John O'Gaunt SCHOOL

# Year 8 Science

# Independent Learning Tasks 2024/25

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## Background

Within this booklet, you will find all of your Independent Learning Tasks for the year. There are a range of different activities for you to complete according to the Independent Learning Calendar, which can be found on our website.

For research tasks, you can decide on your preferred method to present your findings. Some suggestions have been provided.

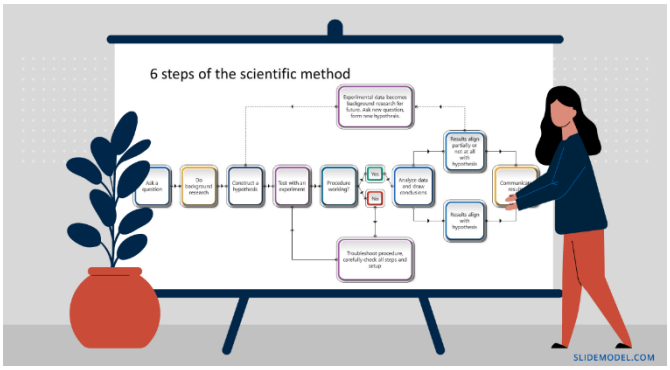
If you have any questions, please speak to your class teacher.

## Instructions for Presenting Work


### Option 1: Creating a Poster

1. **Title and Theme:**
    - **Title:** Ensure your poster has a clear and bold title at the top.
    - **Theme:** Stick to the theme of your research and make it visually engaging.
2. **Content:**
    - **Introduction:** Write a brief introduction to your topic.
    - **Main Points:** Break down your research into key points. Use bullet points or short paragraphs.
    - **Visuals:** Include images, diagrams, or charts to support your points.
    - **Conclusion:** Summarise your findings in a concise manner.
3. **Layout:**
    - **Sections:** Divide your poster into sections (e.g., Introduction, Methods, Results, Conclusion).
    - **Balance:** Ensure there's a good balance between text and images.
    - **Readability:** Use large fonts and clear headings to make your poster easy to read from a distance.
4. **Design:**
    - **Colours:** Use contrasting colours for background and text to make it readable.
    - **Consistency:** Keep a consistent style throughout your poster.
    - **Spacing:** Leave enough space between sections so that the poster doesn’t look cluttered.
5. **Proofreading:**
    - Check for spelling and grammar errors.
    - Make sure all information is accurate and well-presented.

## Option 2: Creating a PowerPoint Presentation




1. **Title Slide:**
    - **Title:** Include the title of your presentation.
    - **Your Name:** Add your name and class.
    - **Date:** Include the date of the presentation.
2. **Content Slides:**
    - **Introduction Slide:**
        - Briefly introduce your topic.
    - **Main Points Slides:**
        - Use one slide per main point.
        - Include bullet points to list key information.
        - Add images, diagrams, or charts to support your points.
    - **Conclusion Slide:**
        - Summarize your findings.
        - Include a final image or thought-provoking question.
3. **Design:**
    - **Templates:** Use a consistent template for all slides.
    - **Fonts:** Use large, clear fonts. Avoid overly fancy fonts.
    - **Colours:** Use contrasting colours for text and background.
    - **Animations:** Use animations sparingly to keep the focus on the content.
4. **Visuals:**
    - **Images and Diagrams:** Make sure all visuals are high-quality and relevant.
    - **Charts and Graphs:** Use charts and graphs to present data clearly.
5. **Practice:**
    - **Rehearse:** Practice presenting your slides to ensure smooth delivery.
    - **Timing:** Make sure your presentation fits within the given time limit.
    - **Q&A:** Prepare for potential questions from your audience.

Year 8.1 Independent Learning

## Planning Investigations

**Year 8 Science Independent Learning Task Sheet: Planning Investigations**


*Objective:*
To understand the steps involved in planning and conducting a scientific investigation, including forming hypotheses, designing experiments, collecting data, and drawing conclusions.

---

*Task 1: Identify the Research Question*

1. **Choose a Topic:**
    - Select a topic of interest that you want to investigate. Examples could include:
        - The effect of light on plant growth
        - The impact of temperature on the rate of a chemical reaction
        - The best material for insulating heat
2. **Formulate a Research Question:**
    - Write a clear and specific research question. For example:
        - "How does the amount of sunlight affect the growth of bean plants?"
        - "How does temperature affect the rate at which Alka-Seltzer tablets dissolve in water?"

*Task 2: Form a Hypothesis*

1. **Develop a Hypothesis:**
    - Based on your research question, form a hypothesis. This is an educated guess about what you think will happen. For example:
        - "I hypothesize that bean plants exposed to more sunlight will grow taller."
        - "I hypothesize that Alka-Seltzer tablets will dissolve faster in hot water compared to cold water."

---

*Task 3: Design the Experiment*

1. **Identify Variables:**
    - **Independent Variable:** The variable you will change (e.g., amount of sunlight, temperature of water).
    - **Dependent Variable:** The variable you will measure (e.g., plant height, dissolution time).
    - **Control Variables:** Variables that must be kept constant to ensure a fair test (e.g., type of plant, amount of water, size of container).
2. **Materials:**
    - List all the materials you will need for your experiment.
3. **Procedure:**
    - Write a step-by-step plan for how you will conduct the experiment. Be detailed and ensure it can be followed easily.

---

*Task 4: Conduct the Experiment*

1. **Carry Out the Procedure:**
    - Follow your step-by-step plan to conduct the experiment.
    - Make sure to record all observations and data accurately.
2. **Collect Data:**
    - Create a data table to organize your measurements and observations.

---

*Task 5: Analyse the Data*

1. **Graph Your Results:**
    - Create a graph to visually represent your data. Choose an appropriate type of graph (e.g., bar graph, line graph).
    - Label the axes and provide a title for your graph.
2. **Interpret the Data:**
    - Analyse the data to see if there are any patterns or trends.
    - Compare your findings with your hypothesis.

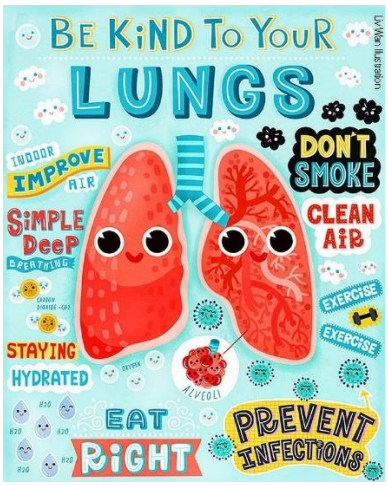
---

*Task 6: Draw Conclusions*

1. **Conclusion:**
    - Write a conclusion that summarizes your findings. Address the following points:
        - Was your hypothesis supported or refuted by the data?
        - What evidence supports your conclusion?
        - What could you do differently if you were to repeat the experiment?
2. **Evaluation:**
    - Reflect on the investigation process. Consider the following:
        - Were there any errors or unexpected results?
        - How could the investigation be improved?
        - What further questions do you have?

Year 8.2 Independent Learning

Breathing and Health




**Year 8 Science Independent Learning Task Sheet: Breathing and Health**
*Objective:*
To understand the human respiratory system, how it functions, and the importance of maintaining good respiratory health.

---

*Task 1: Research the Respiratory System*

1. **Identify Key Components:**
    - Research and identify the main parts of the respiratory system. Include the following:
        - Nose and mouth
        - Trachea (windpipe)
        - Bronchi
        - Lungs
        - Alveoli
        - Diaphragm
2. **Functions:**
    - Write a brief description of the function of each part.

---

*Task 2: Explain the Breathing Process*

1. **Inhalation and Exhalation:**

- Describe the process of inhalation (breathing in) and exhalation (breathing out).
- Explain how the diaphragm and intercostal muscles are involved in breathing.

2. **Gas Exchange:**
   - Explain how gas exchange occurs in the alveoli.
   - Describe the role of oxygen and carbon dioxide in this process.

---

*Task 3: Impact of Exercise on Breathing*

1. **Exercise and Breathing Rate:**
   - Research how exercise affects the breathing rate.
   - Conduct a simple experiment: Measure your resting breathing rate, then measure it again after a few minutes of exercise (e.g., jogging on the spot). Record your observations.
2. **Benefits of Exercise:**
   - Write a short paragraph explaining the benefits of regular exercise on respiratory health.

---

*Task 4: Respiratory Health*

1. **Healthy Habits:**
   - Research and list at least five habits that promote good respiratory health (e.g., not smoking, staying active, avoiding pollutants).
2. **Common Respiratory Diseases:**
   - Identify and describe at least three common respiratory diseases (e.g., asthma, bronchitis, pneumonia).
   - Explain how these diseases affect the respiratory system.

---

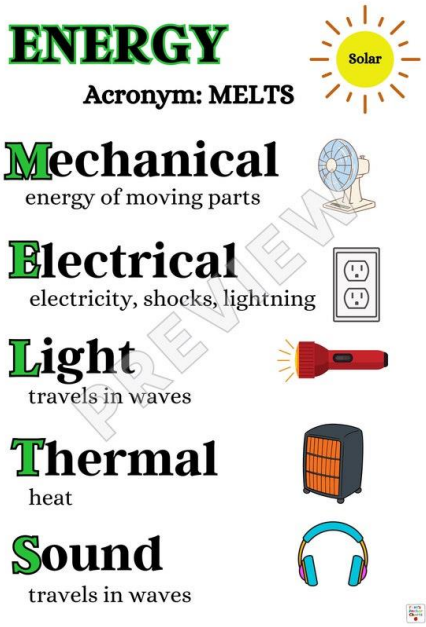
*Task 5: Create a Poster*

1. **Design a Poster:**
   - Create an informative poster about the respiratory system and respiratory health.
   - Include diagrams, key facts, and tips for maintaining a healthy respiratory system.

Year 8.3 Independent Learning

## Energy 1

**Year 8 Science Independent Learning Task Sheet 1: Forms of Energy**
*Objective:*
To understand the different forms of energy and how they are used in everyday life.

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*Task 1: Research Different Forms of Energy*

1. **Identify Key Forms:**
    - Research and write a brief explanation of the following forms of energy:
        - Kinetic Energy
        - Potential Energy
        - Thermal Energy
        - Chemical Energy
        - Electrical Energy
        - Light Energy
        - Sound Energy
2. **Examples:**
    - Provide one example of each form of energy in everyday life.

---

*Task 2: Create a Poster*

1. **Design Your Poster:**
    - Create a poster that includes:
        - The name and definition of each form of energy.
        - An example and illustration of each form.
    - Use colours, images, and diagrams to make your poster visually appealing.

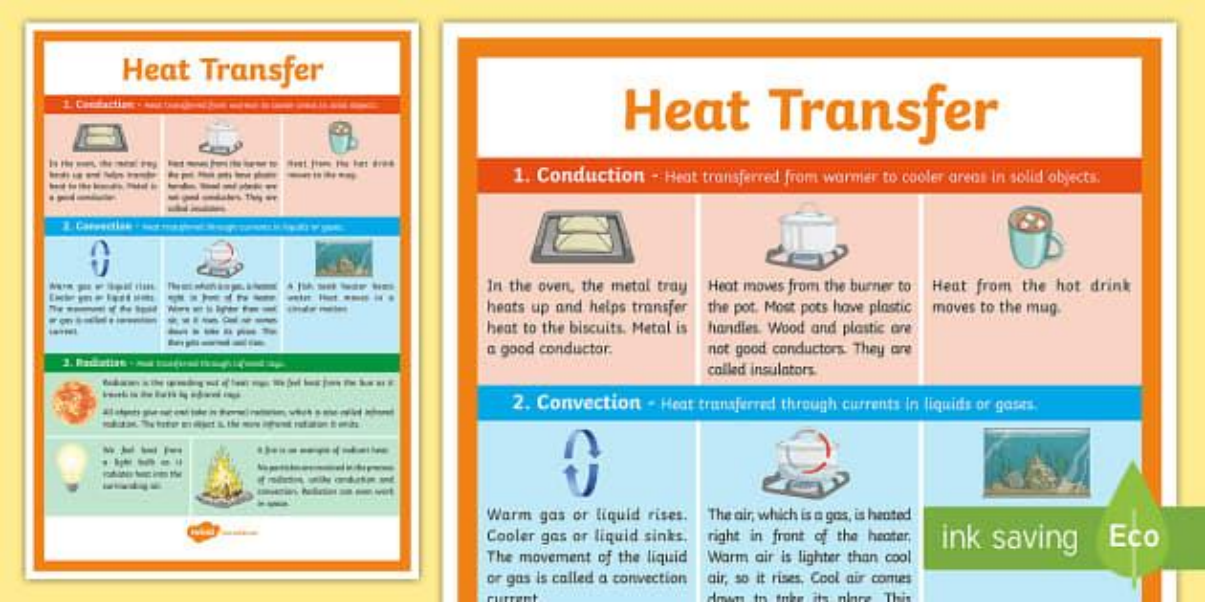
Year 8.4 Independent Learning

Energy 2

**Year 8 Science Independent Learning Task Sheet 2: Energy Transfer and Conservation**

*Objective:*

To understand how energy is transferred and conserved in different systems.

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*Task 1: Research Energy Transfer*

1. **Identify Key Concepts:**
   - Research and write a brief explanation of the following concepts:
     - Energy Transfer
     - Energy Transformation
     - Law of Conservation of Energy
2. **Examples:**
   - Provide one example of energy transfer and one example of energy transformation in everyday life.

---

*Task 2: Conduct a Simple Experiment (Optional)*

1. **Experiment:**
   - Conduct a simple experiment to demonstrate energy transfer. For example:

- **Pendulum Experiment:** Use a pendulum to show the transfer of potential energy to kinetic energy.
- **Materials Needed:** String, weight (e.g., a small ball), and a place to hang the pendulum.

2. **Procedure:**
    - Write down the steps you followed to conduct the experiment.
    - Record your observations and take pictures if possible.
    - Write a short paragraph explaining what you did and what you observed.

---

*Task 3: Create a Concept Map*

1. **Design Your Concept Map:**
    - Create a concept map that includes:
        - Key terms and their definitions (Energy Transfer, Energy Transformation, Law of Conservation of Energy).
        - Examples of each concept.
        - Connections between the concepts.

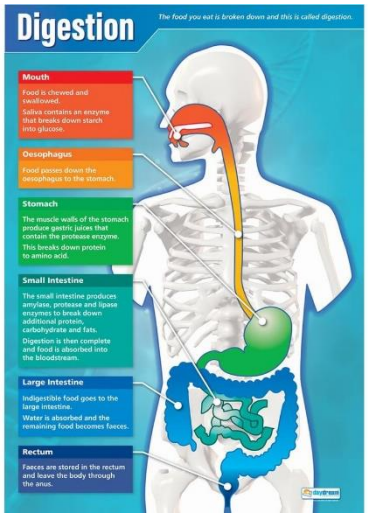
Year 8.5 Independent Learning

Digestion

**Year 8 Science Independent Learning Task Sheet: Digestion**

*Objective:*

To understand the structure and function of the human digestive system, including the role of different organs and the process of digestion.

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*Task 1: Research the Digestive System*

1. **Identify Key Organs:**
    - Research and identify the main organs involved in the digestive system. Include the following:
        - Mouth
        - Oesophagus
        - Stomach
        - Small intestine
        - Large intestine
        - Liver
        - Pancreas
        - Gallbladder
2. **Functions:**
    - Write a brief description of the function of each organ in the digestive process.

---

*Task 2: Describe the Process of Digestion*

1. **Mechanical and Chemical Digestion:**
    - Explain the difference between mechanical and chemical digestion.
    - Provide examples of each type of digestion occurring in the digestive system.
2. **Steps of Digestion:**
    - Describe the process of digestion from ingestion to excretion. Include the role of enzymes and other digestive juices.

---

*Task 3: Create Diagrams*

1. **Digestive System Diagram:**
    - Draw a detailed diagram of the human digestive system.
    - Label each organ and include arrows to show the direction of food movement.
2. **Enzymes and Digestion:**
    - Create a diagram or flowchart showing how enzymes aid in the digestion of carbohydrates, proteins, and fats.

---

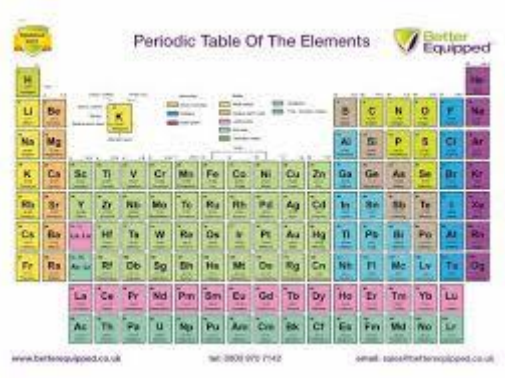
*Task 4: Practical Activity (Optional)*

1. **Digestive Enzymes Experiment:**
    - Conduct a simple experiment to observe the action of digestive enzymes (e.g., using pineapple juice to break down gelatine).
    - Record your observations and take pictures if possible.
    - Write a short paragraph explaining what you did and what you observed.

Year 8.6 Independent Learning

## Periodic Table

**Year 8 Science Independent Learning Task Sheet: The Periodic Table**
*Objective:*
To understand the structure of the periodic table, the properties of elements, and the significance of their arrangement.

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*Task 1: Introduction to the Periodic Table*

1. **Research the History:**
   - Write a brief summary (150-200 words) about the history of the periodic table, including key scientists like Dmitri Mendeleev.
2. **Structure of the Table:**
   - Explain how the periodic table is organised, including:
     - Groups (vertical columns)
     - Periods (horizontal rows)
     - The significance of atomic number
3. **Element Categories:**
   - Identify and describe the main categories of elements:
     - Metals
     - Non-metals
     - Metalloids

---

*Task 2: Research Specific Elements*

1. **Choose Five Elements:**
   - Select five elements from different groups and periods (e.g., Hydrogen, Carbon, Sodium, Chlorine, Iron).

2. **Element Information:**
    - For each element, provide the following information:
        - Symbol and atomic number
        - Group and period
        - Physical properties (e.g., state at room temperature, colour)
        - Common uses
        - Interesting facts

---

*Task 3: Create a Diagram*

1. **Draw the Periodic Table:**
    - Draw a simplified version of the periodic table.
    - Colour-code the different categories of elements (metals, non-metals, metalloids).
2. **Label Key Elements:**
    - Label the five elements you researched with their symbol and atomic number.
    - Include a legend to explain your colour-coding.

---

*Task 4: Explore Trends in the Periodic Table*

1. **Atomic Radius:**
    - Research and explain the trend in atomic radius across a period and down a group.
2. **Reactivity:**
    - Research and explain the trend in reactivity for metals and non-metals across a period and down a group.
3. **Electronegativity:**
    - Research and explain the trend in electronegativity across a period and down a group.

---

*Task 5: Practical Activity (Optional)*

1. **Model an Element:**
    - Create a 3D model of one of the elements you researched using craft materials (e.g., clay, styrofoam balls).
    - Show the atomic structure with protons, neutrons, and electrons.

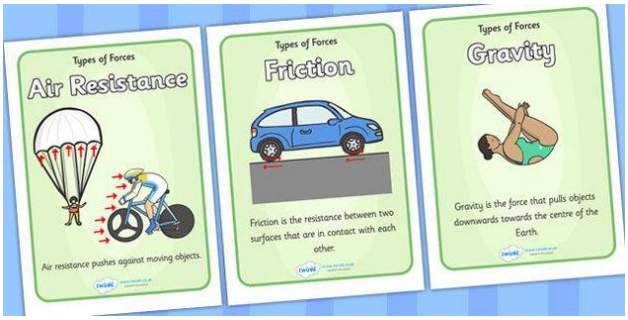
Year 8.7 Independent Learning

## Forces and Pressure

**Year 8 Science Independent Learning Task Sheet: Pressure**

*Objective:*

To understand the concept of pressure, how it is calculated, and its applications in everyday life.

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*Task 1: Research the Concept of Pressure*

1. **Definition:**
   - Write a definition of pressure.
   - Explain the relationship between force, area, and pressure.
2. **Formula:**
   - Write the formula for calculating pressure
   - Define the units used for pressure, force, and area (e.g., Pascals (Pa), Newtons (N), square metres ($m^2$)).

---

*Task 2: Calculate Pressure*

1. **Example Calculation:**
   - Provide an example calculation. For instance:
     - If a force of 20 Newtons is applied over an area of 4 square metres, what is the pressure?

2. **Practise Problems:**
   - Solve the following problems:
     1. A force of 50 N is applied over an area of 10 $m^2$. Calculate the pressure.
     2. A person stands on one foot on an area of 0.2 $m^2$ with a force of 600 N. Calculate the pressure.

3. A book exerts a force of 10 N on a table over an area of 0.5 $m^2$. Calculate the pressure.

---

*Task 3: Applications of Pressure*

1. **Everyday Examples:**
    - Research and describe at least three everyday examples where pressure is applied. For example:
        - Atmospheric pressure
        - Pressure in car tyres
        - Blood pressure
2. **Explanation:**
    - Explain how pressure plays a role in each example and why it is important.

---

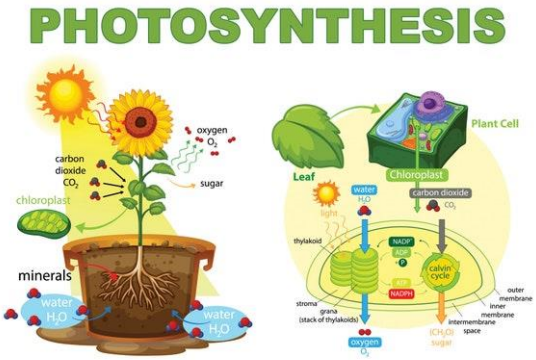
*Task 4: Experiment (Optional)*

1. **Conduct a Simple Experiment:**
    - Design and perform a simple experiment to measure pressure. For example:
        - Use a bathroom scale to measure the force exerted by an object.
        - Measure the area over which the force is applied.
        - Calculate the pressure using the formula.
    - Record your observations and take pictures if possible.
    - Write a short paragraph explaining what you did and what you observed.

Year 8.8 Independent Learning

## Photosynthesis

**Year 8 Science Independent Learning Task Sheet: Photosynthesis**
*Objective:*
To understand the process of photosynthesis, its importance, and how it occurs in plants.

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*Task 1: Research Photosynthesis*

1. **Basic Definition:**
    - Write a clear and concise definition of photosynthesis.
2. **Photosynthesis Equation:**
    - Write down the word equation for photosynthesis:
    - Write down the balanced chemical equation for photosynthesis:

---

*Task 2: Describe the Process*

1. **Key Components:**
    - Describe the role of the following components in photosynthesis:
        - Chlorophyll
        - Sunlight
        - Carbon dioxide
        - Water

---

*Task 3: Importance of Photosynthesis*

1. **For Plants:**
    - Explain why photosynthesis is crucial for plants.
2. **For the Environment:**

- Describe the importance of photosynthesis for the environment and other living organisms.

---

*Task 4: Conduct a Practical Experiment (Optional)*

1. **Experiment: Investigating the Effect of Light on Photosynthesis**
   - **Materials Needed:**
     - A healthy green plant (e.g., a potted plant or spinach leaves)
     - Beaker or jar
     - Water
     - Sodium bicarbonate (baking soda)
     - Light source (e.g., lamp or sunlight)
     - Stopwatch
   - **Procedure:**

1. Fill the beaker or jar with water and add a small amount of sodium bicarbonate to it (this provides carbon dioxide).
2. Place the plant in the water.
3. Position the light source close to the plant.
4. Observe and record any changes, such as the formation of oxygen bubbles on the leaves.

   - **Observations:**
     - Record your observations and take pictures if possible.
     - Write a short paragraph explaining what you did and what you observed.

---

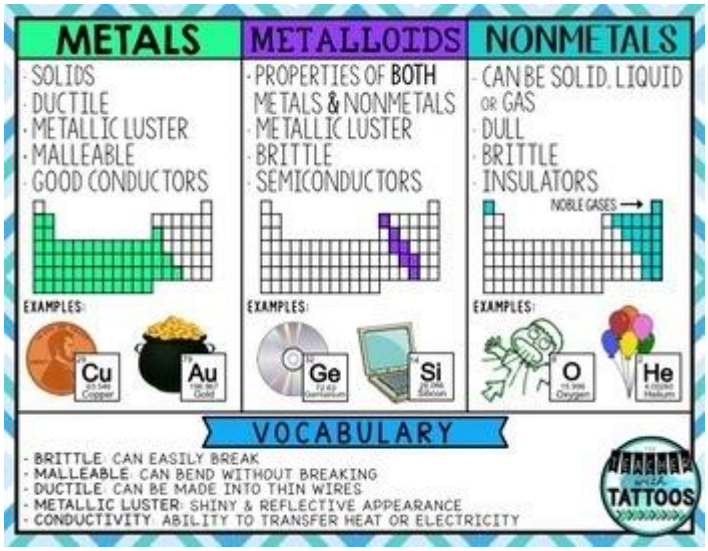
*Task 5: Create a Poster*

1. **Poster Elements:**
   - Create a poster that includes the following elements:
     - Title: "Photosynthesis"
     - Definition and equation of photosynthesis
     - Diagram of a chloroplast showing where photosynthesis occurs
     - Description of the stages of photosynthesis
     - Explanation of the importance of photosynthesis
     - Any interesting facts or additional information

Year 8.9 Independent Learning

## Metals and Non-Metals

**Year 8 Science Independent Learning Task Sheet: Metals and Non-Metals**
*Objective:*
To understand the properties, uses, and differences between metals and non-metals.

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*Task 1: Research Properties*

1. **Properties of Metals:**
   - Research and list the physical and chemical properties of metals. Include properties such as:
     - Conductivity (thermal and electrical)
     - Malleability
     - Ductility
     - Density
     - Reactivity with acids
2. **Properties of Non-Metals:**
   - Research and list the physical and chemical properties of non-metals. Include properties such as:
     - Poor conductivity (thermal and electrical)
     - Brittle (if solid)
     - Dull appearance
     - Low density

- Various states at room temperature (solid, liquid, gas)

---

*Task 2: Identify Examples and Uses*

1. **Examples of Metals:**
   - Identify at least five metals and their common uses. For example:
     - Iron: Used in construction and manufacturing.
     - Copper: Used in electrical wiring and plumbing.
     - Aluminum: Used in packaging and transportation.
     - Gold: Used in jewelry and electronics.
     - Zinc: Used in galvanizing and alloys.
2. **Examples of Non-Metals:**
   - Identify at least five non-metals and their common uses. For example:
     - Oxygen: Essential for respiration.
     - Carbon: Found in all living organisms, used in steel production.
     - Sulfur: Used in fertilizers and chemicals.
     - Nitrogen: Used in fertilizers and the production of ammonia.
     - Chlorine: Used in water purification and disinfectants.

---

*Task 3: Compare and Contrast*

1. **Venn Diagram:**
   - Create a Venn diagram to compare and contrast the properties of metals and non-metals. Include at least five points in each section (metals, non-metals, and common properties).

---

*Task 4: Practical Activity (Optional)*

1. **Conduct a Simple Experiment:**
   - If possible, perform a simple experiment to observe the properties of metals and non-metals. For example:
     - Test the conductivity of different materials using a simple circuit.
     - Observe the reaction of a metal (e.g., zinc) with acid (e.g., hydrochloric acid) to produce hydrogen gas.
     - Write a short paragraph explaining what you did, your observations, and conclusions.

---

*Task 5: Application in Everyday Life*

1. **Real-World Application:**
    - Write a short essay (200-300 words) on how the properties of metals and non-metals influence their use in everyday life. Include examples of how these materials are used in household items, technology, and industry.

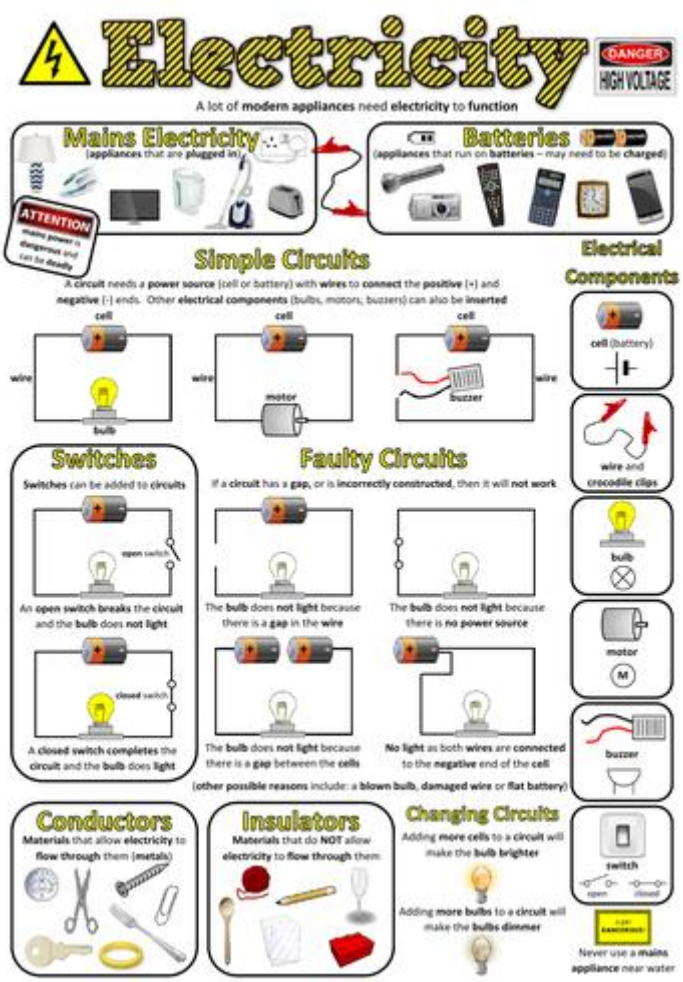
Year 8.10 Independent Learning

## Electricity

**Year 8 Science Independent Learning Task Sheet: Electricity**

*Objective:*

To understand the basic concepts of electricity, including circuits, current, voltage, and resistance, and apply this knowledge through practical activities.

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*Task 1: Research Basic Concepts*

1. **Electricity Basics:**
   - **Definition:** Write a brief definition of electricity.
   - **Components:** Identify and describe the main components of an electric circuit (e.g., battery, wires, switch, bulb).
2. **Current, Voltage, and Resistance:**
   - **Current:** Define electric current and its unit of measurement (amperes, A).

- **Voltage:** Define voltage and its unit of measurement (volts, V).
- **Resistance:** Define resistance and its unit of measurement (ohms, Ω).
- **Ohm's Law:** Write down Ohm's Law and explain the relationship between current, voltage, and resistance.

---

*Task 2: Create Diagrams*

1. **Simple Circuit Diagram:**
   - Draw a simple circuit diagram that includes a battery, switch, and a bulb.
   - Label all the components clearly.
2. **Series and Parallel Circuits:**
   - Draw a diagram of a series circuit with two bulbs.
   - Draw a diagram of a parallel circuit with two bulbs.
   - Label all the components clearly and describe the differences between the two types of circuits.

---

*Task 3: Practical Activity*

1. **Building a Simple Circuit:**
   - **Materials:** Gather materials such as a battery, wires, a switch, and a bulb.
   - **Procedure:** Build a simple circuit that lights up the bulb when the switch is closed.
   - **Observation:** Record your observations and take pictures if possible.
2. **Experiment with Series and Parallel Circuits:**
   - **Materials:** Gather additional materials such as another bulb and more wires.
   - **Procedure:** Build a series circuit with two bulbs and a parallel circuit with two bulbs.
   - **Observation:** Record the brightness of the bulbs in both circuits and explain the difference.

---

*Task 4: Calculate and Analyse*

1. **Ohm's Law Calculations:**
   - Given a circuit with a 9V battery and a 3Ω resistor, calculate the current flowing through the circuit using Ohm's Law.

- Given a circuit with a current of 2A and a resistance of 4Ω, calculate the voltage across the circuit.

2. **Power Calculation:**
   - Write down the formula for electrical power:
   - Calculate the power of a circuit with a voltage of 12V and a current of 1.5A.

---

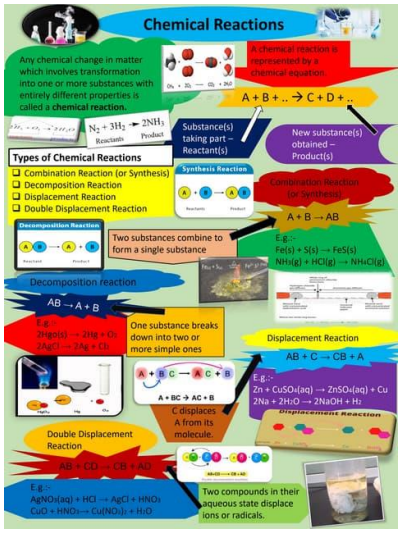
*Task 5: Research Applications*

1. **Real-World Applications:**
   - Research and write about three real-world applications of electricity (e.g., household appliances, electric vehicles, renewable energy sources).
   - Explain how electricity is used in each application and its importance.

Year 8.11 Independent Learning

## Chemical Reactions

**Year 8 Science Independent Learning Task Sheet: Chemical Reactions**
*Objective:*
To understand the principles of chemical reactions, including types of reactions, reactants and products, and the conservation of mass.

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*Task 1: Research Chemical Reactions*

1. **Basic Concepts:**
    - Research and write definitions for the following terms:
        - Chemical Reaction
        - Reactant
        - Product
        - Conservation of Mass
2. **Types of Reactions:**
    - Research and write a brief explanation of the following types of chemical reactions:
        - Combustion
        - Decomposition
        - Neutralization
        - Displacement
        - Synthesis

---

*Task 2: Balanced Chemical Equations*

1. **Understanding Equations:**
    - Explain why chemical equations need to be balanced.
    - Write a brief explanation of the Law of Conservation of Mass and how it applies to chemical reactions.
2. **Balancing Equations:**
    - Practice balancing chemical equations:

---

*Task 3: Practical Experiment (Optional)*

1. **Conduct an Experiment:**
    - Choose a simple chemical reaction to perform at home or in the lab (e.g., vinegar and baking soda, making a salt solution, reaction between magnesium and hydrochloric acid).
    - **Materials Needed:**
        - List all the materials you will need for the experiment.
    - **Procedure:**
        - Write down the steps you will follow to conduct the experiment.
    - **Observations:**
        - Record your observations during the experiment.
        - Take pictures if possible.
    - **Conclusion:**
        - Write a short paragraph explaining what you learned from the experiment.

---

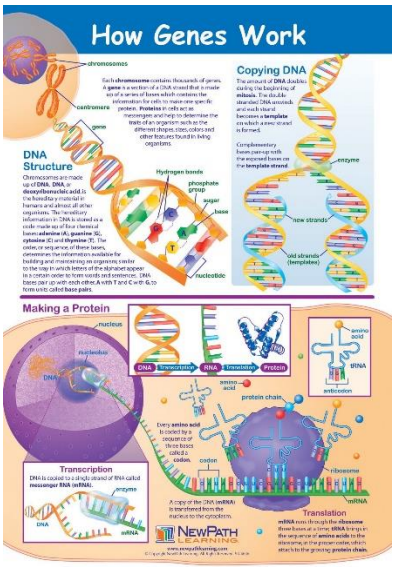
*Task 4: Real-World Applications*

1. **Research Applications:**
    - Research and write about at least three real-world applications of chemical reactions. Examples could include:
        - The role of combustion in engines.
        - The process of photosynthesis in plants.
        - The use of neutralization reactions in medicine.

Year 8.12 Independent Learning

## Genetic and Evolution

**Year 8 Science Independent Learning Task Sheet: Genetics and Evolution**
*Objective:*
To understand the basic principles of genetics and evolution, including the structure of DNA, inheritance, natural selection, and the evidence supporting evolutionary theory.

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*Task 1: Introduction to Genetics*

1. **Research DNA:**
    - **Structure:** Describe the structure of DNA, including the double helix, nucleotides, and base pairs (adenine, thymine, cytosine, guanine).
    - **Function:** Explain the role of DNA in storing genetic information and controlling the production of proteins.
2. **Key Terms:**
    - Define the following key terms:
        - Gene
        - Chromosome
        - Allele
        - Genotype
        - Phenotype

---

*Task 2: Inheritance*

1. **Mendelian Genetics:**
    - Research Gregor Mendel and his experiments with pea plants.
    - Explain the principles of inheritance, including dominant and recessive alleles.
2. **Punnett Squares:**
    - **Example Problem:** Create a Punnett square to predict the offspring of a cross between two heterozygous pea plants (Tt x Tt) for tall (T) and short (t) plants.
    - **Interpretation:** Explain the genotypic and phenotypic ratios of the offspring.

---

*Task 3: Natural Selection and Evolution*

1. **Natural Selection:**
    - Explain the concept of natural selection as proposed by Charles Darwin.
    - Provide an example of natural selection in action (e.g., peppered moths during the Industrial Revolution).
2. **Evolution:**
    - Define evolution and explain how natural selection contributes to the process.
    - Describe the evidence supporting evolutionary theory, including fossil records, comparative anatomy, and genetic similarities.

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*Task 4: Case Study*

1. **Choose a Case Study:**
    - Select a case study related to genetics or evolution (e.g., antibiotic resistance in bacteria, finch beak variation in the Galápagos Islands).
2. **Research and Report:**
    - Research the chosen case study and write a report covering the following points:
        - Background information
        - Key findings
        - Importance and implications for our understanding of genetics and evolution

---

*Task 5: Creative Project (Optional)*

1. **Create a Model or Poster:**
    - Create a 3D model or poster to illustrate a concept related to genetics or evolution (e.g., DNA structure, natural selection process).
2. **Presentation:**
    - Prepare a short presentation (3-5 minutes) to explain your model or poster to the class.

Year 8.13 Independent Learning

## The Earth (Climate and Resources)

**Year 8 Science Independent Learning Task Sheet: Earth's Climate and Resources**

*Objective:*

To understand the factors affecting Earth's climate, the concept of natural resources, and the impact of human activities on the environment.


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*Task 1: Research Earth's Climate*

1. **Climate vs. Weather:**
    - Define the difference between climate and weather.
    - Provide examples of each.
2. **Climate Zones:**
    - Research and describe the different climate zones on Earth (e.g., tropical, temperate, polar).
    - Identify the characteristics of each climate zone.
3. **Factors Affecting Climate:**
    - Explain the factors that influence Earth's climate, including:
        - Latitude
        - Altitude
        - Ocean currents
        - Wind patterns

- Human activities

---

*Task 2: Understand Climate Change*

1. **Greenhouse Effect:**
   - Explain the greenhouse effect and its role in regulating Earth's temperature.
   - List the main greenhouse gases (e.g., carbon dioxide, methane, water vapor).
2. **Causes of Climate Change:**
   - Identify and describe the natural and human-induced causes of climate change.
   - Provide examples of human activities that contribute to climate change (e.g., burning fossil fuels, deforestation).
3. **Impact of Climate Change:**
   - Research and explain the potential effects of climate change on:
     - Weather patterns
     - Sea levels
     - Ecosystems
     - Human health

---

*Task 3: Explore Natural Resources*

1. **Types of Natural Resources:**
   - Define natural resources and categorize them into renewable and non-renewable resources.
   - Provide examples of each type (e.g., renewable: solar energy, wind energy; non-renewable: coal, oil).
2. **Resource Management:**
   - Explain the importance of managing natural resources sustainably.
   - Research and describe methods of conserving natural resources (e.g., recycling, using energy-efficient appliances).

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*Task 4: Create Diagrams and Models*

1. **Greenhouse Effect Diagram:**
   - Create a diagram to illustrate the greenhouse effect.
   - Label the key components, including greenhouse gases and their sources.

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*Task 5: Practical Activity (Optional)*

1. **Carbon Footprint Calculation:**
    - Calculate your own carbon footprint using an online calculator.
    - Identify areas where you can reduce your carbon footprint and write a short action plan.
2. **Resource Conservation Project:**
    - Conduct a small project at home to conserve resources (e.g., starting a recycling program, reducing water usage).
    - Document your project with photos and a short report on what you did and the impact it had.

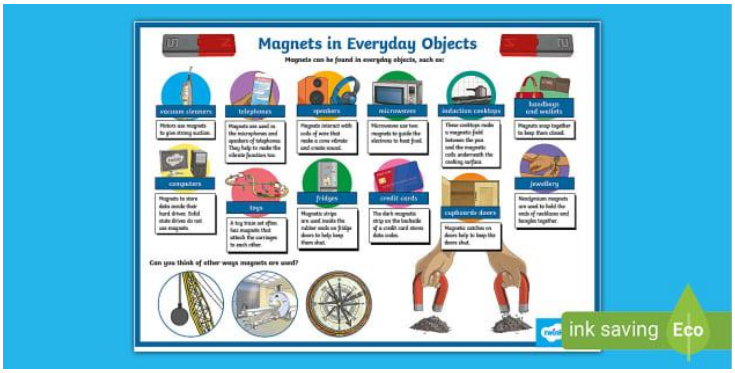
Year 8.14 Independent Learning

## Magnetism

**Year 8 Science Independent Learning Task Sheet: Magnetism**

*Objective:*

To understand the principles of magnetism, the properties of magnets, and their applications in everyday life.

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*Task 1: Research the Basics of Magnetism*

1. **What is Magnetism?**
    - Write a brief explanation of magnetism. Include the following points:
        - Definition of magnetism
        - Basic properties of magnets (e.g., north and south poles, attraction, and repulsion)
2. **Magnetic Materials:**
    - List at least three materials that are magnetic (e.g., iron, nickel, cobalt).
    - Explain why these materials are magnetic.

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*Task 2: Explore Magnetic Fields*

1. **Magnetic Field Lines:**
    - Draw a diagram of a bar magnet and show the magnetic field lines around it.
    - Label the north and south poles and the direction of the magnetic field lines.
2. **Earth's Magnetic Field:**

- Write a short paragraph explaining the Earth's magnetic field and how it protects us from solar radiation.

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*Task 3: Investigate Electromagnets*

1. **How Electromagnets Work:**
   - Explain what an electromagnet is and how it works.
   - List the components needed to make a simple electromagnet (e.g., battery, wire, iron nail).
2. **Applications of Electromagnets:**
   - Provide two examples of how electromagnets are used in everyday life (e.g., in electric motors, MRI machines).

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*Task 4: Conduct a Simple Experiment (Optional)*

1. **Make an Electromagnet:**
   - Follow these steps to make a simple electromagnet:
     - Gather materials: a battery, insulated copper wire, and an iron nail.
     - Wrap the copper wire around the iron nail, leaving some wire free at each end.
     - Connect the free ends of the wire to the battery terminals.
     - Observe how the nail becomes magnetized and can pick up small metal objects like paperclips.
2. **Record Observations:**
   - Write a short paragraph describing what you did and what you observed.
   - Take pictures if possible.

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*Task 5: Real-Life Applications of Magnetism*

1. **Magnetic Devices:**
   - Research and write about one device that uses magnetism (e.g., a compass, a hard drive, or an electric motor).
   - Explain how magnetism is crucial to the functioning of the device.