CONVERT COMPOUND UNITS

BUILDING BLOCKS

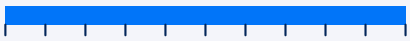
NAME _____ CLASS _____ DATE _____

KEY IDEA

To change units, do the same to both sides.

1 km is 1000 m, so 3 km is 3000 m.

A bigger unit needs fewer of them.



× 3 (1 km = 1000 m / 3 km = 3000 m) × 3

1 Fill in the missing numbers.

1 km = ☐ m		**1 hour =** ☐ minutes	
1 minute = ☐ seconds		**1 litre =** ☐ ml	
1 kg = ☐ g		**1 m =** ☐ cm	

2 Use the frames to change the units.

a) Change 4 km into metres.

× 4 (1 km = 1000 m / 4 km = ☐ m) ☐

b) Change 3 hours into minutes.

☐ (1 hour = 60 minutes / 3 hours = ☐ minutes) ☐

3 Change into the bigger unit.

a) Change 5000 m into km.

× 5 (1000 m = 1 km / 5000 m = ☐ km) ☐

b) Change 240 seconds into minutes.

☐ (60 seconds = 1 minute / 240 seconds = ☐ minutes) ☐

4 When you change the units, does the number get bigger or smaller? Circle.

a)	**km**	→	**m**	The number gets	BIGGER SMALLER
b)	**minutes**	→	**hours**	The number gets	BIGGER SMALLER
c)	**ml**	→	**litres**	The number gets	BIGGER SMALLER

CONVERT COMPOUND UNITS

SUPPORT

NAME _____ CLASS _____ DATE _____

KEY IDEA

Change one unit at a time.

120 m per minute into km per hour:

× 60 (1 minute = 120 m ; 60 minutes = 7200 m) × 60

7200 m = 7.2 km

so 120 m per minute = 7.2 km per hour

1 Change each rate into a rate per hour.

a) 5 litres per minute

× 60 (1 minute = 5 litres ; 60 minutes = ☐ litres) ☐

b) 2 km per minute

☐ (1 minute = 2 km ; 60 minutes = ☐ km) ☐

2 Change each rate into a rate per minute.

a) 900 m per hour

÷ 60 (60 minutes = 900 m ; 1 minute = ☐ m) ☐

b) 240 litres per hour

☐ (60 minutes = 240 litres ; 1 minute = ☐ litres) ☐

3 Change the distance unit.

a) 3 km per hour into m per hour

× 3 (1 km = 1000 m ; 3 km = ☐ m) ☐

b) 4500 m per hour into km per hour

☐ (1000 m = 1 km ; 4500 m = ☐ km) ☐

4 Priya runs 200 m per minute. Leon runs 10 km per hour.

☐ (1 minute = 200 m ; 60 minutes = ☐ m) ☐

Priya's speed is ☐ km/h

Who is faster? PRIYA LEON

CONVERT COMPOUND UNITS

CORE

NAME _____ CLASS _____ DATE _____

KEY IDEA

5 m/s → × 60 → 300 m per minute → × 60 → 18 000 m per hour → ÷ 1000 → 18 km/h

Change each part of the unit in turn. Check: should the number get bigger or smaller?

FLUENCY

1 Convert each rate.

a) 15 m/s into km/h

b) 72 km/h into m/s

c) 4.5 litres per minute into litres per hour

d) 2400 ml per hour into litres per minute

e) 1.2 km per minute into m/s

2 Water flows from a pipe at a constant 180 litres per hour. Choose your own steps.

1 hour = 180 litres

=

1 second =

Give your answer in ml per second:

_____ ml/s

REASONING

3 Write these speeds in order, from slowest to fastest.

20 m/s **70 km/h** **1.1 km per minute** **1250 m per minute**

slowest _____ _____ _____ _____ fastest

4 Zara changes 6 m/s into km/h like this:

6 × 60 = 360 m per minute 360 ÷ 1000 = 0.36 So 6 m/s = 0.36 km/h

a) Explain Zara's mistake.

.....

b) Write 6 m/s in km/h. _____ km/h

CONVERT COMPOUND UNITS

GREATER DEPTH

NAME _____ CLASS _____ DATE _____

REASONING

1 Is each statement always, sometimes or never true? Circle your answer.

If it is sometimes true, give an example of when it is true and when it is not.

a) To change m/s into km/h, multiply by 3.6. ALWAYS SOMETIMES NEVER

b) The speed with the bigger number is faster. ALWAYS SOMETIMES NEVER

c) To change cm^2 into m^2, divide by 100. ALWAYS SOMETIMES NEVER

PROBLEM SOLVING

2 Gold has a density of 19.3 g/cm^3.

$1\ m^3 = 1\ 000\ 000\ cm^3$

a) Write this density in kg/m^3. _____ kg/m^3

b) Find the mass of a solid gold cube with edges of 2 cm. _____ g

3 A cheetah can run at 30 m/s for a short time. A car travels at 70 mph.

5 miles ≈ 8 km

a) Which is faster? Show your working.

b) How far can the cheetah run in 20 seconds? _____ m

★ CHALLENGE FOR ALL

4 A paddling pool holds 2.4 m^3 of water (1 m^3 = 1000 litres). A hose fills it at 0.5 litres per second.

a) How long does the pool take to fill? Give hours and minutes. _____

b) A second hose giving 45 litres per minute is used at the same time.
How much time does this save? _____ minutes

CONVERT COMPOUND UNITS – ANSWERS

ANSWERS

BUILDING BLOCKS

1. 1 km = 1000 m · 1 hour = 60 minutes · 1 minute = 60 seconds · 1 litre = 1000 ml · 1 kg = 1000 g · 1 m = 100 cm
2. a) × 4 on both sides: 4000 m · b) × 3 on both sides: 180 minutes
3. a) × 5 on both sides: 5 km · b) × 4 on both sides: 4 minutes
4. a) BIGGER · b) SMALLER · c) SMALLER

SUPPORT

1. a) × 60 on both sides: 300 litres, so 300 litres per hour · b) × 60 on both sides: 120 km, so 120 km per hour
2. a) ÷ 60 on both sides: 15 m, so 15 m per minute · b) ÷ 60 on both sides: 4 litres, so 4 litres per minute
3. a) × 3 on both sides: 3000 m per hour · b) × 4.5 on both sides: 4.5 km per hour
4. × 60 on both sides: 12 000 m in an hour = 12 km, so 12 km/h · Priya is faster

CORE

1. a) 54 km/h · b) 20 m/s · c) 270 litres per hour · d) 0.04 litres per minute · e) 20 m/s
2. e.g. ÷ 60 (1 minute = 3 litres), then ÷ 60 (1 second = 0.05 litres): 50 ml per second
3. 1.1 km per minute (66 km/h), 70 km/h, 20 m/s (72 km/h), 1250 m per minute (75 km/h)
4. a) 0.36 is in km per minute, not km per hour: she has not changed minutes into hours · b) 0.36 × 60 = 21.6 km/h

GREATER DEPTH

1. a) Always · b) Sometimes: 20 m/s is faster than 60 km/h, but 50 m per minute (3 km/h) is slower than 5 km/h · c) Never: 1 m^2 = 10 000 cm^2, so divide by 10 000
2. a) 19.3 × 1 000 000 = 19 300 000 g = 19 300 kg, so 19 300 kg/m^3 · b) 8 cm^3 × 19.3 = 154.4 g
3. a) 70 mph ≈ 112 km/h; cheetah: 30 × 3.6 = 108 km/h, so the car · b) 30 × 20 = 600 m
4. a) 2400 litres ÷ 0.5 = 4800 s = 80 minutes = 1 hour 20 minutes · b) 30 + 45 = 75 litres per minute; 2400 ÷ 75 = 32 minutes, saving 48 minutes