



hands-on activities

The Universe

The Spin Is In

Background Information

In 1924 astronomer Edwin Hubble discovered that the Milky Way was just one of many different galaxies in the universe. Each galaxy contains billions of stars, and the stars rotate around a mass at or near the center of the galaxy. As Hubble discovered more galaxies, he noticed that they could be categorized by groups based on their shapes. The most common types of galaxies are called spirals (like the Milky Way), ellipticals, and irregulars.

Later, Hubble set up a classification system based on the galactic shape, which is also related to the speed at which a galaxy rotates. In this activity, you are going to make models of galactic motion where individual milk particles represent stars within the galaxy. Then, you'll use your models to determine how the shape of a galaxy is affected by gravity and the speed of rotation.

What You Need

- i 7 wide-mouth plastic cups
- i water
- i dry powdered milk
- i plastic spoon
- i photos of different galaxies, including spirals, ellipticals, and irregulars

What to Do

1. Place a small amount of dry powdered milk in a plastic cup. Fill six cups half full with water.
2. Rotate the cup slowly to get the water flowing in a circular motion. Using the spoon, sprinkle about half a teaspoon of powdered milk into the water at the center of the rotation. Then stop rotating the cup, and observe the pattern the milk particles make in the water. Sketch what you see on the worksheet.
3. Repeat step 2 with a fresh cup of water, and sketch the results on the worksheet.
4. With a fresh cup of water, rotate the cup slower than the initial tests. Using the spoon, sprinkle about half a teaspoon of powdered milk into the water at the center of the rotation. Then stop rotating the cup, and observe the pattern the milk particles make in the water. Sketch what you see on the worksheet.
5. Repeat step 4 with a fresh cup of water, and sketch the results on the worksheet.
6. With a fresh cup of water, rotate the cup faster than the previous tests. Using the spoon, sprinkle about half a teaspoon of powdered milk into the water at the center of the rotation. Then stop rotating the cup, and observe the pattern that the milk particles make in the water. Sketch what you see on the worksheet.
7. Repeat step 6 with a fresh cup of water, and sketch the results on the worksheet.
8. Answer the follow-up questions on the worksheet.



hands-on activities

The Universe

The Spin Is In Worksheet

Name: _____

Record your observations below.

Rotation Speed	Pattern of Milk Particles	
	<i>Cup 1</i>	<i>Cup 2</i>
Initial Rotation		
Slower Rotation		
Faster Rotation		

Look at the photos of the different-shaped galaxies. How do your drawings compare with the photos?

How does altering the speed of rotation affect the drawings (the shape of the galaxies)?