

A Question of Scale

After seeing the video *Powers of Ten*, students think about the sizes of different things in the universe. In this activity, they try to place various objects on a metric "powers of 10" scale.

Before Class

1. Photocopy a worksheet for each student
2. Using a paper cutter, cut the worksheets along the dotted line. [Students will cut dashed lines.]
3. It's best to do this activity after the class has seen the video "Powers of Ten."

In Class

1. Hand out worksheets and lists of challenge objects.
2. Have students cut each challenge object from the list with scissors and tape it to the appropriate place on the distance scale. Give them several minutes to do this. Allow them to consult each other and get opinions from friends.
3. Conclude activity with a vote of where each object goes. Then give typical distances and sizes from the list below. Discuss the difference between *distance* and *size*.

Distances to Quote in "A Question of Scale"

width of a light switch lever	about 1 cm
ping pong ball	about 3 cm
softball	about 10 cm
basketball	about 30 cm
width of a door	about 1 m
height of doorway	2+ m
the classroom	about 6 m?
the school	about 100 m?
depth of the Grand Canyon	over 1 km
height of Mt. Everest	8.78 km
deepest depth of Pacific Ocean	11 km
Denver to Kansas City	890 km
length of California	1000 km
Nashville to New York City	1,213 km
diameter of Moon	3,476 km
San Francisco to New York.....	4,100 km
diameter of Earth	12,756 km
diameter of Jupiter	142,800 km
distance to the Moon	384,402 km
diameter of the Sun.....	1.4 million km
distance to the Sun.....	152 million km
distance from Sun to Saturn	almost 1.5 billion km
nearest star (other than Sun)	38 million million km (off the scale)
Milky Way Galaxy	100,000 LY or a million billion km (way off the scale)

Materials

- "Question of Scale" worksheet (1/student; master on next page)
- Pair of Scissors (1/student)
- Tape (1 for every group of 3 or 4 students)

A Question of Scale	
1 cm	• basketball
	• classroom
10 cm	• deepest depth of Pacific Ocean
	• Denver to Kansas City
1 meter	• depth of the Grand Canyon
	• distance of Sun from Earth
10 meters	• Earth to Moon distance
	• Earth's diameter
100 meters	• height of a doorway
	• height of Mt. Everest
1 km	• Jupiter's diameter
	• length of California
10 km	• Milky Way galaxy
	• Moon's diameter
100 km	• Nashville to New York City
	• nearest star (other than Sun)
1000 km	• ping pong ball
	• San Francisco to New York
10,000 km	• softball
	• Sun to Saturn
100,000 km	• Sun's diameter
	• the school
1 million km	• width of a door
	• width of a light switch lever
10 million km	
100 million km	
1 billion km	
