

Compound Measures Worksheet

1. A car travels 180 km in 2 hours 15 minutes. Calculate its average speed in km/h and explain the steps you took to convert the time to hours.
2. A factory uses 120 litres of paint to cover 480 square metres of wall. What is the rate of paint used per square metre? Discuss why this compound measure is useful in planning.
3. If a cyclist maintains a speed of 18 km/h, how far will they travel in 40 minutes? Explain your reasoning and any conversions you made.
4. Water flows from a tap at a rate of 0.08 litres per second. How much water will be released in 5 minutes? Explain how you arrived at your answer.
5. A recipe uses 350 grams of flour to make 14 cookies. Calculate the amount of flour used per cookie and discuss how this compound measure helps in scaling recipes.
6. A bus travels 210 km using 28 litres of fuel. What is the fuel efficiency in km per litre? Why might this compound measure be important for drivers?
7. A tank is being filled at a rate of 12 litres per minute. How long will it take to fill a 540-litre tank? Explain the importance of understanding rates in this context.
8. A runner completes a 400-metre lap in 56 seconds. What is the runner's average speed in metres per second? Discuss why average speed is a compound measure.
9. Electricity is supplied at a rate of 1500 watts for 3 hours. Calculate the total energy used in kilowatt-hours (kWh). Explain the steps and conversions involved.

Answer Key

1. Average speed = distance/time = $180 \text{ km} / 2.25 \text{ h} = 80 \text{ km/h}$. Time converted: $2 \text{ h } 15 \text{ min} = 2 + 15/60 = 2.25 \text{ hours}$.
2. Paint per square metre = $120 \text{ litres} / 480 \text{ m}^2 = 0.25 \text{ litres/m}^2$. Useful for estimating total paint needed for any area.
3. Distance = speed $\times$ time = $18 \text{ km/h} \times (40/60) \text{ h} = 18 \times 0.6667 \approx 12 \text{ km}$. Conversion: $40 \text{ min} = 2/3 \text{ hour}$.
4. Water in 5 min = $0.08 \text{ L/s} \times 300 \text{ s} = 24 \text{ litres}$. $5 \text{ minutes} \times 60 = 300 \text{ seconds}$.
5. Flour per cookie = $350 \text{ g} / 14 = 25 \text{ g per cookie}$. Helps adjust quantities for more or fewer cookies.
6. Fuel efficiency = $210 \text{ km} / 28 \text{ L} = 7.5 \text{ km/L}$. Important for cost and environmental reasons.
7. Time = total volume/rate = $540 \text{ L} / 12 \text{ L/min} = 45 \text{ minutes}$. Understanding rates helps plan filling time.
8. Average speed = $400 \text{ m} / 56 \text{ s} \approx 7.14 \text{ m/s}$. Average speed combines distance and time, making it a compound measure.
9. Energy = power $\times$ time = $1500 \text{ W} \times 3 \text{ h} = 4500 \text{ Wh} = 4.5 \text{ kWh}$. Convert watts to kilowatts ($1500 \text{ W} = 1.5 \text{ kW}$), then multiply by hours.