









# 2020-21 CURRICULUM MAP FOR SCIENCE







## YEAR 9

|  |   |  |
|--|---|--|
| <p><b>HALF TERM 1: Who do you think you are?</b></p> <p><b>Genetics</b></p> <p>1. To know how and what information is passed from one generation to another – DNA, blood group, eye colour, gender.</p> <p>2. Draw and interpret <b>genetic diagrams</b>. Direct proportion, simple ratios, and probability to predict the outcome of a genetic cross. Genetic diagrams give us the possible gametes that can be formed from the characteristic alleles carried by the parents. (<b>Alleles</b> are different versions of the same gene).</p>  |    | <p>Articles on genetic engineering.<br/>'Dolly the Sheep'<br/>Reading and extracting key information on the problems that can occur with selective breeding.</p>           |
| <p><b>Inheritance</b></p> <p>1. Know the different forms of genes and how alleles can be dominant or recessive. <b>Dominant</b> alleles are always expressed with a capital letter and in the phenotype (physical characteristics you see). A <b>recessive</b> allele is only expressed if two copies are present.</p> <p>2. How genetic disorders such as <b>polydactyly</b> (extra fingers and toes, dominant trait so is inherited from only one parent) and cystic fibrosis are inherited. – Some disorders are the result in the change of bases and coding and can be passed on from parent to child. (<b>cystic fibrosis</b> – recessive so both parents must have condition for offspring to have it, although you can be a carrier if only one parent has it)</p>   |    | <p>Extended writing on the advantages and disadvantages of offering embryo screening for genetic disorders to all pregnant couples.</p>                                    |
| <p>3. <b>Haemophilia</b> and <b>red/green colour blindness</b> are sex linked inherited disorders (women can carry but men have condition, as Y chromosome contains less genetic info).</p> <p>4. <b>Selective breeding</b> is used to produce plants and animals with desired characteristics. For example, flowers of a certain colour, cattle which produce the most meat/milk, largest vegetables.</p> <p><b>Variation</b></p> <p>1. <b>Genetic variation</b> arises from the mixing of gametes (sex cells). Even full siblings will have genetic differences.</p> <p>2. <b>Environmental variation</b> comes from the environment and can include characteristics such as accents, scars, piercings, weight, skills.</p> <p>3. <b>Identical twins</b> share the same DNA, however will have some differences. They will have different fingerprints. They will also have differences from environmental variation, height, weight, IQ etc..</p> |   | <p>Group work<br/>Debate cards on genetic engineering/ cloning of animals.<br/>Group discussion on inherited and environmental characteristics.</p>                        |
| <p>1. <b>Genetic variation</b> arises from the mixing of gametes (sex cells). Even full siblings will have genetic differences.</p> <p>2. <b>Environmental variation</b> comes from the environment and can include characteristics such as accents, scars, piercings, weight, skills.</p> <p>3. <b>Identical twins</b> share the same DNA, however will have some differences. They will have different fingerprints. They will also have differences from environmental variation, height, weight, IQ etc..</p>  |  | <p>PSHE – link to inheritance and relationships.<br/>History – How genetic information is passed down through generations.<br/>Health and social care – Sex Education.</p> |
| <p><b>HALF TERM 2:</b></p> <p><b>Our Changing world</b></p> <p><b>Climate Change</b></p> <p>1. The main gases in the earth's atmosphere are <b>oxygen</b> (21%) <b>nitrogen</b> (78%) with small amounts of <b>carbon dioxide</b> and other rare gases like argon.</p> <p>2. The amount of carbon dioxide is increasing from burning fossil fuels and deforestation.</p>   |  | <p>Reading about how the Earth's atmosphere has changed overtime (The evolution of the atmosphere).<br/>Reading information on extinction and speciation.</p>              |
| <p>3. <b>Combustion</b> is an important chemical reaction that produces carbon dioxide. Incomplete combustion produces carbon monoxide and soot.</p> <p>4. Carbon dioxide is a <b>greenhouse gas</b>. The greenhouse effect happens when the heat from the sun is not able to escape back into space (like a greenhouse).</p> <p>5. The Consequences of <b>global warming</b> such as ice caps</p>   |  | <p>A letter to the president explaining how people are causing global warming, with consequences and possible solutions.</p>   |










# 2020-21 CURRICULUM MAP FOR SCIENCE

## YEAR 9

|   |   |   |
|---|---|---|
| <p>melting, change in rain fall and extreme weather events.</p> <p>6. Global warming is increasing due to humans adding “locked up carbon” to the atmosphere</p> <p>7. The <b>carbon cycle</b> shows how carbon moves in and out of the atmosphere through processes such a photosynthesis and respiration.</p> <p>8. The Earth is running out of natural resources. Recycling can be used to help preserve the earth’s resources and often uses less energy than extracting the raw materials from the ground.</p> <p>9. <b>Recycling</b> mean less material is sent to landfill.</p>  |    | <p>Are humans really changing the climate? – A debate with pupils giving evidence from both sides of the argument.</p> <p>Research and presentation/video news report on extinct and endangered species.</p>  |
| <p><b>HALF TERM 3: All the fun of the fair</b></p> <p><b>Energy transfer</b></p>  |    | <p>Geography – Use of natural resources, human impacts on the landscape and environment.</p> <p>Maths – drawing pie charts and representing data in graphs.</p> <p>History – Extinction of species over time. Exploration and discovery of mew countires which may have led to habitats/species being affected.</p> |
| <p>1. There are 7 different <b>energy stores</b> – Thermal, magnetic, chemical, electrostatic, gravitational, kinetic and elastic.</p> <p>2. The Principle of <b>conservation of energy</b> states that energy cannot be made or destroyed, just transferred from one place to another or transformed from one type to another.</p> <p>3. There are 4 methods of <b>transferring energy</b> (mechanically, heating, electrically, by light and sound).</p>  |    | <p>Reading about the history of magnets, compasses and the Earth’s magnetic field.</p>  |
| <p>4. Energy is transferred when a force moves an object.</p> <p>5. Heat energy can be transferred by conduction, convection and Radiation. This can be explained using particle theory.</p> <p>6. Insulation can be used to reduce heat transfer.</p> <p>7. Energy transfers are not 100% efficient, Sanky diagrams can be used to show this.</p> <p>8. Household appliances – Looking at <b>power ratings</b> of household appliances in watts, <b>comparing energy transfers</b>. Calculating the cost of domestic <b>fuel bills</b> and fuel use.</p>   |  | <p>The story of a particle around a convection loop or mine shaft</p>   |
| <p><b>Magnets</b></p> <p>1. The area around the magnet that the magnet can affect is the <b>magnetic field</b>. The closer field lines the stronger the magnet.</p> <p>2. Draw a magnetic field using a plotting compass or iron fillings.</p> <p>3. Poles on a magnet can be identified using the ideas of <b>attraction and repulsion</b>.</p>  |  | <p>Presentations on electromagnetic spectrum.</p> <p>Explanation of results from electromagnets investigation</p>   |
| <p>4. The Earth has a magnetic field like the one of a bar magnet. Compasses can be used to find direction because of the earth magnetic field.</p> <p>5. A wire with a current will have a magnetic field around it, this wire is called a solenoid.</p> <p>6. Plan and carry out an investigation to discover the effects of current, number of coils and type of core on an electromagnet.</p> <p>7. Devices such a bells and motors can be made using electro magnets.</p> <p><b>Waves</b></p> <p>1. Transverse and longitudinal waves can be described in terms of <b>amplitude, frequency and wavelength</b>. Light is an example of a transverse wave, sound is an example of a longitudinal wave.</p> |  | <p>Technology – Using motors to move vehicles. Properties of materials that make them good insulators</p> <p>Geography – using compasses for navigation.</p> <p>Maths – use of sanky diagrams to show useful and wasted energy and to calculate efficiency.</p>   |








# 2020-21 CURRICULUM MAP FOR SCIENCE YEAR 9

|   |   |  |
|---|---|--|
| <p>2. Superposition happens when waves meet.</p> <p>3. Light is part of the <b>electromagnetic spectrum</b>. The EM spectrum has 7 parts gamma, x-rays, UV, light, IR, microwaves, Radio waves there are uses and dangers associated with each part.</p>  |   |  |
| <p><b>HALF TERM 4: Revolution</b></p> <p><b>Displacement</b></p> <p>1. A metal from the <b>electrochemical series</b> is mixed with the ions (charged atom) of a metal lower down in the electrochemical series - a more reactive metal will <b>displace</b> (take position of) a less reactive metal from its compounds.</p> <p><b>Reactivity</b></p> <p>1. Understand what is meant by a <b>reactant</b> (what raw materials go into the reaction) and a <b>product</b> (what is made). – reactants found on the left-hand side of an equation and products on the right.</p> <p>2. <b>Balancing equations</b> – all equations must be balanced so that it shows the number of each element within a formula, and the number of each element on either side must be the same.</p> <p>3. A <b>catalyst</b> speeds up the rate of a reaction. However, it is not used up itself in the reaction. (Catalytic converter in a car is used to change carbon monoxide into carbon dioxide).</p> <p>4. <b>Testing for gases</b> – Carbon dioxide (limewater turns cloudy), Hydrogen (squeaky pop test) and Oxygen (re lights a glowing splint).</p> <p><b>Extracting Metals</b></p> <p>1. Extraction of metals. Iron is extracted from iron oxide in the blast furnace. To extract copper from copper oxide it must be mixed with carbon powder and heated to produce carbon dioxide and copper.</p> <p><b>Electrolysis</b></p> <p>1. <b>Electrolysis</b> is the process by which substances are broken down using electricity. (Electro – electricity, lysis – to break down).</p> <p>2. <b>Positive ions</b> (cations) will move to the anode (negative electrode). <b>Negative ions</b> (anions) move to the cathode (positive electrode)</p> <p>3. <b>PANIC</b> – positive anode, negative is cathode.</p> <p>4. <b>Cations</b> are always metals, <b>anions</b> are always non-metals.</p> |    | <p>Reading and extracting information on electrolysis and how metals are extracted in different countries.</p>                           |
|   |    | <p>Extended writing task on reactivity with metals and acids.<br/>Experimental write up for the required practical of Electrolysis.</p>  |
|   |    | <p>Discussions about the reactivity series – displacement reactions football team game.</p>  |
|   |   | <p>Technology – link to advances in new technology used in extracting metals.<br/>Maths – Link to numeracy with balancing equations.</p> |
| <p><b>HALF TERM 5: Pandemic</b></p> <p><b>Pathogens</b></p> <p>1. The four types of pathogens are <b>bacteria, fungi, virus and protists</b>.</p> <p>2. Bacterial infections include <b>TB and gonorrhoea</b>.</p> <p>3. Viruses include <b>cold, HIV, flu, and Covid 19</b>.</p> <p>4. <b>Athletes foot and ringworm</b> are fungal infections.</p> <p>5. <b>Malaria</b> is caused by a protist.</p> <p>6. <b>Health</b> is defined as a state of physical, mental and social wellbeing.</p> <p>7. <b>Alexander Fleming</b> accidentally discovered penicillin, the first antibiotic. <b>Antibiotics</b> treat bacterial infections.</p> <p>8. Louis Pasteur was a French microbiologist who worked on</p>   |  | <p>Stories of how Edward Jenner and Alexander Fleming made their scientific discoveries.</p>   |
|   |  | <p>'A dodgy bbq' extended grade assessed task.</p>   |
|   |  | <p>Class discussion on Covid-19 pandemic.<br/>Group work and discussion on different types of pathogens.</p>                             |



# 2020-21 CURRICULUM MAP FOR SCIENCE YEAR 9

|   |  |   |
|---|--|---|
| <p>curing diseases and developed <b>pasteurisation</b> – a heat treatment used to kill pathogens in food.</p> <p>9. Case study on the 2020 <b>pandemic Covid-19</b>.</p>  |   | <p>History – the stories of Alexander Fleming, Louis Pasteur and Edward Jenner.</p> <p>PSHE/Health and social – health and disease</p> <p>Travel and tourism – prevalence of diseases around the world.</p> <p>Geography – Origin of Covid-19 and how it spread throughout the world.</p> |
| <p><b>HALF TERM 6: Pandemic</b></p> <p><b>Immunology</b></p> <ol style="list-style-type: none"> <li><b>Primary defences</b> (non-specific) against infection include skin, tears, body hair and stomach acid.</li> <li><b>Secondary defence</b> includes the trigger of an immune response in the body.</li> <li>White blood cells produce <b>antibodies</b> (specific, each antibody only works on one type of antigen) which fight the antigen which causes the infection.</li> <li><b>Phagocytosis</b> is the process of engulfing pathogens and destroying them.</li> <li>Edward Jenner developed the first <b>vaccine</b> (for smallpox) after observing that milkmaids did not contract smallpox as they were exposed to cowpox.</li> <li>Vaccine comes from the Latin word for cow – vacca.</li> </ol> |   | <p>Stories of how Edward Jenner and Alexander Fleming made their scientific discoveries.</p>  |
|   |   | <p>'A dodgy bbq' extended grade assessed task.</p>  |
|   |   | <p>Class discussion on Covid-19 pandemic.</p> <p>Group work and discussion on different types of pathogens.</p>   |
|   |  | <p>History – the stories of Alexander Fleming, Louis Pasteur and Edward Jenner.</p> <p>PSHE/Health and social – health and disease</p> <p>Travel and tourism – prevalence of diseases around the world.</p> <p>Geography – Origin of Covid-19 and how it spread throughout the world.</p> |