YEAR 9 SCIENCE MID YEAR REVISION GUIDE

EXAM WEEK **Beginning Monday 11 January 2027**	**ONE 60-MINUTE SCIENCE EXAM** **20 min Biology • 20 min Chemistry • 20 min Physics**

What should I revise?

8.09	Nutrition and Digestion
8.10	Space
9.01	Cellular Respiration
9.02	Magnetic Fields and Electromagnets
9.03	Atoms and Elements
9.04	Waves

Important: Any topic from Year 7 or Year 8 could also be assessed.

How to revise effectively

1 Knowledge Organisers: blank page retrieval

Find the relevant Knowledge Organiser on the school website. Work on one small section at a time.

READ · 2 minutes	Read a small section carefully, paying attention to definitions, facts and diagrams.
COVER & RETRIEVE · 4 minutes	Close the organiser. On a blank page, write everything you can remember: keywords, explanations, formulas and labelled diagrams.
CHECK & CORRECT · 2–3 minutes	Reopen the organiser. Check your answers and use a different-coloured pen to add missing facts and correct mistakes.

2 Core Knowledge Questions

Use the question banks later in this guide to test yourself. Cover the answer column, say or write your answer, and then check. Keep practising anything you get wrong.

Question sets provided: 8.10 Space; 9.01 Cellular Respiration; 9.02 Magnetic Fields and Electromagnets; 9.03 Atoms and Elements; 9.04 Waves.

8.09 Nutrition and Digestion: a core knowledge question set is not included. This topic is still examinable: use the Knowledge Organiser and to revise it.

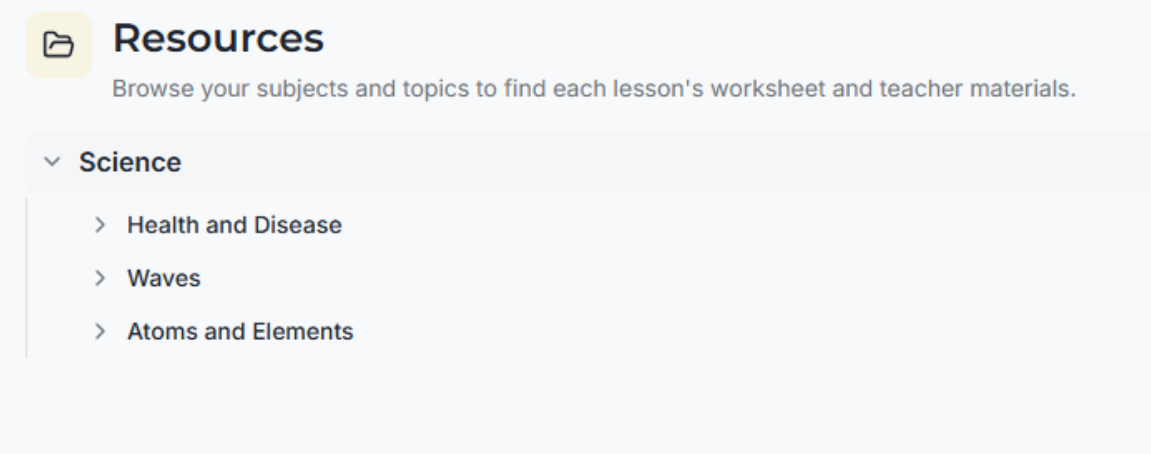
3 Use Noticed to revisit difficult lessons

Go to app.noticedtechnology.com, open Resources → Science, select the topic and lesson you want to recap, and choose Interactive worksheet.

Noticed: finding your revision worksheets

The example screens below show the Resources area, followed by the interactive worksheets available within a topic.

1. In Resources → Science, expand the topic you need.



2. Choose Interactive worksheet for the lesson you want to revisit.



Core Knowledge Question Bank

Cover the answers, test your recall, and check and correct. The tables below reproduce the question sets supplied for revision.

8.10 Space

Available questions supplied: Lesson 2 only. Continue to revise the full Space topic.

Lesson	Code	Question	Answer
2	A	What is a gravity force?	Gravity is a non-contact force that acts between any two objects with mass.
2	B	What two things affect the weight of an object?	The object's mass and gravitational field strength Weight (N) = Mass (kg) × Gravitational field strength (N/kg)
2	C	Which two factors affect the size of a gravity force?	Mass and distance between objects
2	D	Why are planets and stars spherical?	Large gravity forces pull matter towards their centres

9.01 Cellular Respiration

Lesson	Code	Question	Answer
1	A	What is cellular respiration?	A series of chemical reactions in cells that break down glucose to transfer energy for life processes.
1	B	Why is cellular respiration an exothermic process?	Energy is transferred to the surroundings (the thermal store).
1	C	What is the difference between breathing and cellular respiration?	Breathing is a mechanical process that moves air in and out of the lungs; cellular respiration is a series of chemical reactions that transfers energy for life processes.
1	D	Where does breathing take place and where does cellular respiration take place?	Breathing takes place in the lungs; cellular respiration takes place inside cells.
1	E	What is biomass?	The dry mass of one or more organisms.
2	A	What are the reactants in aerobic respiration?	Glucose and oxygen.
2	B	What are the products of aerobic respiration?	Carbon dioxide and water.
2	C	Where does most aerobic respiration take place in a cell?	In the mitochondria.
2	D	Why would some cells have more mitochondria than others?	Cells with a greater demand for energy would need more mitochondria for aerobic respiration.
2	E	When do plants carry out aerobic respiration?	Plants carry out aerobic respiration continuously when oxygen is available.
4	A	What is anaerobic respiration in animals?	A type of cellular respiration that does not use oxygen and uses glucose to transfer energy for life processes.
4	B	What is the word equation for anaerobic respiration in animals?	Glucose → lactic acid.
4	C	What happens to lactic acid during intense exercise?	It can build up in muscles during intense exercise
4	D	What happens to lactic acid after intense exercise?	It is transported to the liver, where it is broken down, allowing muscles to recover.
4	E	What effects can a build-up of lactic acid have on muscles?	It is associated with a burning sensation, can cause muscle fatigue and can contribute to muscle cramps.
4	F	Why can anaerobic respiration only be sustained for a short time?	It causes lactic acid to build up, reducing the ability of muscles to continue contracting effectively.
5	A	When might plant cells carry out anaerobic respiration?	When oxygen is unavailable, such as when plants grow in waterlogged soil.
5	B	What is the word equation for anaerobic respiration in plants?	Glucose → ethanol + carbon dioxide.
5	C	Where does anaerobic respiration take place in plant cells?	In the cytoplasm.
5	D	When might microorganisms carry out anaerobic respiration?	When oxygen is unavailable, for example in thick layers of liquid or waterlogged conditions.
5	E	What is fermentation?	The process of anaerobic respiration in microorganisms.
5	F	What is the word equation for anaerobic respiration in microorganisms such as yeast?	Glucose → ethanol + carbon dioxide.

9.02 Magnetic Fields and Electromagnets

Lesson	Code	Question	Answer
1	A	What types of material can a magnet attract?	Iron, steel, nickel and cobalt.
1	B	What are magnets generally made of, and are they permanent?	They are generally made of iron or steel and are permanent.
2	A	What happens to magnetic force as the distance between magnetic objects increases?	The magnetic force decreases.
2	B	What is a magnetic field?	The region around a magnet in which another magnet experiences a force.

Lesson	Code	Question	Answer
2	C	What do magnetic field lines represent?	They represent the strength and direction of a magnetic field.
2	D	How do magnetic field lines show the direction and strength of a magnetic field?	Arrows point from a N-pole to a S-pole, and the lines are closer together where the force is greatest.
3	A	How does Earth's magnetic field affect a freely rotating bar magnet?	It causes the magnet to turn so that its N pole points roughly northwards.
3	B	Why can a compass be used for navigation?	Earth behaves like a large bar magnet, so a compass aligns with Earth's magnetic field.
4	A	When is there a magnetic field around a wire?	When electricity flows through the conductor.
4	B	What shape are the magnetic field lines around a current-carrying wire, and does the field have poles?	The field lines are circular and the field does not have poles.
4	C	What happens to the direction of the magnetic field if the direction of the current changes?	The direction of the magnetic field changes.
4	D	How does increasing the current affect the strength of the magnetic field around a wire?	It increases the strength of the magnetic field.
4	E	What happens when a piece of iron is placed through the centre of a coil?	It becomes a temporary magnet aligned with the field and greatly increases the strength of the magnetic field.
4	F	What is an electromagnet?	A coil of wire with an iron core that becomes a temporary magnet when current flows.
5	A	What happens to the magnetic field when a wire is wrapped into a long coil?	The field becomes stronger at the ends of the coil and it now has poles.
5	B	What two changes can make an electromagnet stronger?	Increase the number of turns of the coil or increase the electric current (or voltage).
6	A	How do the strengths of electromagnets and permanent magnets compare?	Electromagnets are much stronger than permanent magnets.
6	B	How can the magnetic effect of an electromagnet be controlled?	It can be switched on and off.
6	C	Why are electromagnets useful in devices such as scrapyard cranes and maglock doors?	Their magnetic effect can be controlled by switching them on and off, and they are much stronger than permanent magnets.
6	D	Give two examples of devices that use electromagnets.	Cranes in scrapyards and maglock doors.

9.03 Atoms and Elements

Lesson	Code	Question	Answer
1	A	What are the three main subatomic particles in an atom?	Protons, neutrons and electrons.
1	B	Where are protons, neutrons and electrons found in an atom?	Protons and neutrons are found in the nucleus; electrons are arranged in shells around the nucleus.
1	C	What does the atomic number of an element represent?	The number of protons in the nucleus of an atom.
1	D	What does the mass number of an atom represent?	The total number of protons and neutrons in the nucleus of an atom.
1	E	How can you calculate the number of neutrons in an atom?	Mass number – atomic number.
1	F	How many electrons does a neutral atom have compared with its number of protons?	The same number of electrons as protons.
2	A	What is meant by electron configuration?	The way in which an atom’s electrons are arranged in shells around the nucleus.
2	B	How are electrons arranged in the first 20 elements?	For the first 20 elements, electrons fill shells in a simple pattern: 2, then 8, then 8, with any remaining electrons for potassium and calcium placed in the fourth shell.
2	C	What is the electron configuration of sodium?	2,8,1.

Lesson	Code	Question	Answer
2	D	What is the electron configuration of chlorine?	2,8,7.
3	A	How did Mendeleev arrange the elements in his periodic table?	Mendeleev arranged elements mostly in order of increasing atomic weight, while using element properties to group elements with similar properties together.
3	B	Why did Mendeleev leave gaps in his periodic table?	He believed some elements had not yet been discovered, so he deliberately left gaps where the undiscovered elements could fit.
3	C	How did the discovery of new elements support Mendeleev's periodic table?	Newly discovered elements, such as gallium, had properties that closely matched Mendeleev's predictions.
3	D	Why was Mendeleev able to swap the order of some elements?	He prioritised keeping elements with similar properties together when atomic weight order and property similarities conflicted.
4	A	What is a period in the periodic table?	A horizontal row of elements.
4	B	What is a group in the periodic table?	A vertical column of elements.
4	C	How are elements arranged in the modern periodic table?	In order of increasing atomic number (proton number).
4	D	What does the number of electron shells tell you about an element's position?	The element's period.
4	E	What does the number of electrons in the outer shell tell you about an element's position?	The number of electrons in the outer shell.
4	F	Why do elements in the same group have similar chemical properties?	Elements in the same group have the same number of electrons in their outer shell, which helps explain why they often have similar properties.
5	A	What is a physical property of an element?	A feature of a substance that can be observed without forming a new substance, such as melting point.
5	B	What is a chemical property of an element?	How a substance behaves in a chemical reaction, where new substances are formed.
6	A	What should you look for when interpreting a graph showing a physical property of elements?	Identify the elements being compared, the physical property shown, whether the data goes across a period or down a group, and whether the values increase, decrease, stay similar, or show a more complex pattern.
6	B	How can a trend in a graph be used to predict a value for an element?	Use the overall pattern in the data to make a sensible estimate of the unknown value or property.
7	A	What are the main properties of Group 1 elements?	They are metals that are solid at room temperature, soft, electrical and thermal conductors, and have relatively low melting and boiling points compared with many familiar metals. They are also reactive.
7	B	How does the reactivity of Group 1 elements change down the group?	It increases as you go down the group.
7	C	What is the word equation for a Group 1 metal reacting with water?	Group 1 metal + water → metal hydroxide + hydrogen.
7	D	What is the word equation for a Group 1 metal reacting with chlorine?	Group 1 metal + chlorine → metal chloride.
8	A	What are the main properties of Group 7 elements?	They are reactive non-metals. They are gases or solids/liquids depending on the element, have low melting and boiling points, are poor electrical and thermal conductors, and exist as diatomic molecules.
8	B	How does the reactivity of Group 7 elements change down the group?	Reactivity decreases down the group.
8	C	How can a trend in Group 7 data be used to predict an unfamiliar element's reactivity?	Use the pattern of decreasing reactivity down the group to predict the relative reactivity of the unfamiliar element.
8	D	What is the word equation for a Group 7 element reacting with a metal?	Metal + halogen → metal halide.
8	E	What is the word equation for a Group 7 element reacting with a Group 1 metal?	Group 1 metal + halogen → metal halide.

Lesson	Code	Question	Answer
9	A	What are the main properties of Group 0 elements?	They are unreactive (inert) gases with full outer electron shells.
9	B	How does a physical property such as boiling point change down Group 0?	Boiling point increases down the group.
9	C	How can data be used to identify a trend in Group 0 properties?	Compare the physical property values down the group and identify the overall pattern, such as an increase in boiling point.
9	D	How can a Group 0 trend be used to predict a value for an unfamiliar element?	Use the overall pattern in the data to make a sensible estimate of the value for the unfamiliar element.
10	A	What does a balanced symbol equation show?	The same number of each type of atom on both sides of the equation.
10	B	Why must chemical equations be balanced?	To show the law of conservation of mass: atoms cannot be created or destroyed in a chemical reaction.
10	C	How do you balance a symbol equation?	Add coefficients in front of chemical formulae or element symbols so there are equal numbers of each type of atom on both sides.
10	D	What should you never change when balancing an equation?	The subscripts within chemical formulae.

9.04 Waves

Lesson	Code	Question	Answer
1	A	What is a wave?	A transfer of energy, without transferring particles.
1	B	What four characteristics are used to describe waves?	Amplitude, wavelength, frequency and period.
1	C	What is the period of a wave?	The time taken for one complete wave to pass a point
1	D	What is a mechanical wave?	A wave that transfers energy by the vibration of particles
1	E	What happens to particles in a medium after a mechanical wave has passed?	They return to their resting positions/equilibrium.
1	F	What equation links the period and frequency of a wave?	period = 1 ÷ frequency.
2	A	What is a transverse wave?	A wave in which particles or parts of an object vibrate at right angles (perpendicular) to the direction in which the wave travels.
2	B	Give three examples of transverse waves.	Ripples on water, waves on ropes and light waves.
2	C	What does a distance–time graph of a transverse wave show?	The size of the vibration over time.
2	D	What does a displacement–distance graph of a transverse wave show?	The distance moved by matter from its rest position at a particular moment in time.
3	A	What is the wave speed equation?	wave speed = frequency × wavelength.
3	B	Why can it be difficult to measure waves accurately in the field?	Waves are constantly moving and move quickly.
3	C	What equipment can be used to observe water waves in a laboratory?	A ripple tank.
3	D	How can a ripple tank investigation be used to find the speed of water waves?	Produce ripples in the tank, measure their frequency and wavelength, then calculate wave speed using wave speed = frequency × wavelength.
3	E	What is the fastest wave, and how fast does it travel in a vacuum?	Light; it travels at 300,000,000 m/s in a vacuum.
4	A	What is meant by a high-pressure region in a material?	A region where particles are close together; this is called a compression.
4	B	What is meant by a low-pressure region in a material?	A region where particles are far apart; this is called a rarefaction.

Lesson	Code	Question	Answer
4	C	How can mechanical waves transfer energy through a material using pressure?	Regions of high and low pressure move through matter, transferring energy.
4	D	How do particles transfer energy when a pressure wave passes through a material?	Particles vibrate and momentarily move closer to another region, transferring some energy to those particles. They continue vibrating until they have passed on the energy from the source and return to rest.
4	E	What type of wave is caused by moving regions of high and low pressure?	A longitudinal wave (pressure wave).
4	F	Give examples of waves that transfer energy through pressure changes.	Audible sound, ultrasound and some seismic waves.
5	A	What is a longitudinal wave?	A wave in which particles vibrate backwards and forwards along the same direction in which the wave travels.
5	B	What does a distance–time graph for a longitudinal wave show?	The size of the vibration over time; it may be displayed on an oscilloscope or seismogram.
5	C	What does a displacement–distance graph for a longitudinal wave show?	The distance moved by matter from its rest position at a particular moment in time.
6	A	What is ultrasound?	A type of pressure wave
6	B	How does increasing the frequency of a wave affect the rate of energy transfer?	The higher the frequency, the more quickly energy is transferred by the wave.
6	C	What happens when waves interact with matter?	Energy is absorbed by particles and their energy stores increase.
7	A	What are electromagnetic waves?	Waves that do not require a medium to travel. Visible light and infra-red are examples.
7	B	How are electromagnetic waves different from mechanical waves?	Electromagnetic waves can travel through a vacuum; mechanical waves require a medium. Electromagnetic waves are always transverse.
7	C	At what speed do electromagnetic waves travel through a vacuum?	At the speed of light.
7	D	What is the order of the electromagnetic spectrum from lowest to highest frequency?	Radio, microwave, infra-red, visible light (red to violet), ultra-violet, X-rays and gamma-rays.
7	E	How does wavelength change as frequency increases across the electromagnetic spectrum?	Wavelength decreases as frequency increases.
7	F	How can electromagnetic waves be detected?	By specific detectors
7	G	What happens to the energy of an electromagnetic wave as its frequency increases?	It has more energy and can be more dangerous to humans.
8	A	What range of electromagnetic radiation does the Sun emit?	The Sun emits all types of electromagnetic radiation, but mainly visible light, infra-red and some ultraviolet.
8	B	Which types of electromagnetic radiation does Earth's atmosphere absorb most of?	Most ultraviolet, X-rays and gamma radiation.
8	C	How can electromagnetic waves interact with different substances?	Substances may absorb, transmit, refract or reflect electromagnetic waves, and the way they interact can vary with wavelength.
9	A	What is a ray model used to show?	The direction in which waves travel, especially during transmission, reflection and refraction.
9	B	What determines the speed of a wave in a material?	The medium through which the wave is travelling. Frequency and amplitude do not change the speed.
9	C	What is refraction?	Transmission of a wave with a change in direction and speed.
10	A	What happens when energy transferred by a wave is absorbed by matter?	The energy is transferred to the matter; absorption depends on the type of wave and the material.
11	A	What is reflection?	The act of something being sent back from a surface
11	B	What factors affect the amount of reflection?	The type of wave, the surface and the materials.
12	A	How can waves be used to generate renewable electricity?	Energy from waves such as solar radiation can be used to power renewable resources that generate electricity.

Lesson	Code	Question	Answer
12	B	What types of electromagnetic radiation does the Sun emit most?	Mainly visible light, infra-red and some ultraviolet, although it emits all types of electromagnetic radiation.