

Power and Energy Transferred

KS3 Physics · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

Write 3 kW in watts.

Step 1 · Kilo means thousand

$$1 \text{ kW} = 1000 \text{ W.}$$

Step 2 · Multiply

$$3 \times 1000 = 3000 \text{ W.}$$

Answer: 3000 W

Check: Going from kW to W, the number gets bigger.

2. Now try one with the steps

A 60 W laptop is on for 5 seconds. How much energy is transferred?

Step 1 · Meaning of 60 W

Step 2 · Formula

Step 3 · Calculate

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. What is the unit of power? [1]

2. How many watts are in 1 kW? [1]

3. Write 2.5 kW in watts. [1]

4. Write 1500 W in kilowatts. [1]

5. A microwave is rated 800 W and a hair dryer 2 kW. Which transfers more energy each second? [1]
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6. An 8 W LED bulb is on for 10 seconds. How much energy does it transfer, in joules? [2]
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7. A 100 W television is on for 1 minute. How much energy does it transfer, in joules? [2]
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8. Write 6000 J in kilojoules. [1]
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9. A 3000 W kettle is on for 2 minutes. How much energy does it transfer, in kJ? [3]
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10. An 800 W microwave transfers 48 000 J. For how many seconds was it on? [2]
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11. A cereal bar label says 420 kJ. For how many seconds could this energy run a 100 W television? [2]
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12. A food label says a packet of crisps contains 2250 kJ per 100 g. How much energy is in a 25 g bag, in kJ? [2]
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13. Explain why a kettle needs a much higher power rating than a phone charger. [2]
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14. A 2 kW heater is on for 30 minutes. How much energy does it transfer, in kJ? [3]
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4. Before you hand it in

Multiplying by minutes: $100\text{ W} \times 2\text{ min} = 200\text{ J}$.

Convert time to seconds first: $100 \times 120 = 12\,000\text{ J}$.

Mixing kW and W in one sum.

Convert to watts ($\times 1000$) before using $\text{energy} = \text{power} \times \text{time}$ in joules.

"A higher power rating means it uses more energy."

Power is energy per second. A 2 kW heater on for 1 hour transfers the same energy 1 kW heater on for 2 hours.

Confusing kJ and kcal on food labels.

Physics uses kilojoules. 1 kcal is about 4.2 kJ.