

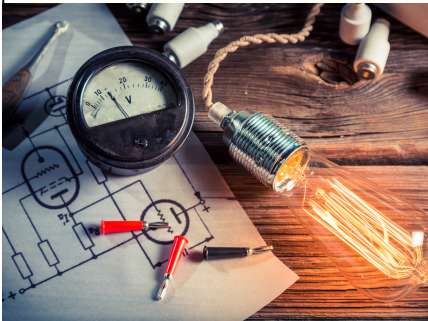


Knowledge Summary

Year 9 Term 4 2023/24

Science

Physics Module Energy and Resources



Essential Questions/Knowledge

- Identify which fuels are renewable and which are non-renewable.
- Identify activities that require large energy transfers.
- Describe biofuels as carbon neutral whereas fossil fuels are not.
- State that wind turbines, wave generators, hydroelectric systems, and tidal systems are renewable energy resources.
- Describe some simple advantages or disadvantages of renewable energy systems.
- Outline the operation of a renewable energy source.
- Explore the operation of a solar cell.
- Describe one difference between solar cells and solar heating systems.
- State that radioactive decay is the source of heating in geothermal systems.
- List some environmental problems associated with burning fossil fuels.
- Identify the waste products of fossil fuels and nuclear fuel.
- Describe simple advantages and disadvantages of a variety of renewable energy resources.
- Rank the start-up times of various power stations.
- Compare some of the advantages and disadvantages of various energy resources.
- Discuss the construction of a power plant in the local area in simple terms by using information provide

How students will be assessed on their knowledge

- Daily retrieval
- In-class tasks
- Extended writing questions
- End of unit assessments

Questions/Knowledge to deepen understanding

- Compare energy use from different sources and different societies from available data.
- Compare fossil fuels and nuclear fuels in terms of energy provided, waste, and pollution.
- Discuss some of the problems associated with biofuel use and production.
- Compare the operation of hydroelectric, wave, and tidal systems.
- Explain in detail the purpose, operation, and advantages of a pumped storage system.
- Justify the choice of an energy resource by using numerical and other appropriate data.
- Analyse the power output of a variety of energy resources.
- Calculate the energy provided by a solar heating system by using the increase in water temperature.
- Plan in detail an investigation into the factors that affect the power output of a solar cell.
- Evaluate methods of reducing damage caused by waste products of fossil fuels and nuclear fuels.
- Discuss the problems associated with nuclear accidents and the public perception of nuclear safety.
- Evaluate the suitability of an energy resource for a range of scenarios.
- Use the capital and operational costs of energy resources to evaluate their usefulness.
- Form persuasive arguments for and against a variety of energy resources.
- Compare the different ways that energy is transferred.
- Explain in detail how to reduce risks.

Key Concepts

- Energy Demands
- Energy From Wind and Water
- Power From the Sun and the Earth
- Energy and the Environment
- Big Energy Issues

Tier 2 and 3 vocabulary linked to the unit

- Renewable
- Non-renewable
- Carbon Neutral
- Fossil Fuel
- Biofuel
- Photosynthesis
- Combustion
- Hydroelectricity
- Geothermal