

Describing movement and average speed

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

Name: _____ Date: _____ Class: _____

These problems train you to describe motion with a reference object and trajectory, to use $v = d \div t$ in all its forms, to convert between m/s and km/h and to read distance-time graphs. They start with short recall and finish with multi-step journeys.

The worksheet suits Grade 6, Year 7 and Class 6 students working towards NGSS middle school physical science and similar science curricula.

Level: Grade 6 science (Year 7 · Class 6) · **Curriculum:** MS-PS2-2

Problem 1 Moving or at rest? (easy)

Wanjiru sits on a seat in a matatu that drives along a straight road in Nairobi.

1. State whether she is moving or at rest relative to the seat.
2. State whether she is moving or at rest relative to a tree beside the road.
3. Explain why both answers can be correct.

Problem 2 Speed formula and units (easy)

1. Write the formula for average speed in words and in symbols.
2. Give the SI unit of speed.
3. Give one other unit often used for road vehicles.

Problem 3 A 100 m run (easy)

Bilal runs 100 m in 20 s on a school track in Lahore.

1. Calculate his average speed in m/s.

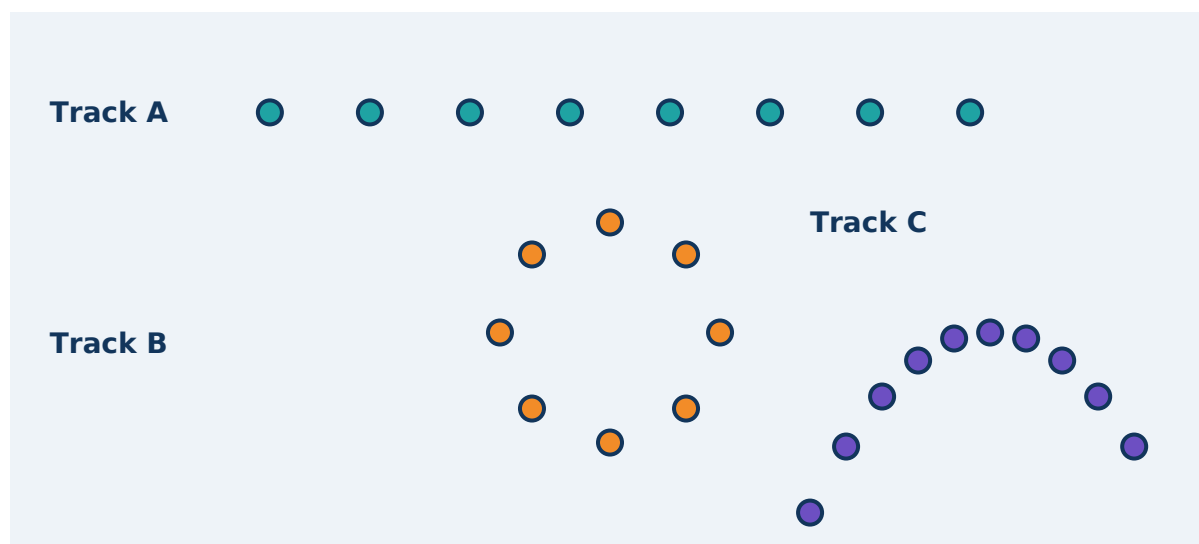
Problem 4 A long drive (easy)

Emma drives 150 km in 3 h from Leeds to a coastal town.

1. Calculate her average speed in km/h.

Problem 5 Reading dotted tracks (easy)

The figure shows the positions of three objects recorded at equal time intervals.



Positions of three moving objects recorded at equal time intervals.

1. Name the shape of the trajectory in each of tracks A, B and C.
2. Which track could be made by the tip of the second hand of a clock?
3. In track A the dots are equally spaced. What does this tell you about the speed?

Problem 6 Distance of a scooter (easy)

Mei rides a scooter at a steady 12 m/s for 30 s.

1. Calculate the distance she covers.

Problem 7 Time for a bus journey (medium)

Diego's coach in Texas keeps an average speed of 80 km/h on a 200 km journey.

1. Calculate the journey time in hours.
2. Write the answer in hours and minutes.

Problem 8 Converting units (medium)

1. Convert 54 km/h into m/s.
2. Convert 8 m/s into km/h.
3. A cheetah can reach 29 m/s. Is that more or less than 100 km/h?

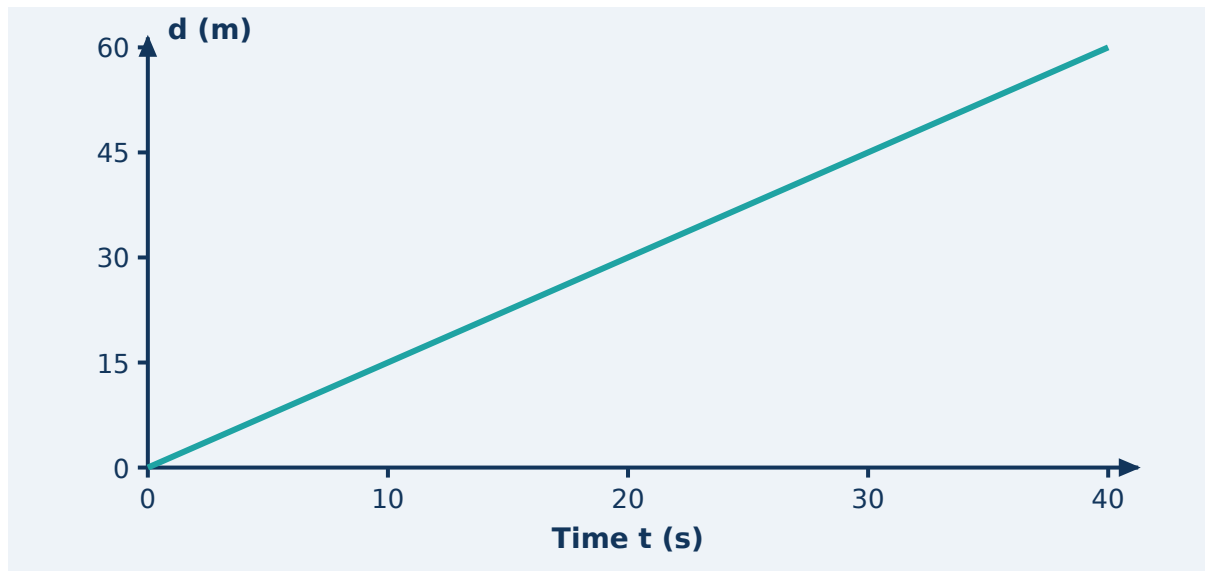
Problem 9 Cycling to the market (medium)

Kofi cycles 6 km to a market in Accra in 20 minutes.

1. Convert 20 minutes into hours (fraction).
2. Calculate his average speed in km/h.
3. Calculate his average speed in m/s.

Problem 10 Reading a graph (medium)

The graph shows the distance travelled by a walker.



Distance-time graph for a walker.

1. Read the distance covered after 20 s.
2. Read the time needed to reach 45 m.
3. Calculate the speed of the walker.

Problem 11 Who is faster? (medium)

Aarav runs 400 m in 80 s. Hina cycles 2.7 km in 10 minutes.

1. Calculate the speed of each in m/s.
2. State who is faster.

Problem 12 Journey with a stop (medium)

A minibus travels 90 km in 2 h, including a 30 minute stop at a market.

1. Calculate the average speed for the whole journey.
2. Calculate the average speed while the minibus was moving.
3. Explain why the two values differ.

Problem 13 Spot the error (medium)

A student writes: "A car travels 150 km in 90 minutes, so $v = 150 \div 90 = 1.67$ km/h."

1. Identify the mistake.
2. Write the correct calculation and answer.

Problem 14 Toy car data (medium)

Positions of a toy car were recorded every 2 s.

Time (s)	0	2	4	6	8
Distance (m)	0	4	12	16	16

1. Calculate the speed of the car in each 2 s interval.

2. State when the car was at rest.
3. Calculate the average speed over the 8 s.

Problem 15 A sprint in two units (medium)

A sprinter runs 100 m in 9.8 s.

1. Calculate the average speed in m/s to one decimal place.
2. Convert it to km/h to one decimal place.

Problem 16 Two parts of a trip (hard)

Wanjiru drives the first 60 km of a trip at 40 km/h, then 100 km at 80 km/h.

1. Calculate the time for each part.
2. Calculate the average speed for the whole trip to one decimal place.
3. Show that this is not the same as the mean of 40 km/h and 80 km/h.

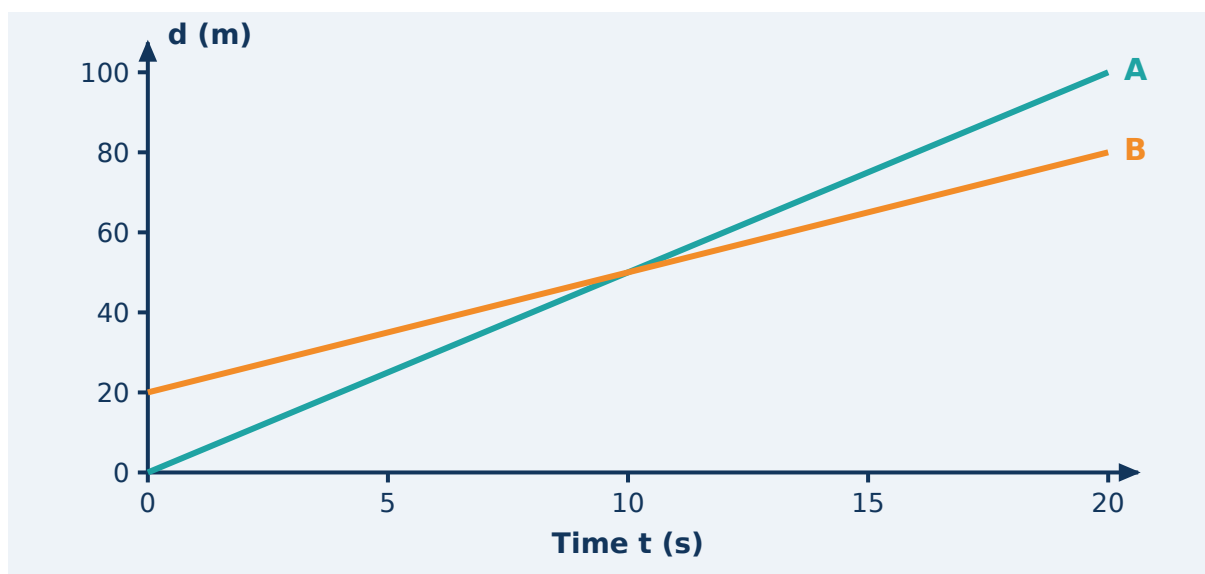
Problem 17 Cyclists meeting (hard)

Emma and Diego start together at the two ends of a 27 km cycle path and ride towards each other. Emma rides at 12 km/h and Diego at 15 km/h.

1. Calculate the speed at which the gap between them shrinks.
2. Calculate the time before they meet.
3. Calculate the distance Emma has covered when they meet.

Problem 18 Two runners on a graph (hard)

The graph shows runners A and B on a straight track.



Distance-time graphs for runners A and B.

1. Calculate the speed of each runner.
2. State which runner starts ahead and by how much.
3. Find the time when A catches B and the distance from the start at that moment.

Problem 19 Catching the school bus (hard)

A school bus must cover 18 km and arrive at 07:45. The driver plans an average speed of 40 km/h.

1. Calculate the journey time in hours and in minutes.
2. Calculate the latest departure time.

Problem 20 Laps of a track (hard)

Chiamaka runs 3 laps of a 400 m circular track in 4 min 30 s and finishes where she started.

1. Calculate the distance she ran.
2. Calculate her average speed in m/s and in km/h.
3. Her final position is the starting point. Explain why her average speed is still not zero.