Planets and seasons: two models

Names: Class: Date:

Work with a partner. Part 1 is a model of the solar system, seen from space. Part 2 is a model of Earth going round the Sun, which you can also look at as if you lived on the globe.

PART 1 A pocket solar system

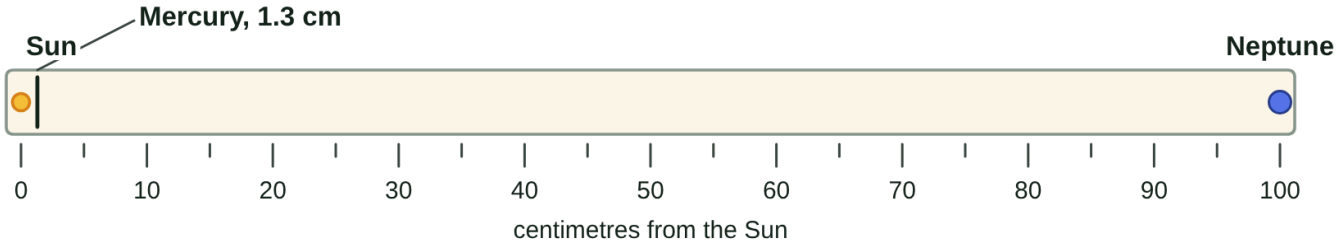
You need: A strip of paper at least 1 metre long (a roll of adding-machine paper, or strips of A4 taped end to end), a metre ruler or a tape measure, a sharp pencil and coloured pencils.

Safety. Lay the strip along a desk or a clear bit of floor, and keep long strips out of walkways so nobody slips on them.

1. Write Sun at one end of the strip, at 0 cm. Measure 100 cm along the strip, and write Neptune there.
2. Measure from the Sun again, and mark each planet at its distance in the table. Write its name beside its mark.
3. Colour each planet's mark. Then hold the strip up with your partner and look along it from the Sun.

Planet	Distance from the Sun on your strip (cm)
Mercury	1.3
Venus	2.4
Earth	3.3
Mars	5.0
Jupiter	17.2
Saturn	31.7
Uranus	63.5
Neptune	100

The distances are NASA's, scaled so that Neptune is 100 cm from the Sun. In the picture the Sun and Neptune are drawn much bigger than they would be at this scale.



1. Which four planets are within 6 cm of the Sun?

2. Where is the biggest gap between two planets next to each other?

3. How many times farther from the Sun is Neptune than Earth? Use the table.

4. On your strip, the Moon would be less than a tenth of a millimetre from Earth. What does that tell you about the distances in the solar system?

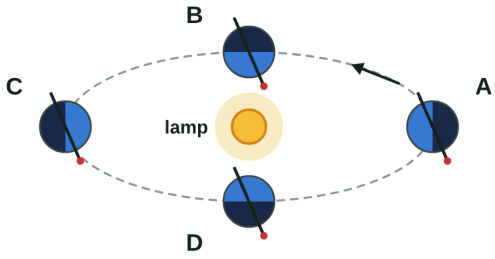
5. Mercury takes 0.241 Earth years to go round the Sun, Earth takes 1 year and Neptune takes 164.8 years. What happens to the time a planet takes to go round as you go along your strip, away from the Sun?

PART 2 A model of the seasons

You need: A globe, or a ball with a skewer through it for the axis; a lamp without a shade; a paper star; masking tape; and a room you can make dark.

> **Safety.** Keep the lamp's cord out of the way so nobody trips. Don't touch the lamp's bulb while it is on, because it can get hot, and don't stare into the light. If you use a ball and a skewer, an adult pushes the skewer through, and you keep the sharp end pointing away from people.

1. Stick the star on one wall. Put the lamp in the middle of the room, at about the height you will hold the globe.
2. Mark four places on the floor with tape, about 1 metre from the lamp: A between the lamp and the star, C on the far side of the lamp from the star, B halfway between them on your right as you stand at A facing the lamp, and D opposite B.
3. Stand at A. Hold the globe so that its axis leans over, with the South Pole leaning towards the star.
4. Keep the South Pole leaning towards the star all the time, and carry the globe round the lamp from A to B, C and D. Seen from above, that is anticlockwise, the way Earth goes round the Sun.
5. At each place, spin the globe slowly, anticlockwise seen from above, and watch the land round each pole. Fill in a row of the table.



The red dot is the South Pole. The arrow shows the way round.

Place	Which pole leans towards the lamp?	Which hemisphere gets more light?	Which pole's area stays in the light the whole time the globe turns?	Which month is it?
A				
B				
C				
D				

1. At which place is it summer in Australia? How can you tell from the globe?

2. Why must the South Pole keep leaning towards the star the whole way round?

Answers (turn the page round). Part 1: 1. Mercury, Venus, Earth and Mars. 2. Between Uranus and Neptune, 36.5 cm. 3. About 30 times (100 ÷ 3.3). 4. The planets are very far apart compared with the distance from Earth to the Moon, and most of the solar system is empty space. 5. It gets longer: the farther a planet is from the Sun, the longer it takes to go round. **Part 2, the table:** at A the North Pole leans towards the lamp, the Northern Hemisphere gets more light, the area round the North Pole stays in the light, and it is June. At C the South Pole leans towards the lamp, the Southern Hemisphere gets more light, the area round the South Pole stays in the light, and it is December. At B and D neither pole leans towards the lamp, both hemispheres get the same light, and neither pole's area stays in the light. It is September at B and March at D. **Questions:** 1. At C, because the South Pole leans towards the lamp, so the Southern Hemisphere gets more light and the area round the South Pole stays in the light all the way round. 2. Earth's axis keeps pointing the same way in space all year, so each hemisphere leans towards the Sun for part of the year and away from it for another part.