**Energy transfer worksheet. E = P x t E = Q x V**

**BASIC**

1. **Re-arrange** the equations in order to find equations for:
2. time t
3. power P
4. charge Q
5. potential difference V
6. **Calculate** the energy transferred by a 3,000 W hairdryer in 60 seconds.
7. **Calculate** the energy transferred in a component when the charge passing through it is 30 C and the potential difference is 20 V.
8. **Calculate** the energy transferred when the charge flow is 30 C and the potential difference is 4 V.
9. **Calculate** the energy transfer for a charge flow of 20 C when the potential difference is 6.0 V.

**MEDIUM**

1. An Xbox uses a power of 125 W and is left on for a time of 2500s. **Calculate** the amount of energy used.
2. **Calculate** the voltage supplied to a 5,000 J appliance that transfers 20 C of electrical charge.
3. A kettle uses a power of 1800 W, and uses 36000 J of energy. **Calculate** the time that the kettle was left on for.
4. **Calculate** the charge transferred by a 5000 J electrical appliance when the voltage supplied to it is 230 V.
5. A laptop uses a power of 65 W, and uses 1300 J of energy. **Calculate** how long the laptop was used for.
6. An iPhone charger uses 2400 J of energy and delivers 12 V of potential difference. **Calculate** the charge of the charger.
7. **Convert** into Watts:

**To go from kW to W → × 1000**

1. 3.5 kW.
2. 0.7 kW.
3. **Convert** into kiloWatts:

**To go from W to kW → ÷ 1000**

1. 7000 W.
2. 19000 W.

**HARD** (for these questions look at the unit conversions on the inside cover of your exercise book)

1. **Calculate** the energy transferred by a 2 kW electric radiator in 5 minutes.

You need to convert kW into W

P = 2 kW = \_\_\_\_\_\_\_\_\_\_ W

You need to convert minutes into seconds

t = 5 minutes = \_\_\_\_\_\_\_\_\_\_ s

1. **Calculate** the power for an electrical appliance that transfers 5 kJ of energy in 15 minutes.
2. **Calculate** the time it takes a 60 kW appliance to transfer 0.02 kJ of electrical energy.
3. **Calculate** the charge transferred by a 0.05 kJ electrical appliance when the voltage supplied to it is 1000 mV.
4. **Calculate** the voltage supplied to a 0.05 MJ appliance that transfers 3 C of electrical charge.
5. **Describe** what happens to the energy transferred by an appliance if:
6. the power of the appliance increases (and the time is kept the same)
7. the time decreases (and the power of the appliance is the same)
8. **Describe** what happens to the energy when:
9. the potential difference increases (and the charge is kept the same)
10. the charge decreases (and the potential difference is kept the same)