**Science Relocation Pack**

**Year 9 – Investigative Chemistry**

**Spring 1**

**The Knowledge - Instructions**

Use LCWC to embed the knowledge into your long-term memory. You can do this in your relocation booklet.

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|  | **Week 1** | **Energy Types (P.1)** |
| 1 | What type of energy store is exemplified by moving objects? | Kinetic energy |
| 2 | The law of conservation of energy states what three things that can happen to energy | Transferred usefully, stored or dissipated |
| 3 | Which word means 'wasted into the surroundings'? | Dissipated |
| 4 | When energy is wasted, it is usually which energy stores? | Thermal and sound |
| 5 | The law of conservation of energy states that which two things cannot happen to energy? | Created or destroyed |
| 6 | What can be done to moving parts in a system to reduce heat loss by friction? | Lubrication (adding oil/grease) |
| 7 | What name is given to a material which does not conduct thermal energy well? | Thermal insulator |
| 8 | What name is given to a material which allows thermal energy to pass through it easily? | Thermal conductor |
| 9 | What is the unit for energy? | Joules (J) |
| 10 | What type of heat transfer occurs in solids? | Conduction |
| 11 | What type of heat transfer happens only in fluids (gas and liquids)? | Convection |
| 12 | Which is the only type of thermal energy transfer can occur in a vacuum? | Radiation |
| 13 | Which dissipates less thermal energy? Thin walls or thick walls? | Thick |
| 14 | Which dissipates less thermal energy? Walls with large or small area | Small |
| 15 | Which dissipates less thermal energy? Large or small temperature difference | Small |
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|  | **Week 2** | **Work power and efficiency (P.2)** |
| 1 | Equation for work done. | Work done =Force x distance |
| 2 | Units for work done. | Joules (J) |
| 3 | What is work done? | Energy transferred. |
| 4 | Units for power. | Watts (W) |
| 5 | Equation for power. | Power = Energy transferred/time |
| 6 | Units for time. | seconds (s) |
| 7 | Define power. | Rate at which energy is transferred. |
| 8 | One watt is the same as… | 1 joule per second. |
| 9 | Equation for efficiency in terms of energy | efficiency = useful output energy transfer/total input energy transfer |
| 10 | Equation for efficiency in terms of power | efficiency = useful output power/total input power |
| 11 | Units for efficiency | No units |
| 12 | Units for force | Newtons (N) |
| 13 | One Joule is the same as… | one Newton-metre |
| 14 | The minimum value of efficiency | 0 |
| 15 | The maximum value of efficiency | 1 |
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|  | **Week 3** | **Elastic objects and potential Energy (P.3)** |
| 1 | What is the equation for elastic potential energy? | Ee=1/2ke2 Elastic potential energy (J) = 1/2 x spring constant (N/m) x extension2 (m) |
| 2 | What is the equation for kinetic energy? | Ek = 1/2 mv2 Kinetic energy (J) = 1/2 x mass (Kg) x velocity2 (m/s) |
| 3 | What is the equation for gravitational potential energy? | Eg=mgh Gravitational potential energy (J) = mass (kg) x gravitational field strength (N/kg) x height (m) |
| 4 | Which equation describes Hooke's Law? | F = ke Force (N) = spring constant (N/m) x extension (m) |
| 5 | What type of energy is stored in a stretched elastic band? | Elastic potential energy |
| 6 | What type of energy is stored in a squashed up tennis ball? | Elastic potential energy |
| 7 | What needs to be applied for an object to change shape? | A force |
| 8 | Define the term for an object returning to its original shape after being stretched | Elastic deformation |
| 9 | Define the term for an object not returning to its original shape after being stretched | Inelastic deformation |
| 10 | Identify the Law: "The extension of a spring is directly proportional to the force applied to it." | Hooke's Law |
| 11 | What sort of energy is stored in a bungee cord? | Elastic potential energy |
| 12 | What do you call the point at which Hooke's Law no longer applies? | The limit of proportionality |
| 13 | In a graph of Hooke's Law, what happens at the limit of proportionality? | Line no longer straight, it will curve |
| 14 | What is the equation for "gravitational potential energy"? | Eg = mgh |
| 15 | What is the equation for Kinetic Energy? | Ek=1/2mv2 |
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|  | **Week 4** | **Waves (P.4)** |
| 1 | What are the two types of waves? | Transverse and longitudinal |
| 2 | What type of wave is sound? | Longitudinal |
| 3 | What type of wave is visible light? | Transverse |
| 4 | How do the particles that make up a wave transfer energy? | They oscillate (vibrate) |
| 5 | What are the 4 properties of a wave? | Frequency, amplitude, wavelength, period |
| 6 | Define "frequency" | The number of waves passing a fixed point per second ( hertz) |
| 7 | Define "amplitude" | Maximum displacement that any particle achieves from its undisturbed position (metres) |
| 8 | Define "wavelength" | Distance from one point on a wave to the same point on the next wave (metres) |
| 9 | Define "period" | Time taken for 1 complete oscillation (seconds) |
| 10 | State the equation to calculate the period of a wave | T=1/f Period (s) = 1/ frequency (Hz) |
| 11 | State the equation to calculate wave speed | v = f x λ  wave speed (m/s) = frequency (Hz) x wavelength (m) |
| 12 | State the relationship between speed and wavelength | They are directly proportional |
| 13 | In a transverse wave, oscillations are \_\_\_\_\_\_\_\_ to the direction of energy transfer | perpendicular |
| 14 | In a longitudinal wave, oscillations are \_\_\_\_\_\_\_\_\_\_\_ to the direction of energy transfer | parallel |
| 15 | What do waves transfer? | Energy (not matter) |
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|  | **Week 5** | **Electromagnetic waves 1 (P.5)** |
| 1 | What type of waves are electromagnetic waves? | Transverse |
| 2 | At what speed do all electromagnetic waves travel? | Speed of light (300,000,000m/s) |
| 3 | What do the different types of electromagnetic waves vary in? | Frequency |
| 4 | List the electromagnetic waves in order of frequency from lowest to highest | Radio waves, microwaves, infrared waves, visible light, ultraviolet, X-Rays, gamma rays |
| 5 | Which sub-cellular structure is damaged by ionising radiation? | DNA |
| 6 | Which type of wave is the most ionising? | Gamma Rays |
| 7 | Which wave is used in medical imaging? | X-Rays |
| 8 | Which wave is used in telecommunications? | Radio waves and microwaves |
| 9 | Which wave has the longest wavelength? | Radio waves |
| 10 | State 3 properties shared by all electromagnetic waves | 1) All travel at the speed of light  2) All transverse 3) All travel through a vacuum |
| 11 | Which wave has the shortest wavelength? | Gamma rays |
| 12 | State 1 risk associated with UV rays | Skin cancer |
| 13 | Which two types of waves are ionising radiation? | X-Rays and Gamma Rays |
| 14 | Which wave can be detected by the human eye? | Visible light |
| 15 | Which 3 rays can have hazardous effects on the human body? | UV, X-Ray and Gamma rays |
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|  | **Week 6** | **Electromagnetic waves 2 (P.6)** |
| 1 | What is produced by oscillations in electrical circuits? (HT only) | Radio waves |
| 2 | What happens when a radio wave is absorbed? (HT only) | Alternating current produced |
| 3 | What causes EM waves to be generated/absorbed? | Changes in atoms/nuclei of atoms |
| 4 | State two effects of UV waves | Cause skin to age prematurely, increase risk of skin cancer |
| 5 | State two effects of X-rays and gamma rays | 1) mutations of genes, 2) cancer |
| 6 | State two uses of radio waves | TV and radio |
| 7 | State 2 uses of microwaves | Satellite communication and cooking food |
| 8 | State 3 uses of infrared | Electrical heaters, cooking food, infrared cameras |
| 9 | State 1 use of visible light | Fibre optic communication |
| 10 | State 2 uses of UV waves | Energy efficient lamps and sun tanning |
| 11 | State two uses of X-rays and gamma rays | Medical imaging and treatments |
| 12 | Why are radio waves used in television and radio? (HT only) | Can be reflected from atmosphere due to wavelength |
| 13 | Why are microwaves used in cooking? (HT only) | Frequency matches frequency of water particles vibrating |
| 14 | Why are microwaves used in satellite communication?(HT only) | Frequency allows them to pass through atmosphere |
| 15 | Why are X-rays and gamma rays used in medical imaging? (HT only) | Highly ionising and penetrating |
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|  | **Week 7** | **Sound and light waves introduction (P.7)** |
| 1 | What type of waves are sound waves? | Longitudinal |
| 2 | What type of waves are light waves? | Transverse |
| 3 | Light waves travel in \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ | Straight lines |
| 4 | Why can sound waves not travel in a vacuum | A vacuum has no particles |
| 5 | What happens to the speed of a light wave as it enters a more dense medium | The first part of the light wave slows down |
| 6 | Which state does a sound wave travel fastest in? | Solid |
| 7 | Which state does a sound wave travel slowest in? | Gas |
| 8 | What happens to the direction of a light wave as it enters a different medium? | The light wave changes direction towards the normal |
| 9 | What must sound waves travel through? | A medium |
| 10 | When light and sound waves reach a boundary between mediums (materials) what four things can happen to them? | Reflected, refracted, absorbed, transmitted |
| 11 | What happens to the loudness of a sound wave when it's amplitude increases? | The loudness increases |
| 12 | What happens to the pitch of a sound wave when it's frequency increases? | The pitch increases (gets higher) |
| 13 | Do light waves vary their speed? | No, they all travel at the same speed |
| 14 | What is the amplitude of a sound wave related to? | It's volume |
| 15 | What is the frequency and wavelength of a sound wave related to? | It's pitch |
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|  | **Week 8** | **Properties of waves (separate only) (P.8)** |
| 1 | State 3 things that can happen to waves when they reach a boundary | Reflected, transmitted or absorbed |
| 2 | State the name of a reflected sound wave | Echo |
| 3 | What happens when a sound wave travels through a solid? | The solid particles vibrate |
| 4 | Name the 4 main parts of the ear | 1) Pinna, 2) Ear drum, 3) Cochlea, 4) Auditory nerve |
| 5 | Why is human hearing limited? | Limited frequency range in which sound waves can convert to vibrations in solids |
| 6 | What is the range of normal human hearing? | 20Hz - 20kHz |
| 7 | State two uses of ultrasounds | Medical and industrial imaging |
| 8 | Name one object that converts sound waves into electrical waves | Microphone |
| 9 | State the two types of waves produced by earthquakes | P-waves and S-waves |
| 10 | Which type of wave are P-waves and S-waves? | P-waves = longitudinal S-waves = transverse |
| 11 | Which type of earthquake wave travels in solids only? | S-waves |
| 12 | Which type of earthquake wave travels in solids AND liquids? | P-waves |
| 13 | What have P-waves and S-waves provided evidence for? | Structure and size of Earth's core |
| 14 | Name two animals that use echolocation | Bats and dolphins |
| 15 | State one use of echolocation by humans | Measuring water depth |
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|  | **Week 9** | **Light waves - reflection (separate only) (P.9)** |
| 1 | Visible light is made up of a \_\_\_\_\_\_\_\_\_\_\_\_ of colours | spectrum |
| 2 | What determines the colour of visible light? | It's wavelength and frequency |
| 3 | Which type of reflection occurs from a smooth surface in a single direction? | Specular reflection |
| 4 | Which type of reflection occurs from a rough surface and causes scattering of light? | Diffuse reflection |
| 5 | How does a colour filter work? | Absorbs certain wavelength and transmits others |
| 6 | What determines the colour of an opaque object? | Which wavelengths of light are most strongly reflected |
| 7 | What colour does an object occur if all wavelengths of light are REFLECTED equally? | White |
| 8 | What colour does an object occur if all wavelengths of light are ABSORBED equally? | Black |
| 9 | What is the name given to an object that transmits all light? | Transparent |
| 10 | What is the name given to an object that transmits some light? | Translucent |
| 11 | When drawing a ray diagram, what is the name given to the line drawn at 90⁰ to the object? | The normal |
| 12 | What is the name given to the light ray that goes INTO an object? | Incident ray |
| 13 | What is the name given to the light ray that is reflected from an object? | Normal |
| 14 | What is the rule that links the angle of incidence and the angle of reflection? | Angle of incidence = Angle of reflection |
| 15 | Recall the colours of light from low frequency to high frequency | ROYGBIV |
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|  | **Week 10** | **Light waves - refraction (separate only) (P.10)** |
| 1 | Describe what happens to a wave as it moves from a less dense to a more dense medium | It refracts |
| 2 | Describe the change in speed and direction of a wave that is moving from a less dense to a more dense medium | 1) Slows down, 2) changes direction towards the normal |
| 3 | Describe the change in speed and direction of a wave that is moving from a move dense to a less dense medium | 1) Speeds up, 2) changes direction away from the normal |
| 4 | What is the symbol for a convex lens? | ↔ |
| 5 | What is the symbol for a concave lens? | >-< |
| 6 | What is the name given for the point where light rays converge? | Focal point |
| 7 | What is the equation of calculating magnification? | Magnification = image height/object height |
| 8 | Which term means an image is upside down compared to the object? | Inverted |
| 9 | Which term means an image is bigger than the real object? | Magnified |
| 10 | Which term means an image is smaller than the real object? | Diminished |
| 11 | What is a "real" image? | Can be projected onto a screen & formed on opposite side of lens to object |
| 12 | What is a "virtual" image? | Cannot be projected onto a screen & formed on same side of lens to object |
| 13 | When drawing a diagram for light rays passing through a lens, what is the point called where the rays meet/cross? | Converge |
| 14 | When drawing a diagram for light rays passing through a lens, what is the point called where the rays spread out from each other? | Diverge |
| 15 | What is the name given for the line drawn through the middle of a lens? (from the bottom of an object?) | Principal axis |
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|  | **Week 11** | **RP: Thermal insulation (P2) (separate only) (P.42)** |
| 1 | What piece of equipment is used to measure the water that will go into the beaker? | Measuring cylinder |
| 2 | Which piece of equipment measures the starting temperature of the water? | Thermometer |
| 3 | Which piece of equipment is used to measure the time? | Stopwatch |
| 4 | What is the purpose of the cardboard lid? | Prevent heat loss through convection |
| 5 | One experiment aimed to find out which type of insulation was better at insulating the beaker. What was the IV? | Type of material |
| 6 | One experiment aimed to find out which type of insulation was better at insulating the beaker. What was the DV? | Temperature change of water |
| 7 | One experiment aimed to find out the most effective thickness for the insulator. What was the IV? | Thickness of the insulator |
| 8 | One experiment aimed to find out the most effective thickness for the insulator. What was the DV? | Temperature change of the water |
| 9 | Is type of insulator a continuous or a categoric variable? | Categoric |
| 10 | State 2 control varaibles in both experiments | Volume of water & cooling time |
| 11 | Which materials should be the best insulators? | Those with air in them |
| 12 | How will you know which is the best insulator? | Lower temperature change |
| 13 | How could you improve the accuracy of the temperature measurement? | Use a digital thermometer |
| 14 | How could you check your results were repeatable? | Repeat the experiment and see if you got similar results |
| 15 | How could you check your results were repeatable? | Someone else does similar experiment, check they got similar results |
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|  | **Week 12** | **RP: Hooke's Law (P6) (P.46)** |
| 1 | Define Hooke's law | Force is directly proportional to extension of a spring |
| 2 | In this RP, you are investigating the relationship between force and extension of a spring. What would be the IV? | Force |
| 3 | In this RP, you are investigating the relationship between force and extension of a spring. What would be the DV? | Extension of the spring |
| 4 | Which piece of equipment attaches the clampstand to the work bench? | G-clamp |
| 5 | Which piece of equipment is used to hold the top of the spring? | Boss head clamp |
| 6 | State two potential hazards and give a safety precaution you could take to minimize the risk of each | 1) Weights falling on your toes - clamp clamp stand to the work bench 2) Spring scratching your eye - wear safety goggles |
| 7 | What is one common mistake during this practical? | Measuring length of spring not extension |
| 8 | What is it called when a spring no longer returns to it's original shape? | Elastic limit |
| 9 | What is meant by extension? | How much longer the spring has got |
| 10 | How could you check the results were repeatable? | Do the each reading 3 times and check you get the same results each time |
| 11 | How could you check the results were reproducible? | Someone else replicates your study and check whether they get the same results |
| 12 | Which piece of equipment is used to measure extension? | Ruler |
| 13 | Which piece of equipment is used to hold the clamp? | Clamp stand |
| 14 | Which symbol means directly proportional? | ∝ |
| 15 | What kind of graph would you plot? | A scattergraph with line of best fit |
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|  | **Week 13** | **RP: Waves (P8) (P.48)** |
| 1 | Which piece of equipment is used to investigate water waves? | Ripple tank |
| 2 | Which piece of equipment generates the waves in the water? | Motor and bar |
| 3 | How do we see the water waves when using a ripple tank? | Shine light through water and look at the shaddows created |
| 4 | How do you measure the wavelength of the water waves? | Using a ruler |
| 5 | Why do you measure across multiple waves and divide by the number of waves? | Means you are measuring the mean length (more accurate) |
| 6 | How do you measure the frequency of water waves? | Cound how many pass a point in 10 seconds and then divide by 10. |
| 7 | How do you calculate wave speed? | velocity = frequency / wavelength v = f / λ (m/s) (Hz) (m) |
| 8 | What is the piece of equipment that generates waves in a piece of string? | A vibration generator |
| 9 | Which piece of equipment is used to measure the length of the wave? | A meter ruler |
| 10 | How do you determine the frequency of the waves in the piece of string? | Read it from the power supply |
| 11 | What is the most common error made when measuring the wavelength? | Only measuring half of the wave |
| 12 | What is the relationship between wave speed and frequency? | Directly proportional |
| 13 | What is the unit for wavelength? | Metres (m) |
| 14 | What is the unit for frequency? | Hertz (Hz) |
| 15 | What is the unit for wave speed? | Metres per second |
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|  | **Week 14** | **RP: Light (P9) (separate only) (P.49)** |
| 1 | Which piece of equipment produces a single ray of light? | Ray box |
| 2 | Which piece of equipment is used to measure the angle of incidence and the angle of reflection? | Protractor |
| 3 | What is the line drawn at 90⁰ to the surface called? | The normal |
| 4 | What is the light ray that enters the mirror/glass block called? | The incident ray |
| 5 | What is the light ray that leaves the glass block called? | The refracted ray |
| 6 | What is the light ray that is reflected from the mirror called? | The reflected ray |
| 7 | What is the angle between the normal and the incident ray called? | The angle of incidence |
| 8 | What is the angle between the normal and the reflected ray called? | Angle of reflection |
| 9 | What is the relationship between the angle of incidence and the angle of reflection? | They are equal |
| 10 | What happens to a light ray when it enters a more dense material? | It slows down, moves towards the normal |
| 11 | What happens to a light ray when it enters a less dense material? | Speeds up, moves away from the normal |
| 12 | What is the term given to a wave changing speed and therefore direction when it crosses the boundary between two different materials? | Refraction |
| 13 | What is is called when a wave hits a surface and bounces back? | Reflection |
| 14 | Is a light wave transverse or longitudinal? | Transverse |
| 15 | Is a water wave transverse or longitudinal? | Transverse |

**Learning Ladder - Instructions**

These are all the things that you need to able to do securely to make excellent progress in science. You should read through each statement in the first column and prove that you can do it by completing the task in the second column.

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| **1.6. Link energy loss to insulation and thermal conductivity.**  **3.4. Rearrange the efficiency equations to calculate different quantities.**  **2.2. Compare and contrast energy resources in terms of reliability, cost, and political, social and environmental factors.**  **5.1. Use and rearrange equations for elastic potential energy**  **5.2. Use and rearrange equations for kinetic energy**  **5.3. Use and rearrange equations for gravitational potential energy**  **5.4 Recall the units and symbols for the quantities in these equations**  **3.3. Describe examples of applications of power in everyday life**  **6.5 Use and rearrange f = v λ**  **7.3 Explain how EM waves are generated and absorbed**  **7.4 Explain the hazardous effects of UV, X-rays and Gamma rays**  **8.2 Describe reflection of waves at a boundary (triple only)**  **8.3 Construct ray diagrams to show reflection (triple only)**  **8.10 Explain how colour of objects is determined (triple only)**  **8.11 Explain how colour filters work (triple only)** | 1. a) Which of these materials would be best for using in the walls of a house? Explain your answer.  |  |  | | --- | --- | | **Material** | **Thermal Conductivity (W/mK)** | | A | 110 | | B | 80 | | C | 200 |  1. Which thickness of wall would be better for a house – 50cm, 30cm or 90cm? Explain your answer. 2. a) The efficiency of a lightbulb is 70%. If the bulb uses 60J of electricity how much energy is converted to useful light energy? 3. The efficiency of a solar panel is 24%. If 1000J of energy lands on the panel, how many joules are wasted or reflected by the panel? 4. a) Compare the advantages and disadvantages of nuclear power and geothermal power. 5. Compare the advantages and disadvantages of biofuels and fossil fuels. 6. Compare the advantages and disadvantages of solar and hydroelectric power. 7. Compare the similarities and differences between tidal power and wave power. 8. Elastic potential energy = . What is the elastic potential in a wire with a spring constant of 15N/m when there is an extension of 10cm? (give correct units) 9. . What is the speed of an object that has a mass of 25Kg and a kinetic energy of 5000J? (give correct units) 10. . What is the mass of an object that gains 420J of gravitational energy when it is raised 42m? (give correct units) 11. State 2 objects that you might see a power rating for. Explain what this power rating means. 12. Calculate the wave speed of a wave with a frequency of 100Hz and a wavelength of 2m. 13. Complete the table to show the hazards of EM waves.  |  |  |  | | --- | --- | --- | | **Wave** | **Hazard** | **Explanation** | | radio waves |  |  | | microwaves |  |  | | infrared waves |  |  | | visible light |  |  | | ultraviolet light |  |  | | x-rays |  |  | | gamma rays |  |  |  1. Draw a ray diagram to show how light reflects off a smooth surface using these key terms: **reflected ray, incident ray, medium, normal, angle of incidence, angle of reflection, boundary.** 2. Explain why a green object appears black if viewed through a red filter. |

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| **1.2. Describe ways to store energy**  **3.1. Define and calculate work done**  **3.2. Define and calculate power**  **3.4. Use and rearrange both equations for calculating efficiency**  **3.5 Describe ways to increase the efficiency of an energy transfer**  **1.3. Explain the law of conservation of energy.**  **1.4. Describe the concepts of open and closed systems.**  **6.4 Use and rearrange T = 1/f**  **8.1 Describe the properties of light and explain how light travels. (triple only)**  **8.12 Define transparent and translucent (triple only)**  **8.13 Explain what a sound wave is and how the ear detects them (triple only)**  **8.17 Explain how waves can be used for detection and exploration of structures (ultrasound, seismic, echo sounding) (triple only)** | 1. Energy can be stored in a number of different forms. For each of the energy types, describe how the energy can be stored.    1. Chemical energy b. Gravitational energy c. Thermal energy 2. State the equation for work done and calculate the work done by an object that experiences a force of 35N over a distance of 20m. 3. An electric drill uses 5000J over 22s. What is the power of the drill? State its unit. 4. More thermal energy is lost through single glazing than there is through double glazing. Explain why this is in terms of the materials used and their relative conductivity. 5. A car engine uses 5000J of chemical energy. It outputs 2000J of kinetic energy and the rest is lost as thermal energy. Calculate the efficiency of the engine. 6. Define the law of conservation of energy. 7. Explain how lubricants can be used to increase the efficiency of a car engine. 8. Is a bicycle an open or closed energy system? Explain why. 9. A fly flaps its wings back and forth 121 times each second. The period of the wing flapping is \_\_\_\_ sec. 10. Complete the following description of light using these words: **opaque, electromagnetic, transparent, translucent**   Visible light is a type of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ wave that can be seen by the human eye. It can be absorbed, \_\_\_\_\_\_\_\_\_ or transmitted. All objects either allow light through (\_\_\_\_\_\_\_\_\_\_), do now allow light through them (\_\_\_\_\_\_\_\_) or scatter light rays so objects cannot be seen clearly through them (\_\_\_\_\_\_\_\_\_\_).   1. Draw a labelled diagram of the human ear and write a paragraph explaining how sound waves are created by a violin and then travel to reach the ear drum. 2. Draw a mind map to describe and explain the uses of waves in the following: echo sounding, seismic wave detection, the structure of the Earth. |
| **1.1 Describe ways in which energy can be transferred within a system**  **1.5. Describe ways to reduce unwanted energy transfers.**  **6.1 Describe what is meant by ‘a wave’** | 1. Describe one way to reduce the amount of wasted energy produced from a bicycle. 2. Describe two ways to reduce the amount of wasted energy released from a house. 3. Draw an energy transfer diagram for an electric hair dryer. 4. Give the definition of a wave and list three examples of where we would find waves. |

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| **6.2 Describe the difference between longitudinal and transverse waves giving examples for both**  **6.3 Describe amplitude, wavelength (λ), wave speed (v), frequency (f) and period of a wave (T)**  **6.6 Identify amplitude and wavelength from diagrams of a wave**  **7.2 Recall the order of electromagnetic waves and recall their frequency and wavelength and give examples of the uses of these** | 1. Which of these examples are transverse waves and which are longitudinal waves?   a. light waves, radio waves, heat  b. sound waves, earthquake waves   1. Give the definition of each of the following key words:   a. wavelength =  b. wave speed =  c. frequency =  d. period =   1. Label the diagram with each of these key words: amplitude, wavelength.   http://www.studyphysics.ca/newnotes/20/unit03_mechanicalwaves/chp141516_waves/images/transverse.png   1. Draw a poster to show the electromagnetic spectrum. It must include the names of each type of wave, a use of each type of wave, a danger of each type of wave and their frequency. |
| **2.1. Describe the main energy resources on Earth.**  **2.1. Define renewable and non-renewable resources.**  **7.1 Describe what ‘electromagnetic waves’ are**  **8.14 Recall the range of normal human hearing (triple only)** | 1. Name five energy resources that can be used to make electricity. 2. Write definitions for: 3. Renewable resources. 4. Non-renewable resources. 5. Give a definition for an electromagnetic wave. 6. What is the hearing range of a human (Hz)? |