

Topic: YEAR 7 ECOLOGY

Duration: 9 lessons

Composite:
Unit test

Core Key vocabulary:

Producers
Consumers
Predator
Prey
Chlorophyll
Stomata
Chemosynthesis
Aerobic/anaerobic respiration
Food chain
Food web
interdependence
Population
Bioaccumulation
Ecosystem
Community
Habitat
Co-exist
Niche
Competition
Adaptation
Evolution
Extinction
Endangered
Nitrates
Phosphates
Fertiliser

Impressive Vocabulary:

Photosynthesis
Deficiency

Core knowledge Components

1. The equation for photosynthesis is;



2. Photosynthesis is a chemical reaction that takes place inside a plant, producing food for the plant to survive. Plants take in carbon dioxide and water and use the energy from light to produce glucose and oxygen.

3. The main components and functions of a leaf are;

- They are green – contain chlorophyll, which absorbs sunlight
- Thin – allows gases to diffuse in and out of the leaf easily
- Large surface area – to absorb as much light as possible
- Veins – these contain xylem tubes, which transport water, and phloem tubes, which transport glucose.

4. Gases get into and out of a leaf by tiny holes found on the bottom surface of a leaf called the stomata.

5. The minerals needed for healthy plant growth are:

6. Nitrates, phosphates, potassium, magnesium

7. The function of each of the minerals are;

8. Nitrate – for healthy growth

9. Phosphates – for healthy roots

10. Potassium – for healthy leaves and flowers

11. Magnesium – for making chlorophyll

Symptoms of each mineral deficiency.

12. Nitrate - Poor growth and older leaves are yellowed

13. Phosphate - Plant will have poor root growth, and younger leaves look purple

14. Potassium - Has yellow leaves, with dead patches

15. Magnesium - Plant leaves turn yellow

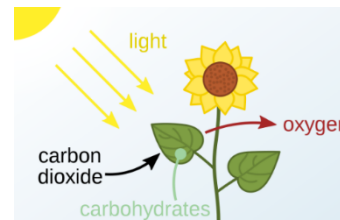
16. Fertilisers replace the minerals that are removed when crops are harvested.

17. Aerobic respiration produces energy from glucose using oxygen.

18. The equation for anaerobic respiration in humans is:



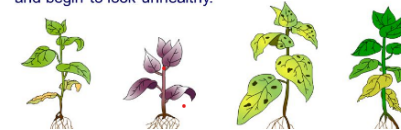
19. A food chains shows what an organism eats and the transfer if energy between organisms.



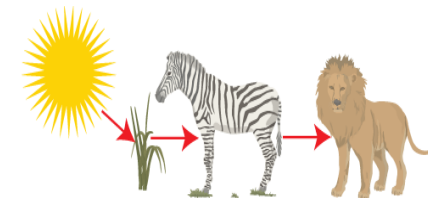
Powerful knowledge components crucial to commit to long term memory

- Name the products and reactants in photosynthesis.
- State the type of energy needed for the reaction.
- What provides the energy for the photosynthesis reaction?
- Why are plants called producers?
- Name 2 minerals plants need for healthy growth.

Plants do not grow properly if they are deprived of minerals and begin to look unhealthy.



- What happens during respiration reactions?
- State that aerobic respiration is:
Glucose + oxygen \rightarrow Carbon dioxide + water + energy
- What is the main difference between aerobic and anaerobic respiration?
- What do food chains show?



- Name 2 resources animals might compete for.
- Name 2 resources plants might compete for.

Links to previous and future topics

KS3: Cells; Reproduction; Inheritance; Variation and Inheritance; Plants.

KS4: Cells and Control; Genetics; Natural Selection & Genetic modification; Ecosystems & Material Cycles; Earth & Atmospheric Science; Conservation of Energy.

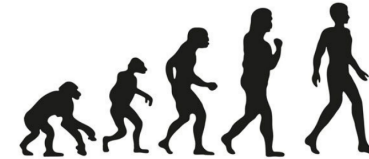
Respiration
Bioaccumulation
Niche
Adaptation
Evolution

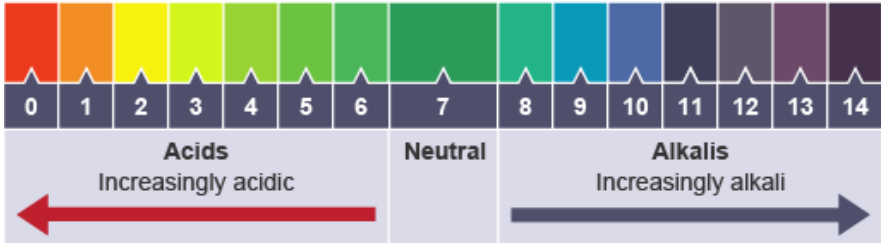
- 20. Plants are called producers because they produce their own food.
- 21. Interdependence means two organisms that depend on each other in an ecosystem.
- 22. An ecosystem is made up of all the organisms and the environment in which they live.
- 23. A niche is a particular place or role that an organism has within an ecosystem.
- 24. Some resources that animals and plants compete for;

Animals	Plants
Food	Light
Water	Water
Space	Space
Mates – to reproduce	Minerals

- 25. Adaptation is the process of change by which an organism or species becomes better suited to its environment.
- 26. An adaptation is a mutation, or genetic change, that helps an organism survive in its environment.
- 27. Natural selection is a process by which a species changes over time in response to changes in the environment, or competition between organisms.
- 28. Evolution is the way that living things change over time.
- 29. Factors that may lead to extinction are; new diseases, new predators, new, more successful competitors, changes in environment, such as climate change, and a single catastrophic event, such as a massive volcanic eruption or a collision between an asteroid and the Earth.

- **What happens in evolution?**
- **What happens when an organism becomes extinct?**



Topic: YEAR 7 ACIDS AND ALKALIS		Duration: 8 lessons	Composite: Unit test
Core Key vocabulary:	Core knowledge Components	Powerful knowledge components crucial to commit to long term memory	Links to previous and future topics
Acid Alkali Base Neutral pH Indicator Hazard Corrosive Weak Strong Concentrated Dilute Litmus Universal indicator Cabbage Beetroot Solution Oxide Sodium Hydroxide Nitric acid Hydrochloric acid Sulphuric acid Vinegar Sodium bicarbonate Neutralisation	<p>1 Acids and Alkalis</p> <p>Acids, bases and alkalis are found in the laboratory and at home.</p> <p>Acids and alkalis are chemical opposites</p> <p>Strong acids and alkalis can be corrosive</p> <p>Acids and bases can neutralise each other.</p> <p>A base that can dissolve in water is also called an alkali.</p> <p>Some common acids are:</p> <ul style="list-style-type: none"> - Vinegar, stomach acid, fizzy drinks <p>Common laboratory acids are:</p> <ul style="list-style-type: none"> - Hydrochloric acid, nitric acid, sulfuric acid. <p>Some common alkalis:</p> <ul style="list-style-type: none"> - Bleach, baking soda, toothpaste <p>Common laboratory alkalis:</p> <ul style="list-style-type: none"> - Sodium hydroxide, potassium hydroxide <p>Acids are solutions containing H⁺ ions</p> <p>Alkalis are solutions containing OH⁻ ions</p> <p>2 Indicators</p> <p>Indicators are chemicals that change colour when put in acids and alkalis.</p> <p>We can make indicators from common coloured vegetables like red cabbage and beetroot</p> <p>Laboratory indicators include litmus indicator and Universal Indicator (UI)</p> <p>The PH scale is based on the colours of UI and can tell us how strong acids and alkalis are.</p>  <p>A pH probe is an electronic device that measures pH and can be used as an alternative to UI indicator as it gives more accurate results.</p> <p>3 Neutralisation</p> <p>When an alkali is added to an acid in the correct volume, it can create a neutral solution. We say acids and alkalis neutralise each other.</p>	<ul style="list-style-type: none"> • Some common acids are, vinegar, stomach acid, fizzy drinks • Some common alkalis include bleach, baking soda, toothpaste • Indicators are chemicals that change colour in acids and alkalis and help us identify them • The pH scale ranges from 1 to 14, with acids in the 1-6 range and alkalis from 8-14 • pH 7 is neutral • UI indicator turns red through green for acids and blue through purple for alkalis. Mid green is neutral • Neutralisation occurs when the correct volume of acid is added to an alkali 	<p>KS3: Particles and solutions, Elements, compounds and mixtures</p> <p>KS4: Chemical Changes, Extracting Metals</p>

Bee stings are acidic so can be neutralised with a weak alkali

Stings

A bee sting is **acidic**

A wasp sting is **alkaline**

Why can **bicarbonate of soda (pH 9)** be used to treat a **bee sting**?

Why can **vinegar (pH 3)** be used to treat a **wasp sting**?

Adding just the right amount of **acid** or **alkali** to the sting causes it to **neutralise!**

Stomach acid can be neutralised with a weakly alkaline antacid like Gaviscon

4 Salts

When acids react with metals, they create salts.

There are hundreds of different salts that can be made from different combinations of metals and acids.

Salts made from hydrochloric acid are named after the metal with the ending chloride (e.g. sodium chloride)

Salts made with nitric acid are called nitrates (e.g. copper nitrate).

Salts made with sulfuric acid are called sulfates (e.g. iron sulphate)

When metals react with salts, a gas is released, this gas is hydrogen. The test for hydrogen is to collect the gas in a test-tube, hold a lit splint over the open tube – if there is hydrogen then it will make a “squeaky pop” sound.

5 Oxides

Metal oxides (like calcium oxide) are alkaline when dissolved in water

Non-metal oxides (like carbon dioxide) are acidic when dissolved in water

Topic: Electricity

KS3 National Curriculum sub-topics:-

- Current Electricity
- Static Electricity

Duration: 8 lessons

Composite:
Unit test

Key vocabulary:

Core knowledge Components

- Ampere
- Battery
- Cell
- Circuit
- Conductor
- Electric Charge
- Electric Current
- Electron
- In Parallel
- In Series
- Insulator
- Ohms
- Potential Difference
- Resistance
- Volt
- Voltmeter

Current, Potential Difference and Resistance

1. An electrical current is a flow of charged particles. In a wire this is a flow of electrons.
2. Electricity is a form of energy resulting from the movement of charged particles.
3. Potential difference is the 'push' that causes the charged particles to flow. This comes from the battery and transfers chemical energy into other forms. Potential difference is measured in volts.
4. Increasing potential difference will increase current.
5. Increasing resistance will decrease current.
6. The equation linking the P.D, current and resistance is, Potential Difference = Current x Resistance ($V=IR$)

Circuits

7. Know the commonly used circuit symbols such as a wire, closed switch, open switch, lamp, and cell, battery of cells, ammeter, voltmeter, resistor and variable resistor. (In each students book)
8. An ammeter is connected in series and measures current.
9. A voltmeter is connected in parallel and measures potential difference.
10. Energy is transferred via the electrical current. Which is a flow of electrons in wires and all home appliances.
11. Energy is transferred to different components and transferred to different stores depending on the component. For examples, a light bulb will convert the energy into thermal store and light transfer.

Series and Parallel Circuits

12. In a series circuit the current is the same everywhere.
13. In a parallel circuit the current splits at junctions.

Atoms

14. Atoms are made of protons, neutrons and electrons. They have the following properties

Sub-atomic particle	Relative Mass	Relative Charge
Proton	1	+1
Neutron	1	0
Electron	0	-1

Static Electricity

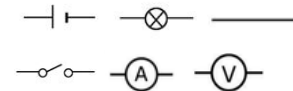
15. Electrons are responsible for static charge.
16. An object can become negatively charged by gaining electrons.
17. An object can become positively charged by losing electrons.
18. Repulsions forces are produced when two like charges are brought close together.
19. Attractive forces are produced when two opposite charges are brought close together.

Electrostatic Fields

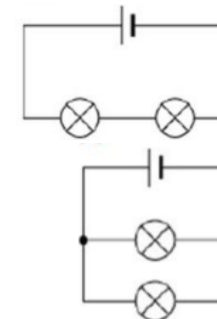
20. An electrostatic field is an area in which a charged particle will feel a force.
21. The electrostatic force is a non-contact force.

Powerful knowledge components crucial to commit to long term memory

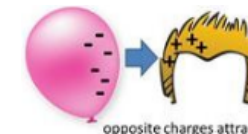
- Define electricity and current.
- Which particle inside a wire is flowing when electricity is produced?
- Name the following circuit symbols:



- Identify these types of circuit:



- Explain how the current travels in each of these circuits.
- What is static electricity?
- Explain how static can be made



- State the name of the force created electrostatically.

Links to previous and future topics

- KS2 Electricity
- Yr 7 Energy Resources
- Yr 7 Chemical Reactions; Elements and Compounds
- KS4: Electricity and Static Electricity
- Yr 8 Structure of metals