

Combined science - Physics - Key stage 4 - Energy

Power - worksheet

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In lesson questions



Independent practice

1. Define the term power.
 - a. Power is the
2. Which example has a higher power?
 - a. A sprinter running the 100 m in 10 s, or
 - b. A marathon runner completing their last 400 m in 50 seconds
3. Explain your answers
4. What are the factors affecting power?



Independent practice

1. Find the power of a lift that transfers 450 J of energy in 15 seconds
2. An electric motor transfers 8000 J of energy in 2.5 seconds. Calculate its power.
3. A weightlifter gives a dumbbell 6 000 J of gravitational potential energy store in 1.2 seconds. What is the weightlifter's power?
4. What is the power of an engine that does 120 000 J of work in 2 minutes?
5. A car transfers 5.95 kJ of energy in 35 seconds. Find the power of the car.
Give your answer in kW.



Independent practice

1. A ship contains an engine with a power of $24\,000\text{W}$. The ship's engine runs for 12 seconds, how much energy is transferred?
2. Find the work done by an electric motor of which has a power of 125 W if it is switched on for 70s.
3. A track cyclist has a peak power of 2250 W and holds this for 10.1 s to complete a lap of the track. How much energy is transferred?
4. A motorcycle has a power of 33 kW and runs for 120 s. How much energy does it transfer?
5. A car has a power of 85 kW and runs for 15 minutes. How much energy is transferred? Give your answer in kJ.



Independent practice

1. A tractor uses 187 500 J of energy to pull a plough. If the power of the tractor is 55 000 W, find the time the plough was pulled for.
2. How long would it take a 100 W light bulb to transfer 47 J of energy?
3. A crane lifts a load at power of 340 W. How long does it take for a crate to gain 1500 J of GPE?
4. A 2 kW hair dryer transfers 12 000 J of energy in 6 s. How much longer would it take a 1.5 kW hair dryer to transfer the same amount of energy?
5. **Challenge:** How long would it take a 200 W motor to lift a 1.5 kg box to a height of 30 m? ($g = 10 \text{ N/kg}$) (hint: think about GPE)



Answers



Review

1. Define the term power.
 - a. Power is the **rate of transfer of energy.**
2. Which example is a higher power?
 - a. A sprinter running the 100 m in 10 s, or
 - b. A marathon runner completing their last 400 m in 50 seconds **Sprinter**
3. Explain your answer. **They are moving faster so will be transferring energy at a higher rate**
4. What are the factors affecting power? **The amount of energy to be transferred, time taken**



Review

1. Find the power of a lift that transfers 450 J of energy in 15 seconds. **30 W**
2. An electric motor transfers 8000 J of energy in 2.5 seconds. Calculate its power. **3 200 W**
3. A weightlifter gives a dumbbell 600 J of gravitational potential energy store in 1.2 seconds. What is the weightlifter's power? **500 W**
4. What is the power of an engine that does 120 000 J of work in 2 minutes?
1000 W
5. A car transfers 5.95 kJ of energy in 35 seconds. Find the power of the car. Give your answer in kW. **1.7 kW**



Review

1. A ship contains an engine with a power of 24 000W. The ship's engine runs for 12 seconds, how much energy is transferred? **288 000 J**
2. Find the work done by an electric motor of which has a power of 125 W if it is switched on for 70s. **8750 J**
3. A track cyclist has a peak power of 2250 W and holds this for 10.1 s to complete a lap of the track. How much energy is transferred? **22725 J**
4. A motorcycle has a power of 33 kW and runs for 120 s. How much energy does it transfer? **3 960 000 J**
5. A car has a power of 85 kW and runs for 15 minutes. How much energy is transferred? Give your answer in kJ. **76 500 kJ**



Review

1. A tractor uses 187 500 J of energy to pull a plough. If the power of the tractor is 55 000 W, find the time the plough was pulled for. **3.4 s**
2. How long would it take a 100 W light bulb to transfer 47 J of energy? **0.47 s**
3. A crane lifts a load at power of 340 W. How long does it take for a crate to gain 1500 J of GPE? **4.4 s**
4. A 2 kW hair dryer transfers 12 000 J of energy in 6 s. How much longer would it take a 1.5 kW hair dryer to transfer the same amount of energy? **2 s**
5. **Challenge:** How long would it take a 200 W motor to lift a 1.5 kg box to a height of 30 m? ($g = 10 \text{ N/kg}$) (hint: think about GPE) **2.25 s**

