



1. John and Silvia want to make a scale model of our solar system. Based on the size of the ball they picked for the sun, the scale of the model will be 69,600 kilometers to 1 inch. The diameter of Jupiter is 142,984 kilometers. What should be the diameter of the ball that represents Jupiter?

The ball should be 2 inches in diameter ($142,984 \text{ km} \div 69,600 \text{ km per inch} \approx 2 \text{ inches}$).

If Earth has a diameter of 12,756 km, what should be the diameter of the ball that represents Earth?

The ball should be 0.18 inch in diameter ($12,756 \text{ km} \div 69,600 \text{ km per inch} \approx 0.18 \text{ inch}$).

Solar System	Actual (kilometers)	Model (inches)
Scale	69,595 km	1 inch
Jupiter	142,984 $\div 69,600$	≈ 2
Earth	12,756 $\div 69,600$	≈ 0.18

2. In *Gulliver's Travels*, Gulliver travels to Brobdingnag. If a pencil is 7 inches in Ourland (the real world), the pencil is 84 inches, or 7 feet, in Brobdingnag. Based on this information, what is the scale factor between Ourland and Brobdingnag?

The scale factor is 1 to 12 ($84 \div 7 = 12$).

Soccer Field	Ourland	Brobdingnag
Pencil	7 inches $\times 12$	84 inches
Scale Factor	1 $\times 12$	12



If a soccer field in Ourland is 75 yards wide and 120 yards long and covers an area of 9,000 square yards, what would be the area of a similar soccer field in Brobdingnag?

Soccer Field	Ourland	Brobdingnag
Scale Factor	1	12
Length	120 yards	1440 yards
Width	75 yards	900 yards

The area of the soccer field in Brobdingnag is 1440×900 or 1,296,000 square yards. Another way to solve this problem is to find the area of a soccer field in Ourland ($120 \text{ yards} \times 75 \text{ yards} = 9000$ square yards) and multiply by the area factor, which is 144 (144×9000 square yards = 1,296,000 square yards). View the *Changing Dimensions: Area* video to review area factor.

3. Gulliver also traveled to Lilliput. If the scale factor between Lilliput and Ourland is 1:12, how long would a bed be in Lilliput if it is 80 inches long in Ourland?

The bed in Lilliput is $6\frac{2}{3}$ inches long ($80 \div 12 = 6\frac{2}{3}$).

	Liliput	Ourland
Scale	1	12
Bed Length	$6\frac{2}{3}$ inches	80 inches

How long would the bed be in Brobdingnag?

The scale factor between Ourland and Brobdingnag is 1:12 (see problem 2). The bed in Brobdingnag is 960 inches long ($80 \times 12 = 960$).

	Ourland	Brobdingnag
Scale	1	12
Bed Length	80 inches	960 inches