

Name _____

Class _____

Date _____

By the end of this worksheet I can...

- ☐ calculate electrical energy using $E_e = VIt$
- ☐ convert minutes and hours into seconds
- ☐ give answers to two significant figures with the correct unit

I DO**Key ideas and worked example** Read this first **$E_e = VIt$**

Electrical energy = voltage × current × time

- Voltage V in volts (V)
- Current I in amps (A)
- Time t in seconds (s)
- Energy E_e in joules (J)

Remember

Always change the time into seconds first: minutes × 60, hours × 3600.

*An electric hob runs at 230 V and draws 5 A. It takes 5 minutes to heat a pot of soup.***Example Calculate the electrical energy used.****Worked answer** set out every step like this

$$t = 5 \times 60 = 300 \text{ s}$$

$$E_e = VIt = 230 \times 5 \times 300$$

$$E_e = 345\,000 \text{ J (345 kJ)}$$

Why marks are not awarded

✗ Using 5 instead of 300 seconds

WE DO**Guided practice** Follow the steps to help you*A hand drier runs for 45 s from a 230 V supply and draws 10 A.***1 Calculate the electrical energy used.** (2 marks)**Steps**

1. Check the time is in seconds
2. Write $E_e = VIt$ and substitute
3. Calculate, round to two significant figures and give the unit

YOU DO

On your own Give answers to two significant figures. Show your working.

2 A 230 V supply charges a battery, drawing 5 A for 2 minutes. Calculate the electrical energy transferred.

3 A turbine drives a 110 V generator with an output current of 3 A. Calculate the electrical energy produced in 1 hour.

4 A 12 V car headlamp draws 4.5 A. Calculate the energy it uses in 20 minutes.

5 A 230 V kettle uses 540 kJ of electrical energy in 3 minutes. Calculate the current it draws.

Check and reflect

Mark your answers with the answer sheet. Which “I can” statement above still needs work? Look back at the notes for that topic on the site.
