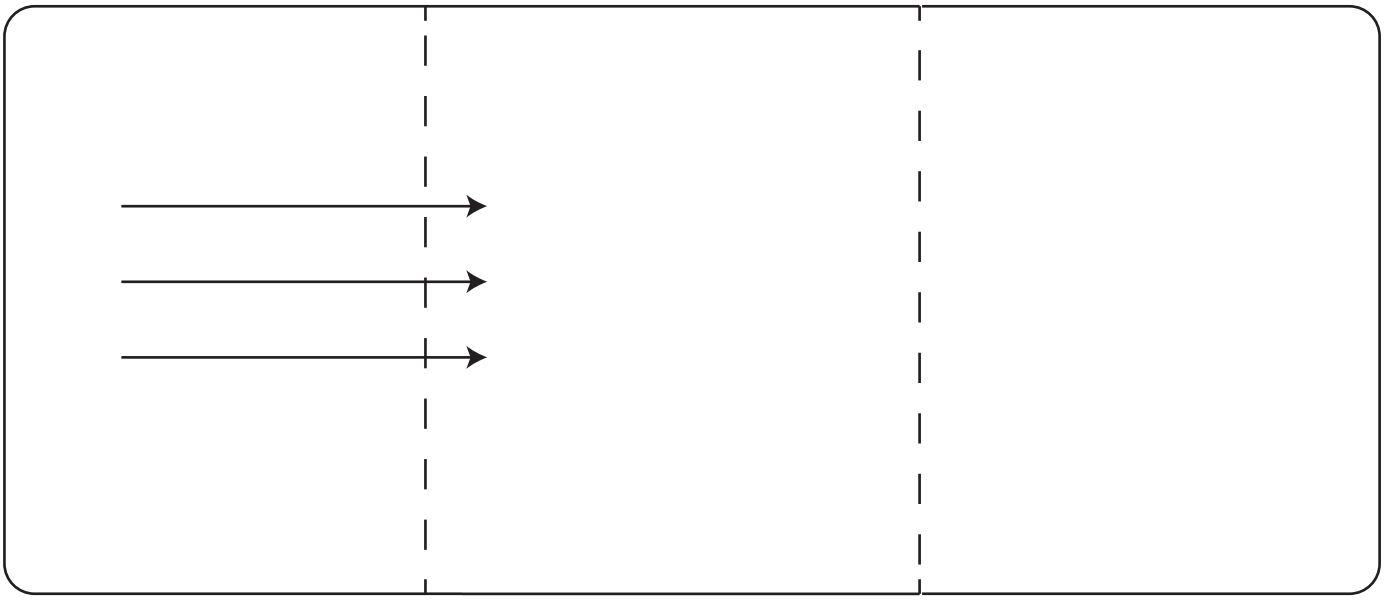
Did your results different from your predicition?

Why do you think these object behaved the way they did when they encountered the gravitational field?

THINK ABOUT: HOW SCIENTISTS ARE ABLE TO SEE OBJECTS IN SPACE THAT ARE FAR AWAY

Tools and instruments are important for scientists in the process of learning and understanding new things. The telescope has allowed people to look up into the sky and have a greater understanding of the solar system and the universe beyond. Find the station that explores optics.

Sit at the light table and experiment with the acrylic blocks and the beams of light. Select a block and study how the light beams are different after traveling through the block.



Light beams **Draw the block shape** **Draw the light beams**

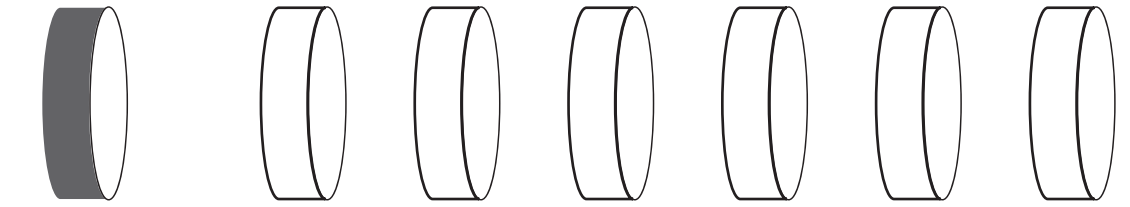
Which shape(s) would be useful in focusing light coming from a far distance?

THINK ABOUT: HOW SCIENTISTS ATE ABLE TO SEE OBJECTS IN SPACE THAT ARE FAR AWAY

Look on the wall next to you with the telescope. Read about refracting and reflecting telescopes.

What does a reflecting telescope have that a refracting telescope does not?

Experiment with building your own telescope using the various lenses at the station. Color in the lenses that together give you the largest and most focused image of Jupiter.



Is this an example of a reflecting telescope or a refracting telescope?