Y8 Science Checklist (Term 2)

Ecosystems (Biology) https://classroom.thenational.academy/units/biological-systems-and-processes-bf5a https://classroom.thenational.academy/units/plants-and-photosynthesis-54c3	☺	😐	☹
Respiration is a series of chemical reactions, in cells, that breaks down glucose to provide energy and form new molecules. Most living things use aerobic respiration but switch to anaerobic respiration, which provides less energy, when oxygen is unavailable.			
Yeast fermentation is used in brewing and bread-making.			
Use word equations to describe aerobic and anaerobic respiration.			
Explain how specific activities involve aerobic or anaerobic respiration.			
Suggest how organisms living in different conditions use respiration to get their energy.			
Describe similarities and differences between aerobic and anaerobic respiration.			
Plants and algae do not eat, but use energy from light, together with carbon dioxide and water to make glucose (food) through photosynthesis. They either use the glucose as an energy source, to build new tissue, or store it for later use.			
Plants have specially-adapted organs that allow them to obtain resources needed for photosynthesis.			
Iodine is used to test for the presence of starch.			
Describe ways in which plants obtain resources for photosynthesis.			
Explain why other organisms are dependent on photosynthesis.			
Sketch a line graph to show how the rate of photosynthesis is affected by changing conditions.			
Use a word equation to describe photosynthesis in plants and algae.			
Suggest how particular conditions could affect plant growth.			
Suggest reasons for particular adaptations of leaves, roots and stems.			
Compare the movement of carbon dioxide and oxygen through stomata at different times of day.			
KEYWORDS	☺	😐	☹
Aerobic respiration: Breaking down glucose with oxygen to release energy and producing carbon dioxide and water.			
Anaerobic respiration (fermentation): Releasing energy from the breakdown of glucose without oxygen, producing lactic acid (in animals) and ethanol and carbon dioxide (in plants and microorganisms).			
Fertilisers: Chemicals containing minerals that plants need to build new tissues.			
Photosynthesis: A process where plants and algae turn carbon dioxide and water into glucose and release oxygen.			
Chlorophyll: Green pigment in plants and algae which absorbs light energy			
Stomata Pores in the bottom of a leaf which open and close to let gases in and out.			

Genes (Biology) **https://classroom.thenational.academy/units/inheritance-variation-and-evolution-0224**	☺	😐	☹
Natural selection is a theory that explains how species evolve and why extinction occurs.			
Biodiversity is vital to maintaining populations. Within a species variation helps against environment changes, avoiding extinction. Within an ecosystem, having many different species ensures resources are available for other populations, like humans.			
Use evidence to explain why a species has become extinct or adapted to changing conditions.			
Evaluate whether evidence for a species changing over time supports natural selection.			
Explain how a lack of biodiversity can affect an ecosystem.			
Describe how preserving biodiversity can provide useful products and services for humans.			
Predict and explain the changes in a population over time due to natural selection.			
Suggest an explanation, based on data, for how a particular evolutionary change occurred.			
Evaluate ways of preserving plant or animal material for future generations.			
Inherited characteristics are the result of genetic information, in the form of sections of DNA called genes, being transferred from parents to offspring during reproduction.			
Chromosomes are long pieces of DNA which contain many genes. Gametes, carrying half the total number of chromosomes of each parent, combine during fertilisation.			
The DNA of every individual is different, except for identical twins.			
There is more than one version of each gene e.g. different blood groups.			
Use a diagram to show the relationship between DNA, chromosomes and genes.			
Use a diagram to show how genes are inherited.			
Explain how a change in the DNA (mutation) may affect an organism and its future offspring.			
Explain why offspring from the same parents look similar but are not usually identical.			
Suggest arguments for and against genetic modification.			
Suggest benefits from scientists knowing all the genes in the human genome.			
Determine how the number of chromosomes changes during cell division, production of sex cells and fertilisation.			
Find out why scientist Watson, Crick and Franklin were so important.			
Keywords	☺	😐	☹
Population: Group of organisms of the same kind living in the same place.			
Natural selection: Process by which species change over time in response to environmental changes and competition for resources.			
Extinct: When no more individuals of a species remain.			
Biodiversity: The variety of living things. It is measured as the differences between individuals of the same species, or the number of different species in an ecosystem.			
Competition: When two or more living things struggle against each other to get the same resource.			
Evolution: Theory that the animal and plant species living today descended from species that existed in the past.			
Inherited characteristics: Features that are passed from parents to their offspring.			
DNA: A molecule found in the nucleus of cells that contains genetic information.			
Chromosomes: Thread-like structures containing tightly coiled DNA.			

Gene: A section of DNA that determines an inherited characteristic.			
Reactions (Chemistry) **https://classroom.thenational.academy/units/energetics-and-rates-067a**	☺	😐	☹
During a chemical reaction bonds are broken (requiring energy) and new bonds formed (releasing energy). If the energy released is greater than the energy required, the reaction is exothermic. If the reverse, it is endothermic.			
Use experimental observations to distinguish exothermic and endothermic reactions			
Use a diagram of relative energy levels of particles to explain energy changes observed during a change of state.			
Predict whether a chemical reaction will be exothermic or endothermic given data on bond strengths.			
Use energy data to select a reaction for a chemical hand warmer or cool pack.			
Combustion is a reaction with oxygen in which energy is transferred to the surroundings as heat and light.			
Thermal decomposition is a reaction where a single reactant is broken down into simpler products by heating.			
Chemical changes can be described by a model where atoms and molecules in reactants rearrange to make the products and the total number of atoms is conserved.			
Write word equations from information about chemical reactions.			
Explain why a reaction is an example of combustion or thermal decomposition.			
Predict the products of the combustion or thermal decomposition of a given reactant and show the reaction as a word equation			
Explain observations about mass in a chemical or physical change.			
Use particle diagrams to show what happens in a reaction.			
Compare the pros and cons of fuels in terms of their products of combustion.			
Use known masses of reactants or products to calculate unknown masses of the remaining reactant or product.			
Devise a general rule for how a set of compounds reacts with oxygen or thermally decomposes.			
Balance a symbol equation.			
Use mass of reactant in equation to determine mass of product eg magnesium and oxygen.			
Keywords	☺	😐	☹
Catalysts: Substances that speed up chemical reactions but are unchanged at the end.			
Exothermic reaction: One in which energy is given out, usually as heat or light.			
Endothermic reaction: One in which energy is taken in, usually as heat.			
Chemical bond: Force that holds atoms together in molecules.			
Fuel: Stores energy in a chemical store which it can release as heat.			
Chemical reaction: A change in which a new substance is formed.			
Physical change: One that changes the physical properties of a substance, but no new substance is formed.			
Reactants: Substances that react together, shown before the arrow in an equation.			

Products: Substances formed in a chemical reaction, shown after the reaction arrow in an equation.			
Conserved: When the quantity of something does not change after a process takes place.			
Forces (Physics) **https://classroom.thenational.academy/units/forces-in-action-543b**	☺	😐	☹
When the resultant force on an object is zero, it is in equilibrium and does not move, or remains at constant speed in a straight line			
One effect of a force is to change an object's form, causing it to be stretched or compressed. In some materials, the change is proportional to the force applied.			
Sketch the forces acting on an object, and label their size and direction.			
Explain whether an object in an unfamiliar situation is in equilibrium.			
Describe factors which affect the size of frictional and drag forces.			
Describe how materials behave as they are stretched or squashed.			
Describe what happens to the length of a spring when the force on it changes.			
Evaluate how well sports or vehicle technology reduces frictional or drag forces.			
Describe the effects of drag and other forces on falling or accelerating objects as they move.			
Using force and extension data, compare the behaviour of different materials in deformation using the idea of proportionality.			
Pressure acts in a fluid in all directions. It increases with depth due to the increased weight of fluid, and results in an upthrust. Objects sink or float depending on whether the weight of the object is bigger or smaller than the upthrust.			
Different stresses on a solid object can be used to explain observations where objects scratch, sink into or break surfaces.			
Use the formula: fluid pressure, or stress on a surface = force (N) / area (m^2).			
Use diagrams to explain observations of fluids in terms of unequal pressure.			
Explain why objects either sink or float depending upon their weight and the upthrust acting on them.			
Explain observations where the effects of forces are different because of differences in the area over which they apply.			
Given unfamiliar situations, use the formula to calculate fluid pressure or stress on a surface.			
Use the idea of pressure changing with depth to explain underwater effects.			
Carry out calculations involving pressure, force and area in hydraulics, where the effects of applied forces are increased.			
Use the idea of stress to deduce potential damage to one solid object by another.			
Keywords	☺	😐	☹
Equilibrium: State of an object when opposing forces are balanced.			
Deformation: Changing shape due to a force.			
Linear relationship: When two variables are graphed and show a straight line which goes through the origin, and they can be called proportional.			
Newton: Unit for measuring forces (N).			
Resultant force: Single force which can replace all the forces acting on an object and have the same effect.			

Friction: Force opposing motion which is caused by the interaction of surfaces moving over one another. It is called 'drag' if one is a fluid.			
Tension: Force extending or pulling apart.			
Compression: Force squashing or pushing together.			
Contact force: One that acts by direct contact.			
Fluid: A substance with no fixed shape, a gas or a liquid.			
Pressure: The ratio of force to surface area, in N/m2, and it causes stresses in solids			
Upthrust: The upward force that a liquid or gas exerts on a body floating in it.			
Atmospheric pressure: The pressure caused by the weight of the air above a surface.			

Revision **Yr 7 Reactions (Chemistry)** **https://classroom.thenational.academy/units/reactivity-609c**	☺	😐	☹
Metals and non-metals react with oxygen to form oxides which are either bases or acids.			
Metals can be arranged as a reactivity series in order of how readily they react with other substances.			
Some metals react with acids to produce salts and hydrogen.			
Iron, nickel and cobalt are magnetic elements.			
Mercury is a metal that is liquid at room temperature.			
Bromine is a non-metal that is liquid at room temperature.			
The pH of a solution depends on the strength of the acid: strong acids have lower pH values than weak acids.			
Mixing an acid and alkali produces a chemical reaction, neutralisation, forming a chemical called a salt and water.			
Acids have a pH below 7, neutral solutions have a pH of 7, alkalis have a pH above 7.			
Acids and alkalis can be corrosive or irritant and require safe handling.			
Hydrochloric, sulfuric and nitric acid are strong acids.			
Acetic and citric acid are weak acids.			
Keywords	☺	😐	☹
Metals: Shiny, good conductors of electricity and heat, malleable and ductile, and usually solid at room temperature.			
Non-metals: Dull, poor conductors of electricity and heat, brittle and usually solid or gaseous at room temperature.			
Displacement: Reaction where a more reactive metal takes the place of a less reactive metal in a compound.			
Oxidation: Reaction in which a substance combines with oxygen.			
Reactivity: The tendency of a substance to undergo a chemical reaction.			
pH: Scale of acidity and alkalinity from 0 to 14.			
Indicators: Substances used to identify whether unknown solutions are acidic or alkaline			
Base: A substance that neutralises an acid - those that dissolve in water are called alkalis.			
Concentration: A measure of the number of particles in a given volume.			

Revision **Yr 7 Forces (Physics)** **https://classroom.thenational.academy/units/forces-and-motion-b426**	☺	😐	☹
Know that if the overall, resultant force on an object is unbalanced, its motion changes and it slows down, speeds up or changes direction.			
Use the formula: speed = distance (m) / time (s) or distance-time graphs, to calculate speed.			
Illustrate a journey with changing speed on a distance-time graph, and label changes in motion.			
A straight line on a distance-time graph shows constant speed, a curving line shows acceleration.			
The higher the speed of an object, the shorter the time taken for a journey.			
Describe how the speed of an object varies when measured by observers who are not moving, or moving relative to the object.			
Suggest how the motion of two objects moving at different speeds in the same direction would appear to the other.			
Predict changes in an object's speed when the forces on it change.			
Mass and weight are different but related. Mass is a property of the object; weight depends upon mass but also on gravitational field strength.			
Every object exerts a gravitational force on every other object. The force increases with mass and decreases with distance. Gravity holds planets and moons in orbit around larger bodies.			
Use the formula: weight (N) = mass (kg) x gravitational field strength (N/kg).			
Gravitational field strength on Earth = 9.8 N/kg. On the Moon it is 1.6 N/kg.			
Explain unfamiliar observations where weight changes.			
Draw a force diagram for a problem involving gravity.			
Deduce how gravity varies for different masses and distances.			
Compare your weight on Earth with your weight on different planets using the formula.			
Compare and contrast gravity with other forces.			
Draw conclusions from data about orbits, based on how gravity varies with mass and distance.			
Suggest implications of how gravity varies for a space mission.			
KEYWORDS	☺	😐	☹
Speed: How much distance is covered in how much time.			
Average speed: The overall distance travelled divided by overall time for a journey.			
Relative motion: Different observers judge speeds differently if they are in motion too, so an object's speed is relative to the observer's speed.			
Acceleration: How quickly speed increases or decreases.			
Weight: The force of gravity on an object (N).			
Non-contact force: One that acts without direct contact.			
Mass: The amount of stuff in an object (kg).			
Gravitational field strength, g: The force from gravity on 1 kg (N/kg).			