Manchester Academy
The best in everyone

Science Big Pictures 2025 – 2026

Year 8

Autumn 01	*Autumn 02*	*Spring 01*
Content 8.01 Heating and Cooling **Particles & Matter** Students are taught to explain temperature of matter using the particle model of matter. They review energy stores and pathways (7.02) and are taught about temperature changes in different systems, and how energy tends to spread across a system. They also review changes of state (7.01) and include sublimation for the first time. They apply new knowledge of temperature to endo- and exothermic reactions (7.04). Thermal conduction is explained in the context of particles, and students are introduced to density (in simple terms) before learning about thermal convection. **Earth Science** Students apply their knowledge of heating and cooling to their understanding of the greenhouse effect and enhanced greenhouse effect (**Geography** 7.02). **Energy** Students are taught that temperature indicates the energy of particles in the material. The temperature changes when energy is transferred to or from the material's thermal energy store. 8.02 Earth and the Atmosphere **Physical Earth** Building knowledge of mountains, volcanoes and earthquakes (KS2 Geography), students are taught about the layers of the Earth, continental drift and tectonic plate movement, the formation and properties of igneous, sedimentary and metamorphic rocks. They are taught about how fossil fuels are formed. They are also introduced to biological, chemical and physical weathering. **Earth Science** Students build on their basic understanding of the atmosphere and are taught the composition of the	**Content** 8.03 Forces and Motion **Motion and Forces** Students build on their knowledge of forces (7.02) and focus specifically on motion and speed. They draw and interpret distance-time graphs. They also consider how speed can be increased by reducing the force of air resistance through streamlining. 8.04 Plants and their processes **Cells and Life** Students review the reactants and products in respiration (7.03, 7.05) and are taught about photosynthesis as the process by which plants produce glucose for respiration, and how the required oxygen is transported via diffusion through the stomata. As in 7.05, when the circulatory system in humans was introduced as a way of transporting products and reactants around the body, students are taught how these same substances are transported around plants. **Variation and Evolution** Students revisit adaptation (7.03, 7.05, 7.08) in the context of adaptations of the cells, tissues, organs and organ systems involved in optimising photosynthesis, effectively transporting the reactants and products of photosynthesis, and reducing transpiration in plants. **Ecological Relationships** Before revisiting food chains more explicitly, students are reminded of the importance of plants as producers (KS2), and are taught photosynthesis, the process by which plants produce food. Students are also taught about the importance of plants in absorbing carbon dioxide from the atmosphere in the context of climate change (8.01 and **Geography** 7.01). **Earth Science**	**Content** 8.05 Electricity 1 **Electricity and Magnetism** Students build on their concrete experience of electrical circuits (KS2) and are introduced to current and potential difference in the context of series circuits (parallel circuits follow in Year 9, to build understanding in small steps). Students are also introduced to the relationship between power, energy transferred and time, and how energy at home is typically measured in kWh. Students then consider the cost of electricity and efficiency of appliances. **Energy** Students revisit energy stores and the electrical pathway (7.02) in the context of electrical circuits and how energy used is calculated in kWh. The tendency of energy to dissipate (8.01) is revisited in the context of useful and non-useful energy transfers. Students calculate efficiency of appliances. 8.06 Interactions and interdependednce **Inheritance and Reproduction** Students review the knowledge that offspring inherit half their genome from each parent (7.08), in the context of advantageous variation and evolution by natural selection. **Variation and Evolution** Students explicitly connect the ideas of genetic variation within a species (7.08) and adaptations (7.05 and others) to explain how organisms come to be adapted to their environment. They taught how some variation causes the organism to be better adapted and how, by natural selections, species evolve. They also consider how organisms can be classified, building on simple classification from KS2. **Ecological Relationships** Formalising the ideas first introduced in KS2, students are taught vocabulary to describe ecosystem organisation (such as ecosystem, community, population, habitat, and environment).

atmosphere, atmosphere changes and air quality changes. Students also revisit the greenhouse and enhanced greenhouse effect (**Geography** 7.02). **Waves** Students revisit the greenhouse and enhanced greenhouse effect (**Geography** 7.02) and apply their more scientific understanding of the transfer of energy by radiation and heating and cooling (8.01). **Ecological Relationships** At the global scale, students are taught how humans have come to rely on fossil fuels. **Energy** Students revisit energy stores and pathways (7.02) in the contexts of fossil fuels as chemical energy store.	Students apply their understanding of the enhanced greenhouse effect and consider the importance of plants in absorbing carbon dioxide – a greenhouse gas – from the atmosphere as part of photosynthesis. **Particles & Chemical Reactions** Students revisit their understanding of chemical changes and rearrangement of atoms in the context of photosynthesis and respiration.	They revisit food chains (KS2) and are taught about biomass transfer, food webs and bioaccumulation. They are also taught about decay and the importance of microorganisms for the ecosystem. Note: In **Geography**, students would have been introduced to a biome as a global ecosystem in Year 7. Alongside 8.06 in Science, students are taught 8.03: Ecosystems in Geography, in which students are taught how climate zones shape biomes, the features of two specific biomes, and the threats to these biomes in the context of climate change.
Content 8.07 Forces and Work **Motion and Forces** Students build on their practical experience of pulleys, levers and gears (KS2) and simple forces (7.01) and are taught about moments and balance; simple machines; work done and Hooke's law. Their knowledge of pressure in the context of gas pressure (7.01) is formalised here with the equation that connects pressure, force and surface area.	Content 8.08 Acids and Alkalis **Substances** Students are introduced to acids and alkalis as substances that have similar properties. They are explained in terms of neutralisation reactions, and the pH scale for measuring acidity/alkalinity. They use simple indicators. **Chemical Reactions** Students are introduced another type of reaction: neutralisation. This adds to their knowledge of precipitation, oxidation, thermal decomposition and combustion reactions. They are also taught reactions of acids and metals. **Earth Science** Students revisit the composition of the atmosphere and air quality (8.02) and are taught about acid rain and chemical weathering. 8.09 Nutrition and Digestion	Content 8.10 Space **Space Physics** Students revisit the basics of space physics (KS2) and are taught about a wider range of celestial bodies, their orbits and their groupings (including galaxies). They revisit day and night (KS2) and are taught *why* day length varies with seasons and why the Sun appears to move across the sky. They are also taught how the Earth's tilt causes seasons. Students also explore the nature of stars and galaxies and the scale of the universe. **Motion and Forces** Students build on understanding of gravity force (7.02) to calculate weight, and therefore how weight is different on Earth to on the Moon. They are also introduced to orbits (but, at this stage, are not expected to explain *why* bodies orbit one another). **Waves** Students revisit the transmission of sound and light, in the context of space as a vacuum

	Variation and Evolution Students revisit adaptations of digestive system (7.05) and add more detail to their understanding, such as the role of enzymes and the pancreas. **Ecological Relationships** Students reinforce the idea that plants make their own food (8.04), and that animals (including humans) need to eat food (8.06). They are taught how the energy transferred to the human consumer in the food chain is released through the processes of digestion and respiration in cells that they were first taught in 7.05. **Health** Students revisit the importance of diet (KS2) and are taught the components of food in a healthy human diet, and what each is needed for in the body. They are also taught the importance of bacteria in the human digestive system. **Substances** Students review polymers (7.07) in the context of digestion, and recognise that proteins and carbohydrates are polymers, whereas fats are not. They also review pH (8.08) and its impacts on enzyme action. **Chemical Reactions** Students make connections between their knowledge of chemical reactions and the role of enzymes in breaking down larger molecules into smaller ones. **Energy** Students revisit energy stores and the pathways (7.02) in the context of how energy is released from chemical energy store of food.	