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|  | Working towards the skills and knowledge needed | Acquiring the skills and knowledge needed | On track with the skills and knowledge needed | Advancing the skills and knowledge needed | Extending the skills and knowledge needed |
| 1. Cells | Recall the life  processes  Identify things as being alive or not.  State the meaning of: organism. | Describe the life processes. | Use life processes to justify whether something is [living, an organism] or is non-living. | Identify ways in which an organism shows each life process.  Compare life processes in a range of plants and animals. | Design a way for deciding if something has ever been alive. |
| 1. Sexual Reproduction | Identify [sperm cells, pollen grains, egg cells] as [sex cells, gametes].  State the meaning of: sex cell, gamete, embryo.  Identify ways in which animals care for their offspring.  State the meaning of: sexual reproduction.  Identify animals that reproduce sexually. | Describe how the fusing of [sex cells, gametes] and their nuclei during fertilisation forms a fertilised egg cell.  Describe how [fish, birds, mammals] care for their offspring.  Describe how [fish, birds, mammals] reproduce sexually. | Describe how a fertilised egg cell grows into an embryo. | Compare the amount of care of offspring in [fish, birds, mammals].    Compare the sexual reproduction of [fish, birds, mammals]. | Explain the implications of a certain level of aftercare in different situations.  Explain the implications of different methods of fertilisation in [fish, birds, mammals]. |
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| 1. Muscles | State the meaning of: breathing, breathing rate, ventilation  Identify the main [parts, organs] of the human gaseous exchange system | Describe the functions of the main parts of the human gaseous exchange system.  Describe how muscles attached to ribs and the diaphragm produce breathing movements.  Describe what happens during gas exchange. | Use a knowledge of respiration and ventilation to explain why inhaled air differs from exhaled air.  Use a model to explain how lungs expand and contract.  Suggest the effects of [diseases that affect, damage] the [gaseous exchange, breathing] system.  Suggest the effects of differences (e.g. in size or organs) between the gaseous exchange systems in different people. | Use a pressure model to explain ventilation.  Suggest reasons for differences in [lung capacity, tidal volume, vital capacity].  Compare the human gaseous exchange system with those of other animals. | Suggest how problems with the [gaseous exchange, breathing] system could be [overcome, treated]. |
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| 1. Ecosystems | Define what is meant by: species, hybrid.  Identify variation between organisms of the same type and of different types. Define what is meant by: variation.  Define the meanings of: habitat, organism. Identify organisms that live in the same habitat. | Describe how hybrids can be distinguished from species.  Tell the difference between and identify examples of continuous and discontinuous variation. | Identify the parents of a hybrid.  Explain why [hybrids, ring species] confuse the idea of a species and make [classification, identification] difficult. | Justify the continuing use of the definition of species despite its limitations.  Evaluate how easy it is to classify members of a ring species. | Investigate the variations within a species to illustrate continuous variation and discontinuous variation. |
| 1. Mixtures | Identify examples of [solids, liquids, gases].  Recall the three states of matter.  State the meaning of: mixture sieving, filtering, insoluble, suspension. | Describe what the three states of matter are like.  Identify mixtures.  Describe how insoluble solids can be separated from a liquid. | Group materials using their states of matter as justification.  Classify mixtures as suspensions, colloids and solutions, on what they look like and whether they separate on standing.  Use a knowledge of [solutions, suspensions, dissolving] to decide how mixtures should be separated. | Identify materials that are difficult to identify as [solids, liquids, gases].  Classify colloids [as foams, emulsions, gels, aerosols, sols] on what they are made up of. | Decide whether it is good to make a certain item out of a [solid, liquid, gas].  Justify the decision to separate a mixture in a certain way. |
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| 1. Acids and Alkalis | Identify risks to themselves and others. Recognise different hazard symbols. State the meaning of: risk, hazard.  Give examples of everyday substances that are [acids, bases, alkalis].  Recall examples of chemical reactions that can and cannot be reversed. | Explain why a certain safety instruction has been given.  Describe how to control familiar risks.  Classify reactions as reversible or irreversible. | Recognise a range of risks and plan appropriate safety precautions.  Apply ideas about neutralisation to distinguish between alkalis and bases. | Plan to reduce risks by using a risk assessment.  Justify chosen methods of risk reduction.  Analyse chemical formulas to deduce the factor that is common to acids and alkalis.  Use observations to decide whether a chemical reaction has taken place. | Produce a detailed risk assessment, having consulted appropriate secondary sources.  Devise methods of risk reduction involving more than one risk factor in an unfamiliar context.  Describe some alternative theories to explain acidity and discuss the evidence for the currently accepted theory |
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| 1. Particle Model | Identify examples of [solids, liquids, gases].  Recall the three states of matter.  Describe the three states of matter in terms of [shape, volume, compressibility].  Recognise that all matter consists of particles. State the meaning of: vacuum, particle | Describe what the three states of matter are like.  Identify a [solid, liquid or gas] from the arrangement of particles. | Group materials using their states of matter.  Draw the arrangement of particles in a [solid, liquid and gas].  Use the particle model of matter to explain the [squashiness/ compressibility, ability to flow, ability to change shape] of [solids, liquids, gases]. | Identify materials that are difficult to identify as [solids, liquids, gases].  Compare different models of particles in [solids, liquids and gases] | Decide whether it is good to make a certain item out of a [solid, liquid, gas].  Evaluate how well the particle model works to explain the properties of mixtures.  Design a model of a [solid, liquid or gas]. |
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| 1. 8. Atoms, Elements and Compounds | State what is meant by: element, atom and a molecule.  State that all materials are made from atoms.  State what is meant by an element, a compound and a mixture.  Describe examples of reactions which form compounds from elements.  Recall some examples of chemical and physical change.  Recall examples of changes that can be reversed and those that cannot.  Recall the most important gases found in the Earth’s atmosphere and their relative amounts. | Explain the difference between an atom and a molecule.  Explain why a substance is a compound and not a mixture.  Name the compound formed by a reaction between two elements.  Explain why a compound has different properties from its elements.  Explain how chemical [changes, reactions] are different from physical changes.  Explain why air is classified as a mixture. | Group together items made from the same material.  Interpret diagrams to identify mixtures of elements and pure elements.  Interpret diagrams to identify [mixtures, compounds, elements].  Classify unfamiliar substances as elements, mixtures or compounds.  Apply the knowledge of naming of compounds to less familiar situations (e.g. nitrides and carbonates).  Air is a mixture of substances, elements and compounds.  The different particles in air can be atoms or molecules. | Compare the uses of different everyday materials.  Use chemical formulae to compare compounds with similar names (e.g. sulfates and sulfides).  Use observations to decide whether a chemical or physical change has taken place.  Interpret diagrams to identify the different types of particles in air.  Use chemical formulae to compare the elements and compounds in air | Explain whether the work of [John Boyd Dunlop, Charles Macintosh, John Loudon McAdam] was useful or not.  Debate the meaning of ‘chemically combined’ in contexts such as dissolving. |
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| 1. Energy | State the meaning of: hydroelectricity, geothermal, biomass/biofuel, solar energy, wind energy, tidal power.  State the meaning of: fuel, combustion, renewable, nonrenewable. Name the three sides of the fire triangle.  Recall examples of renewable and non-renewable fuels and their sources.  Recall the forms in which energy can be stored. Recall the different ways in which energy can be transferred.  Recall the factors that affect the amount of energy needed in a person’s diet.  Describe the factors that affect body mass. State the meaning of: obese. Recall some substances that are used as sources of energy. | Describe advantages and disadvantages of different [renewable, nonrenewable] energy resources.  Describe the factors that make up a good fuel.  Describe how ethanol can be produced and used.  Describe what happens in a fuel cell.  Identify situations in which energy is stored.  Identify situations in which an energy transfer is taking place.  Explain the differing energy needs of people of different ages and activity levels.  Describe the effects of obesity on health.  Describe how energy is released from [food, fuels]. | Suggest ways in which our use of fossil fuels/nonrenewable fuels can be reduced.  Describe energy transfer chains for given situations.  Calculate the energy requirements for a particular person or activity.  Calculate and use the body mass index (BMI) to draw conclusions.  Explain the source of the energy in [food, fuels]. | Explain how the Sun is the ultimate source of the energy used in [hydroelectric, wind, wave] power.  Explain the idea of a ‘carbon neutral’ fuel.  Explain why biofuels are not necessarily carbon neutral.  Compare the temperature rise of water when some fuels are burnt.  Examine rates of obesity in an area and suggest reasons for any trends. | Defend or oppose a decision in favour of using an energy resource in a certain area.  Evaluate ways of reducing consumption of fossil fuels.  Evaluate alternative fuels compared with fossil fuels.  Evaluate data on burning fuels to deduce the [best value for money, best energy per gram of fuel]. |
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| 1. Current | Recall that current is not used up.  Recall the link between current and bulb brightness. Describe how an ammeter is used. State the units for current. State the meaning of: ammeter, current.  Recall how electrical cells work.  Identify common circuit components.  Describe how [changing the voltage of a cell, adding more cells, adding more bulbs] affects the brightness of bulbs in a circuit.  Recall materials that are [conductors, insulators]. State the meaning of: conductor, insulator, complete circuit, open circuit, closed circuit. Describe why a cell is needed in a circuit. | Describe how the current in a parallel circuit divides.  Describe how changing the number or type of components in a circuit affects the current. Describe what the current is like at different points in a series circuit. Measure the current in part of a circuit using an ammeter.  Explain how spare electricity can be used in pumped storage power stations.  Identify common symbols for components.  Explain how [changing the voltage of a cell, adding more cells, adding more bulbs] affects the brightness of bulbs in a circuit.  Explain how switches work to turn a circuit on or off. Describe the effects of breaking or removing bulbs in a circuit. | Predict the current in part of a parallel circuit.  Plan an investigation to check that the current is conserved at a junction.  Explain why an ammeter is connected in series.  Model circuits using simple circuit diagrams  Use the idea of a complete circuit to test whether different materials conduct electricity. | Consider the results of an experiment to measure the current in different parts of a parallel circuit.  Construct a circuit from instructions provided in the form of a circuit diagram |  |
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| 1. Forces | State what is meant by: mass, weight. Recall the direction in which gravity acts.  Recall the different types of friction forces. State what is meant by: friction, air resistance, water resistance, drag.  Recall the unit for measuring forces. Describe how to use a [force meter, newtonmeter].  Recall the effects of forces on an object. State what is meant by [elastic, plastic].  State what is meant by: contact force, non-contact force.  Recall the names of simple forces.  Describe what a force is. | Explain the difference between mass and weight.  Describe how friction forces affect movement.  Explain how a force has caused certain effects on an object.  Describe how the extension of a spring depends on the force applied.  Classify forces as contact and noncontact.  Identify [situations, places] where different forces are likely to be found. | Use gravitational field strength to calculate weights.  Describe the ways in which drag forces can be [increased, reduced].  Represent [sizes, directions] of forces using arrows. Plan to use a newtonmeter.  Use the formula relating force and extension for a spring (Hooke’s law).  Explain what is meant by elastic limit, limit of proportionality.  Describe the effects of different forces on objects. | Compare how force meters and balances that compare masses work.  Compare the size of different forces.  Explain how gravity and forces from the Earth work together.  Identify different types of forces acting on objects.  Identify the direction of forces. | Evaluate the usefulness of different ways of representing the size and direction of forces |
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| 1. Sound | State the meaning of: transverse wave, longtitudinal wave, frequency, amplitude.  Recall the units for frequency.  Recall what sort of waves [light, sound] waves are.  State the meaning of: pitch, volume intensity.  Identify and name different sources of sound.  Name the part of the body we use to hear things. | Relate the frequency and amplitude of a sound wave to its pitch and volume.  Use the terms [frequency, wavelength, amplitude, speed] to describe waves.  Describe how to make different sources of sound louder or quieter.  Describe how a sound changes as you get further from the source.  Use a simple model to explain how we hear things. | Model [transverse, longitudinal] waves.  Use the formula frequency = 1/time period.  Describe how to make sounds of different pitches using a variety of sources.  Use a model incorporating the idea of vibrations to explain how sound travels through different materials. | Identify the parts of a [transverse, longitudinal] wave on a model.  Compare longitudinal and transverse waves.  Relate the size/ length of a source of sound to the pitch of the sound it produces.  Relate the volume/intensity of a sound to the size of the vibrations producing it.  Compare how sounds travel through different materials. | Justify the representation of a longitudinal wave as a transverse wave.  Evaluate different materials used for soundproofing/ sound insulation |