

Earth, day, seasons and orbits

Grade 6 science (Year 7 · Class 6) · Worksheet

Name: _____ Date: _____ Class: _____

These twenty problems train you to describe the planets, explain day, night and the seasons, and use simple speed, time and distance calculations about orbits.

The first problems are recall and reading diagrams. The last ones use data and several steps. They suit Grade 6, Year 7 and Class 6 students working on MS-ESS1-2 style standards.

Level: Grade 6 science (Year 7 · Class 6) · **Curriculum:** MS-ESS1-2

Problem 1 Planet order (easy)

1. List the eight planets in order from the Sun.
2. Which planet is third from the Sun?

Problem 2 Rotate or revolve? (easy)

1. State whether each takes place by rotation or revolution: (a) day and night, (b) one year.
2. How long does each take for the Earth?

Problem 3 True or false? (easy)

1. Decide whether each statement is true or false and correct the false one: (a) The Sun is a star. (b) The Sun moves around the Earth. (c) Mars is a rocky planet.

Problem 4 Gravity and orbits (easy)

1. Which force keeps the planets moving around the Sun?
2. What would happen to a planet if this force suddenly disappeared?

Problem 5 Reading the planet table (easy)

1. Use the table in the lesson. Which planet takes 687 days to orbit the Sun?
2. Does Neptune take more or less time than Saturn? Give both periods.

Problem 6 What causes seasons? (easy)

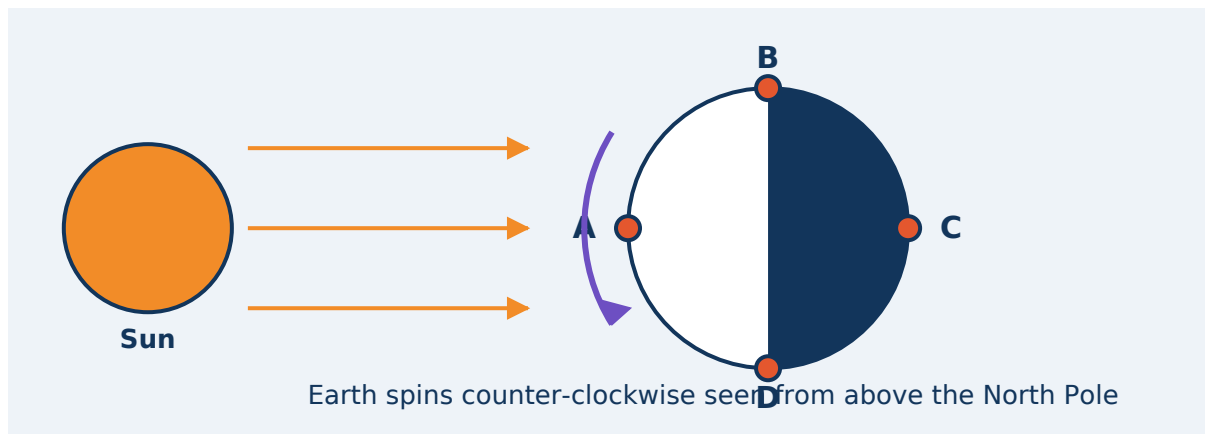
1. Name the feature of the Earth that causes the seasons and give its angle.
2. Is it summer or winter in the north when the north leans toward the Sun?

Problem 7 Time zones (medium)

1. Two towns are 75° apart in longitude. Calculate how many hours apart their clocks are.
2. When it is 10:00 in the western town, what time is it in the eastern one?

Problem 8 Sunrise and sunset (medium)

1. The figure shows four places A, B, C and D on the Earth. Which place has midday and which has midnight?
2. Which place is at sunrise and which is at sunset?



Four places on a spinning Earth.

Problem 9 Light from the Sun (medium)

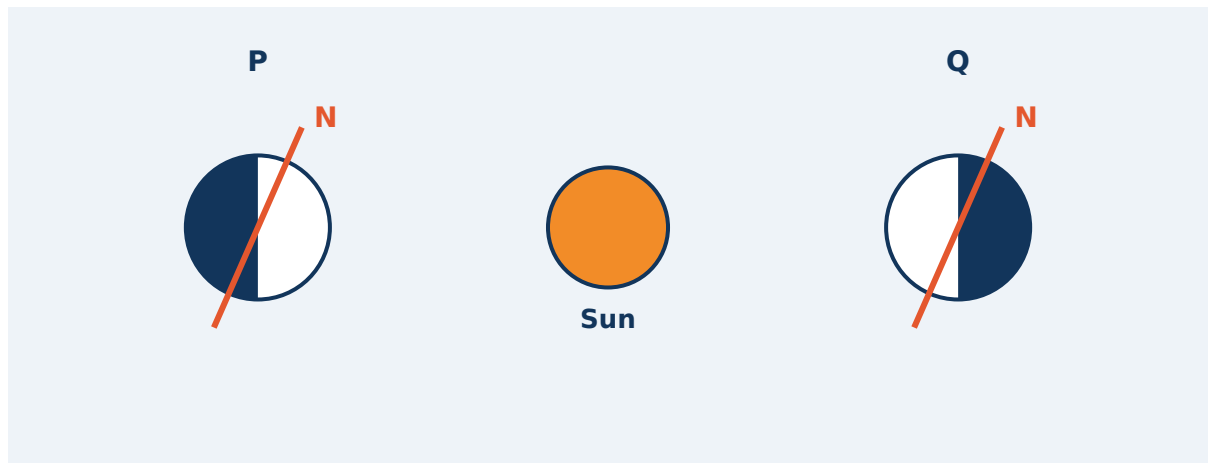
1. The Sun is 150 million km from the Earth. Write this distance in kilometres using powers of ten.
2. Light travels at 300 000 km/s. Calculate the time light takes to reach the Earth in seconds and in minutes.

Problem 10 Years on Venus (medium)

1. Venus takes 225 days to orbit the Sun. How many Venus years are there in 900 Earth days?
2. How many Earth years is 900 days? Give the answer to one decimal place.

Problem 11 Which season? (medium)

1. The figure shows the Earth at two positions P and Q. In which position is it summer in the northern hemisphere? Explain using the tilt.
2. What season is it in the southern hemisphere at the same time?



Two positions of the Earth in its orbit.

Problem 12 Spinning at the equator (medium)

1. The Earth's circumference at the equator is about 40 000 km. Calculate the speed of a person on the equator in km/h.

Problem 13 Weight on other worlds (medium)

1. A student has a mass of 50 kg. Gravitational field strength is 9.8 N/kg on Earth and 3.7 N/kg on Mars. Calculate her weight on each and the difference.

Problem 14 Distance myth (medium)

1. Tomas says: "It is hotter in July because the Earth is closer to the Sun." In Lima in January the Earth is 147 million km from the Sun, and in July it is 152 million km. Use these numbers to show the error.

Problem 15 Age in Mars years (medium)

1. Priya is 10 years old (3650 days). Calculate her age in Mars years (687 days each). Give one decimal place.

Problem 16 Orbital speed of Earth (hard)

1. Earth's orbit is nearly a circle of radius 150 million km. Calculate the length of the orbit ($2\pi r$) in km.
2. Calculate the Earth's orbital speed in km/h (1 year = 8760 h) and in km/s.

Problem 17 Slow Jupiter (hard)

1. Jupiter orbits at a radius of 778 million km and takes 4333 days. Calculate its orbit length in km and its speed in km/h.
2. Compare it with the Earth's speed of 107 589 km/h and say what the result suggests

about speed and distance.

Problem 18 Straight line or curve? (hard)

1. Explain in your own words why a planet does not fall into the Sun even though gravity pulls it.
2. Describe what would happen if the Sun's gravity doubled suddenly while the planet kept the same sideways speed.

Problem 19 Equator and Leeds (hard)

1. Wanjiru lives in Nairobi, almost on the equator, and Emma lives in Leeds at 54° N. In June, Nairobi has about 12 hours of daylight and Leeds about 16.7 hours. Explain the difference and say why Nairobi has little change through the year.

Problem 20 Daylight in Leeds (hard)

1. The chart shows hours of daylight in Leeds on four dates. Calculate the difference between the longest and the shortest day.
2. Express the longest day as a percentage of 24 hours. Give one decimal place.
3. Explain which date is nearest the start of winter in the north and why the days are shortest then.

