

Why weight changes from planet to planet

Grade 7 science (Year 8 · Class 7) · Worksheet

Name: _____ Date: _____ Class: _____

These problems train you to tell mass from weight, to use $W = m \times g$, to rearrange it to find mass or g , and to compare the weight of an object on different planets. They start with recall and units and finish with multi-step reasoning.

They suit Grade 7, Year 8 and Class 7 learners, and match NGSS middle school and early GCSE and IGCSE physics.

Level: Grade 7 science (Year 8 · Class 7) · **Curriculum:** MS-PS2-4

Problem 1 Mass or weight? (easy)

Copy and complete the table with the unit and the measuring instrument.

1. Mass: unit ____ ; instrument ____ .
2. Weight: unit ____ ; instrument ____ .

Problem 2 The weight formula (easy)

Write the formula that links weight, mass and gravitational field strength. State what each symbol means and give the unit of each.

Problem 3 A bag of rice on Earth (easy)

Priya in Delhi buys a 5.0 kg bag of rice. Calculate its weight on Earth ($g = 9.8 \text{ N/kg}$).

Problem 4 True or false? (easy)

Say whether each statement is true or false and correct any false one.

1. Mass is measured in newtons.
2. Your mass is the same on the Moon as on Earth.
3. Weight is a force.

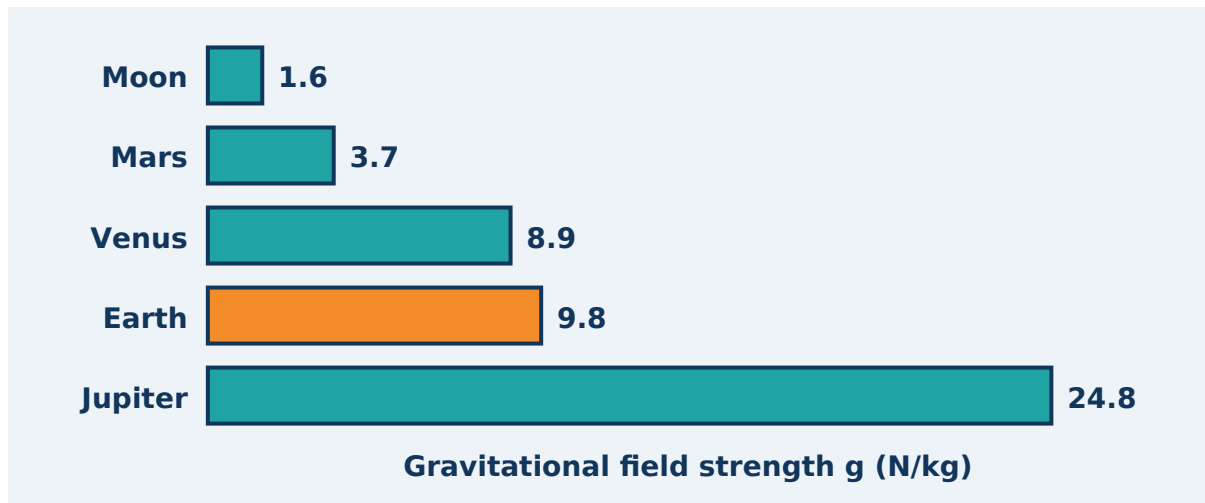
Problem 5 Grams to newtons (easy)

Olu in Ibadan holds a 750 g mango.

1. Convert 750 g into kilograms.
2. Calculate the weight of the mango on Earth.

Problem 6 Reading the gravity chart (easy)

Use the bar chart of surface gravity.



Gravitational field strength on five bodies.

1. Name the body with the strongest gravity.
2. Name the body with the weakest gravity.
3. State the value of g on Venus.

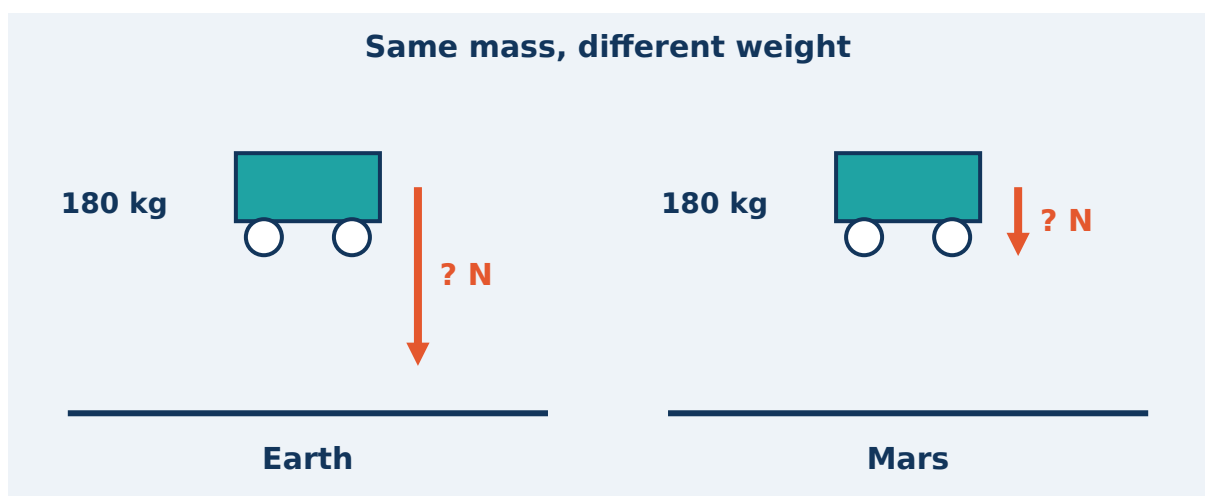
Problem 7 Bathroom scale (easy)

Hana in Seoul steps on a bathroom scale that shows 48 kg.

1. State whether 48 kg is a mass or a weight.
2. Calculate the force of gravity on Hana in newtons ($g = 9.8 \text{ N/kg}$).

Problem 8 Rover on Mars (medium)

A rover has a mass of 180 kg. The diagram shows it on Earth and on Mars.



The rover on Earth and on Mars.

1. Calculate the weight of the rover on Earth.
2. Calculate its weight on Mars ($g = 3.7 \text{ N/kg}$).

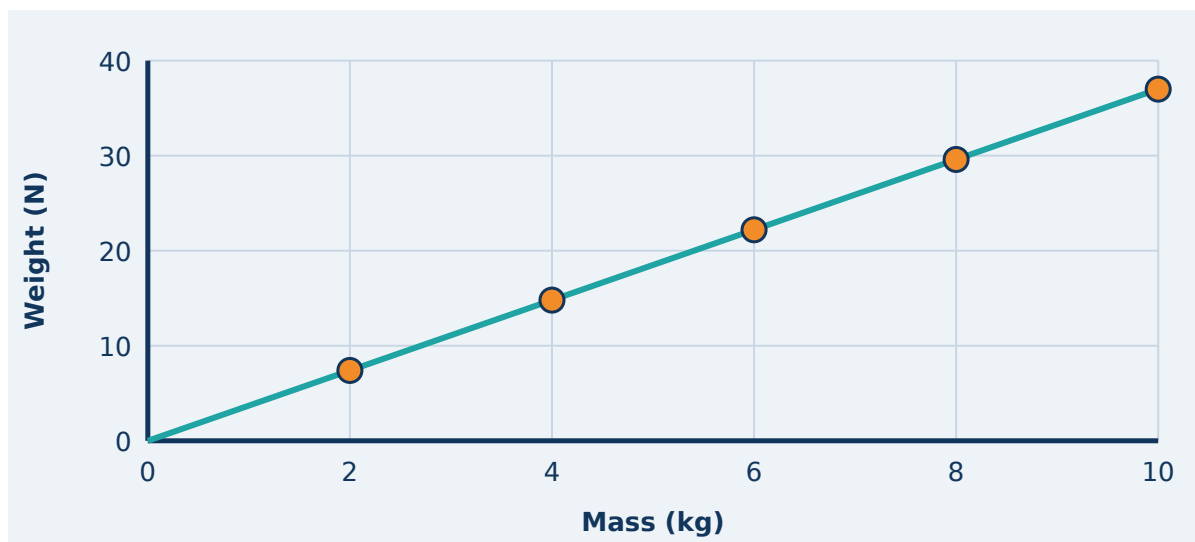
3. State its mass on Mars.

Problem 9 Mass from weight (medium)

A spring scale shows that a box weighs 245 N on Earth. Calculate the mass of the box.

Problem 10 Planet X graph (medium)

Liam in Dublin plots the weights of different masses on an unknown planet.

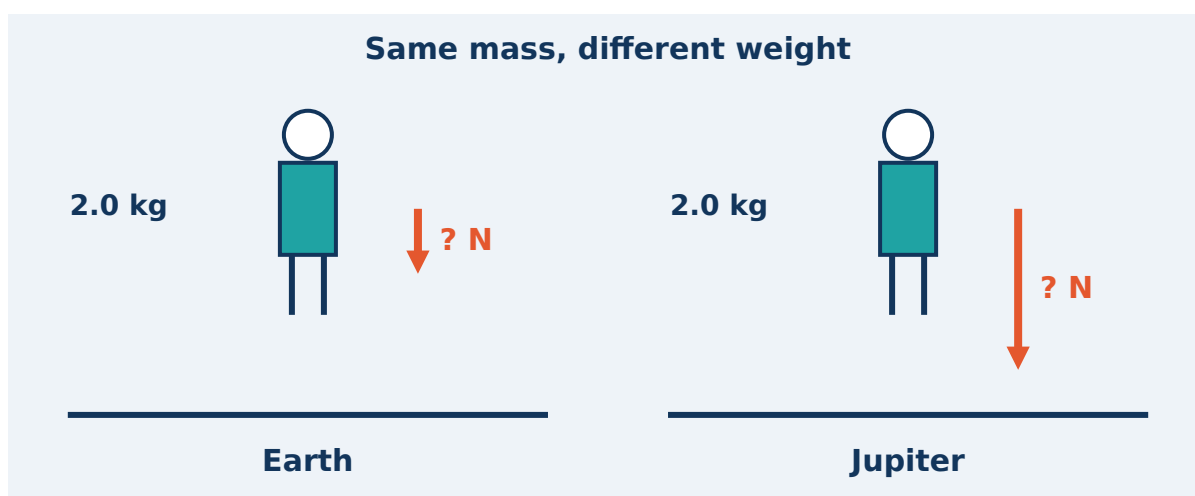


Weight against mass on an unknown planet.

1. Read the weight of a 6 kg mass.
2. Calculate the gradient of the line.
3. Use the table in the lesson to name the planet.

Problem 11 Earth against Jupiter (medium)

A 2.0 kg object is taken from Earth to Jupiter ($g = 24.8 \text{ N/kg}$).



The same object on Earth and on Jupiter.

1. Calculate its weight on each planet.
2. Calculate how many times heavier it feels on Jupiter, to one decimal place.

Problem 12 Jumping on the Moon (medium)

Daniel in Kampala watches a video of an astronaut jumping very high on the Moon.

1. Explain why the astronaut can jump higher than on Earth.
2. State what happens to the astronaut's mass during the trip.

Problem 13 Reading a spring scale (medium)

A bag hangs from a spring scale that reads 14.7 N on Earth.

1. Calculate the mass of the bag.
2. Calculate what the scale would read on the Moon ($g = 1.6 \text{ N/kg}$).

Problem 14 Complete the table (medium)

Calculate the missing values.

Row 1: 3.0 kg on the Moon ($g = 1.6 \text{ N/kg}$), weight ?.

Row 2: 8.0 kg on Venus ($g = 8.9 \text{ N/kg}$), weight ?.

Row 3: mass ? on Earth with weight 98 N.

Problem 15 Spot the error (medium)

Sofia in Cape Town says: "An astronaut with a weight of 80 kg on Earth has a weight of 13 kg on the Moon."

1. Find two mistakes in her statement.
2. Give the correct values if 80 kg is the astronaut's mass.

Problem 16 Lifting a container (hard)

A crane lifts a container of mass 250 kg.

1. Calculate the weight of the container ($g = 9.8 \text{ N/kg}$).
2. The cable pulls up with 3000 N. Calculate the net force and give its direction.
3. Describe the motion of the container.

Problem 17 Three worlds (hard)

An object weighs 117.6 N on Earth.

1. Calculate its mass.
2. Calculate its weight on Jupiter ($g = 24.8 \text{ N/kg}$).
3. Calculate its weight on the Moon ($g = 1.6 \text{ N/kg}$).

Problem 18 Mystery planet (hard)

A space probe of mass 4.0 kg weighs 30 N on the surface of a newly discovered planet.

1. Calculate g on that planet.
2. State which two planets from the lesson table it lies between.
3. Calculate the weight of a 10 kg rock there.

Problem 19 Hammer and feather (hard)

On the Moon, a 1.3 kg hammer and a 0.0030 kg feather are released together and land at the same time.

1. Calculate the weight of each on the Moon ($g = 1.6 \text{ N/kg}$).
2. Explain why they land together even though the weights are different.
3. Explain why the feather falls more slowly on Earth.

Problem 20 Scale on the Moon (hard)

A bathroom scale on Earth converts force to mass by dividing by 9.8 N/kg . Amara, whose mass is 50 kg, stands on this scale on the Moon ($g = 1.6 \text{ N/kg}$).

1. Calculate the force the scale feels.
2. Calculate the reading the scale shows.
3. Explain why the reading is misleading.