Year 9 Physics SoW and HW plan Autumn 2

Lesson	Outcomes	Suggested activities/resources
P1 Energy dissipation	• Define useful and wasted energy Explain what happens to wasted energy • Evaluate whether energy is still useful after it has been used	Challenge question https://www.youtube.com/watch?v=CVzT-Ya118A Write down a definition for wasted energy In the video what are the main causes of wasted energy? What happens to that wasted energy? Now provide a definition for useful energy. Why does a drill bit become hot when you are drilling into wood? What energy transfers are taking place? Why does a brake pad become hot on a bike when you use it? What energy transfers are taking place? Why do you become hot when you run on a running machine? Self mark WWW EBI Answer the challenge question from the beginning; using the information that you have worked out.
P1 Energy and efficiency	• 1. Convert orders of magnitude. 2. Define the term efficiency 3. Calculate the efficiency of a machine. 4. Explain how to reduce energy losses of a machine.	1. Struggle Zone question… A new house is fitted with all the latest energy efficiency measures. An energy surveyor checks a new house and finds that a house is losing 200J of heat through it's roof. Prior to the efficiency measures the house had 4kJ of useful energy. The heaters in the house are producing around 8000J of heat energy. Evaluate whether or not the energy measures are efficient… Gather the information in the boxes below this one to answer this question... 2. Box 1 Orders of magnitude.... Convert 1) 1200000W into kW 2) 1500J into kJ 3) 0.75kW into W 4) 3m into km 5) 5p into £'s

		3. What do you understand by the term efficient? Stuck? Hint 2 3. Box 4 A machine has an input energy of 100J and useful output energy of 80J; it has a wasted energy of 20J and is 80% efficient. Use this to work out what the equation is for efficiency. Stuck? Hint 3 4. Box 5 How would we reduce these energy losses? Stuck? Hint 4 Friction between moving parts causes heating. The resistance of a wire causes it to get hot when a current passes through it. Air resistance causes energy transfer to the surroundings. Sound from machinery causes energy transfer to the surroundings 5. Now go and complete the struggle zone question…… stuck? Hint 5
P1 Electrical appliances	• 1: Identify how energy is transferred to your home • 2: Evaluate the usefulness of electrical appliances • 3: Assess the appropriate electrical appliance for its function	Match up!! Identify which appliance goes with which energy resource. Identify the wasted energy and useful energy in each case. Think, pair, share. Why are electrical appliances so useful? Find all the electrical appliances in this concert and assess how energy is usefully transferred and where it would be wasted
P1 Energy and power	• 1: Define power • 2: Calculate the power of an appliance • 3: Calculate the power efficiency of an appliance • 4: Calculate the power wasted by an appliance	Success criteria: Everything MUST be in your own words where possible and not copied down You should aim to include ..... A definition for power.. What it is measured in and how is this defined.. The equation for power.. The equation for power written in triangle format.. At least one example of a calculation where each term is the subject.. The power efficiency equation. Put it into a triangle. The equation for wasted power using input power and useful power.
Home work: 1. An electric fan heater contains an electric heater and a fan driven by an electric motor:		

a) Describe the energy transfers that take place in the fan heater when it is operating normally.[**5 Marks**]
b) With reference to the fan heater, explain what is meant by: i) useful energy[3 Marks] ii) wasted energy [**3 Marks**]

2. A bungee jumper jumps from a platform and transfers 12000 J from his gravitational potential energy store before the rope attached to him becomes taut and starts to stretch. He then transfers a further 24 000 J from his gravitational potential energy store before he stops falling and begins to rise:
   a) Describe energy transfers and changes to the jumper's energy stores: i) after he jumps before the rope starts to stretch [**2 Marks**] ii) after the rope starts to stretch until he stops falling [**3 Marks**]
   b) Calculate the maximum value of his kinetic energy store during his descent [**2 Marks**]
3. A parachutist of total mass 75 kg jumps from an aeroplane moving at a speed of 60m/s at a height of 900 m above the ground.
   a)Calculate her kinetic energy when she left the aeroplane [**2 Marks**]
   b) Her parachute reduced her speed of descent to 5 m/s, i) Calculate her kinetic energy at this speed [**2 Marks**] ii)Calculate the decrease in her gravitational potential energy store as a result of her descent [**2 Marks**]
   c) Calculate the work done by air resistance during her descent [**2 Marks**]

4. A car's battery contains a store of energy. As the car moves, energy from one store is transferred to another store.
   a) Describe how different stores of energy change as the car moves [**2 Marks**]
   b) The car has a top speed of 12 m/s and the mass of 800 g. Write down the equation that links kinetic energy, mass and speed [**1 Mark**]
   c) Calculate the maximum kinetic energy of the car [**2 Marks**]
   d) Explain why a more efficient motor increases the top speed of the car [**2 Marks**]