**Year 8**

**Energy Revision Booklet**

****

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**



**Types of energy**

**1. The two basic types of energy**

Directions: Determine the best match between basic types of energy and the description provided. Put the correct letter in the blank.

1. Kinetic
2. Potential
3. Both forms of energy

\_\_\_\_\_\_1. A skier at the top of the mountain

\_\_\_\_\_\_2. Gasoline in a storage tank

\_\_\_\_\_\_3. A race-care traveling at its maximum speed

\_\_\_\_\_\_4. Water flowing from a waterfall before it hits the pond below

\_\_\_\_\_\_5. A spring in a pinball machine before it is released

\_\_\_\_\_\_6. Burning a match

\_\_\_\_\_\_7. A running refrigerator motor

**2. Definitions of Energy**

Directions: Write down the definition for each of the following terms.

ENERGY:

KINETIC ENERGY:



POTENTIAL ENERGY:

**3. Types of Energy**

Directions: Draw an arrow to connect the type of energy to its definition. Also identify each energy as kinetic (KE) or potential (PE) and give an example.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **KE or PE** | **Type of energy** |  | **Definition** | **Example** |
|  | Heat |  | Movements of photons |  |
|  | Light |  | Vibration of waves through material |  |
|  | Gravitational |  | Energy that is stored by stretching or squashing |  |
|  | Sound |  | Movement of electrons |  |
|  | Chemical |  | Energy which transfers among particles by means of kinetic energy of those particles |  |
|  | Nuclear |  | Energy of position or height |  |
|  | Electrical |  | Energy stored in bonds of atoms and molecules |  |
|  | Elastic |  | Stored in the nucleus of an atom; released when nucleus splits or combines |  |

** 4. Forms of Energy Continued**

Directions: Match the energy form(s) to the description provided. A few questions may have more than one answer.

\_\_\_\_\_\_\_\_\_\_\_\_\_1. Falling rocks from the top of a mountain (a) Kinetic

\_\_\_\_\_\_\_\_\_\_\_\_\_2. Release of energy from the Sun (b) Electrical

\_\_\_\_\_\_\_\_\_\_\_\_\_3. Energy released from food after it is eaten (c) Heat

\_\_\_\_\_\_\_\_\_\_\_\_\_4. Batteries (d) Gravitational

\_\_\_\_\_\_\_\_\_\_\_\_\_5. The energy that runs a refrigerator (e) Chemical

\_\_\_\_\_\_\_\_\_\_\_\_\_6. Nuclear fission reactors (f) Nuclear

\_\_\_\_\_\_\_\_\_\_\_\_\_7. The rumble of thunder from a storm (g) Sound

\_\_\_\_\_\_\_\_\_\_\_\_\_8. Rubbing your hands together (h) Light

­\_\_\_\_\_\_\_\_\_\_\_\_\_9. Gasoline (i) Elastic

\_\_\_\_\_\_\_\_\_\_\_\_\_10. Bouncing on a trampoline

\_\_\_\_\_\_\_\_\_\_\_\_\_11. Food before it is eaten

\_\_\_\_\_\_\_\_\_\_\_\_\_12. Lightening

\_\_\_\_\_\_\_\_\_\_\_\_\_13. Releasing an elastic band

**Energy Transfer and Transformation**

Define the ***Law of Conservation***:

Define Energy ***Transfer:***

Draw a flow diagram showing the objects through which energy is travelling. Circle the energy transfer.

1. A torch

*Ex, Battery 🡪 wires 🡪 light globe*

1. A fan *(connected to the wall)*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. An Iphone *(listening to music)*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A moving car

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_🡪 wires 🡪 motor🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A Tram or Electric Train

Wires 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 🡪 wheels

Define Energy ***Transformation;***

1. Draw a flow diagram for each of the following energy transformations (***remember you are representing the energy transformations- only use the energy types***);
2. A torch

*Ex, Chemical Potential Energy 🡪 Electrical Energy 🡪 Light Energy*

1. A fan *(connected to the wall)*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. An Iphone (listening to music)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A moving car

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_🡪 Electrical Energy 🡪 Chemical potential energy🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A Tram or Electric Train

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



1. Contrast between Energy Transformation and Energy Transfers?

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1. Suggest one way that energy can be transferred without being transformed.

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1. How do we represent an energy transformation scientifically?

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1. What are the 3 ways that flow diagrams help show transformation? (hint: look at page 48)

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1. Why is the direction the arrows point in a flow diagram important?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Energy Efficiency**

|  |  |  |
| --- | --- | --- |
| **E= (O/I ) X 100** | **O= (E X I) /100** | **I= (O/E) X 100** |

**× 1000**

**Joules kilojoules**

**÷ 1000**

1. Convert the following into joules.

|  |  |
| --- | --- |
| 1.5 kJ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ J | 3.4 kJ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ J |
| 154 kJ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ J | 256 kJ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ J |
| 0.2 kJ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ J | 0.638 kJ = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ J |

1. Convert the following into kilojoules.

|  |  |
| --- | --- |
| 5 J = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ kJ | 27 J = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ kJ |
| 2047 J = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ kJ | 156 J = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ kJ |
| 0.4 J = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ kJ | 0.564 J = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ kJ |

1. Recall the Law of Conservation of Energy and write it out below.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Use the words in the box below to fill in the blanks.

|  |  |  |  |
| --- | --- | --- | --- |
| surroundings | heat | transferred | wasted |
| heat | energy | sound | usefully |

When devices transfer \_\_\_\_\_\_\_\_\_\_\_\_, only part of it is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ transferred to where it is wanted.

The rest of the energy is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in some non-useful way or wasted.

Usually the energy is wasted to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as \_\_\_\_\_\_\_\_\_\_\_\_.

The energy that is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ does not disappear; it is changed into a non-useful form.

The non-useful energy in a light bulb is \_\_\_\_\_\_\_\_\_\_\_\_ .

The non-useful energy from a car is heat and \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. For the following devices, work out the missing information.

|  |  |  |
| --- | --- | --- |
| **Device and amount of energy supplied to it** | **Useful energy produced** | **Wasted energy** |
| Filament light bulb 100 J | 20 J as \_\_\_\_\_\_\_\_\_\_\_ | \_\_\_\_\_\_ J as heat |
| Low energy light bulb 25 J | \_\_\_J as light | 5 J as heat |
| Electric drill 500 J | \_\_\_\_\_ J as kinetic (movement) energy | 200 J as \_\_\_\_\_\_\_\_\_\_ |
| Television 200 J | \_\_\_\_\_\_J as light and sound | 150 J as \_\_\_\_\_\_\_\_\_\_ |



1. Use the words in the box to fill in the blanks, and then answer the question.

|  |  |  |  |
| --- | --- | --- | --- |
| more | wasted | energy | efficient |

The greater the proportion of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ supplied to a device that is usefully transferred, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ efficient the device is.

A car engine is 20% \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ . This means that a lot more energy is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than is used to drive the car forward.

A microwave is 60% efficient. This means that out of every 100 joules of electrical energy supplied, 60 joules are used to heat the food. What happens to the other 40 joules?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. Identify what each of the symbols below represent:

E=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

O=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

I= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Complete the table below showing the input and output energy and the efficiency of each of the devices.

|  |  |  |  |
| --- | --- | --- | --- |
| **Item** | **Total input energy** | **Useful output energy** | **Efficiency** |
| Electric Drill | 300 000 J | 28 000 J |  |
| Hair Straightener | 30 kJ | 15 000 J |  |
| Petrol Engine | 100 kJ | **kJ** | 2.5% |
| Steam Engine | 250 kJ | **J** | 40% |
| Torch | **kJ** | 0.5 kJ | 25% |
| Electric motor | **kJ** | 6400 J | 60% |

1. Some timber containing 32kJ of energy is used in a fireplace to heat a house. If the transfer from the timber to the house is 70% efficient:
2. Calculate the useful output energy. **Show all working.**
3. Discuss where the wasted energy went.

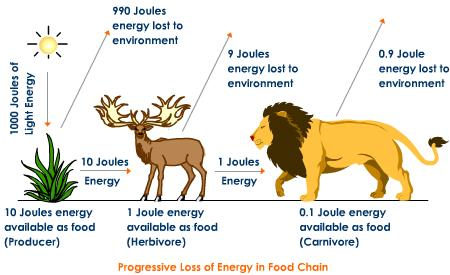
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1. Draw out an energy chain showing the energy transformations that will take place.
2. A train is supplied with 520 kJ of energy.
3. What type of energy is the useful output energy of a train (be specific).

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. If 370 000 J are transformed into heat and sound energy, how many joules of useful output energy would there be? **Show your working.**
2. Calculate the efficiency of the train. **Show all working.**
3. Analyse the diagram below then use your understanding of the Law of Conservation of Energy and Energy Efficiency to explain what is happening.



\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Renewable and Non-Renewable Energy – Revision booklet**

1. Which of the following would be classified as a **renewable** resource?
2. A barrel of oil that would take 8 million years to form.
3. A large piece of coal that would take 4 million years to form.
4. Solar rays from the Sun that take 8 minutes to reach the Earth.
5. Methane gas from the ocean floor that takes 7 thousand years to outgas.
6. One advantage of **solar energy** is that it:
7. is not renewable
8. is efficient in any climate
9. is available at all times
10. is non-polluting.
11. Coal, oil, natural gas, and propane are **fossil fuels**. They are called fossil fuels because:
12. They are non-renewable and will run out
13. They are burned to release energy and they cause air pollution
14. They were formed from the buried remains of plants and tiny animals that lived hundreds of millions of years ago
15. They are mixed with fossils so they will burn better
16. The burning of fossil fuels produces \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
17. Sulphur and nitrates in atmosphere
18. CO2
19. Acid Rain
20. All of the above
21. What does **wind directly** turn to generate electricity?
22. Generator
23. Motor
24. Turbine
25. Engine
26. What is an advantage of using **fossil fuels**?
27. They are clean and non-polluting
28. They will never run out
29. They generate large amounts of electricity relatively cheaply
30. Which energy form uses **uranium or plutonium** to create energy?
31. Nuclear Power
32. Hydroelectric Power
33. Solar Power
34. Which form of renewable energy would most likely get complaints about **noise pollution**?
35. Solar Power
36. Wave Power
37. Wind Power
38. Define a **renewable** energy resource? Give three examples.

|  |
| --- |
|  |
|  |

1. Define a **non-renewable** energy resource? Give three examples.

|  |
| --- |
|  |
|  |

1. Indicate which of the following energy sources are renewable OR Non-renewable.

|  |  |
| --- | --- |
| **Energy source** | **RENEWABLE (R) or NON-RENEWABLE (NR)** |
| Coal |  |
| Solar |  |
| Wind |  |
| Wood |  |
| Uranium |  |
| Natural gas |  |

1. What are the main advantages and disadvantages of the following sources of energy?

|  |  |  |
| --- | --- | --- |
| **Source of energy** | **Advantage** | **Disadvantage** |
| Gas |  |  |
| Nuclear |  |  |
| Wind |  |  |

1. Compare and contrast biomass, geothermal, oil and coal in terms of the following criteria: renewable or non-renewable resource, advantages and disadvantages. Your answer should include a table.

