The High School Leckhampton

Year 7 **SCIENCE**

Intent

Our main aim and ambition in science is for our students to develop a curiosity and a desire to want to find out and understand more about the world around them. Science is a subject rich in knowledge that can change lives and open so many doors for our students. Through teaching a varied curriculum of biology, chemistry and physics, students develop the skills that they require to be able to apply their understanding of science to situations all around them and allow them to make informed choices as an educated citizen who promotes inclusivity. Students will be encouraged to question and recognise the power of rational explanation, fostering a sense of enthusiasm and creativity about natural phenomena.

Topic Titles

7WS Working Scientifically Topic The Lab Licence

7B1 Biology Topic 1 Cells, Organisation and Reproduction

7C1 Chemistry Topic 1 Matter, Particles and Physical Changes

7P1 Physics Topic 1 Waves and Space

7B2 Biology Topic 2 Photosynthesis, Ecosystems and Health

7C2 Chemistry Topic 2 Atoms, Elements, Compounds and Mixtures

7P2 Physics Topic 2 Motion, Forces and Pressure

How will knowledge and skills be taught?

In lessons students will learn from their teacher, and work individually or with others, to develop their scientific knowledge and conceptual understanding.
Practical activities will help students understand the nature, processes, and methods of science, as well as the uses and implications of science for today and the future.
Completing homework using provided resources will help consolidate students' understanding and prepare them for future lessons.
Optional activities will challenge and extend students' scientific application.

Links with other subjects

ART – Drawing accurate, annotated scientific diagrams.
DT – Properties of materials.
ENGLISH – Using comparative terms, learning word etymology, recalling exact definitions, writing and following detailed instructions.
MATHS – Converting units, calculating averages, rates and percentages, rounding results, using and rearranging equations, drawing scatter and bar graphs.
PSHE – The effects of drugs, exercise and puberty on the body.

Recommended Reading and Preparation for Learning

How to Grow a Human: Adventures in Who We Are and How We Are Made – Philip Ball
Where the Wild Things Grow: A Forager's Guide to the Landscape – David Hamilton
The Strange Chemistry of Plants, Poisons and Processed Foods – George Zaidan
KEW: Grow, Forage and Make: Fun things to do with plants – Alys Fowler
How the Body Works: The Facts Simply Explained – Dorling Kindersley
George's Secret Key to the Universe – Lucy and Stephen Hawking
Fourteen Wolves: A Rewilding Story – Catherine Barr
A Short History of Nearly Everything – Bill Bryson
The Incredible Human Journey – Alice Roberts
Diary of a Young Naturalist – Dara McAnulty
Horrible Science Collection – Nick Arnold
The Disappearing Spoon – Sam Kean

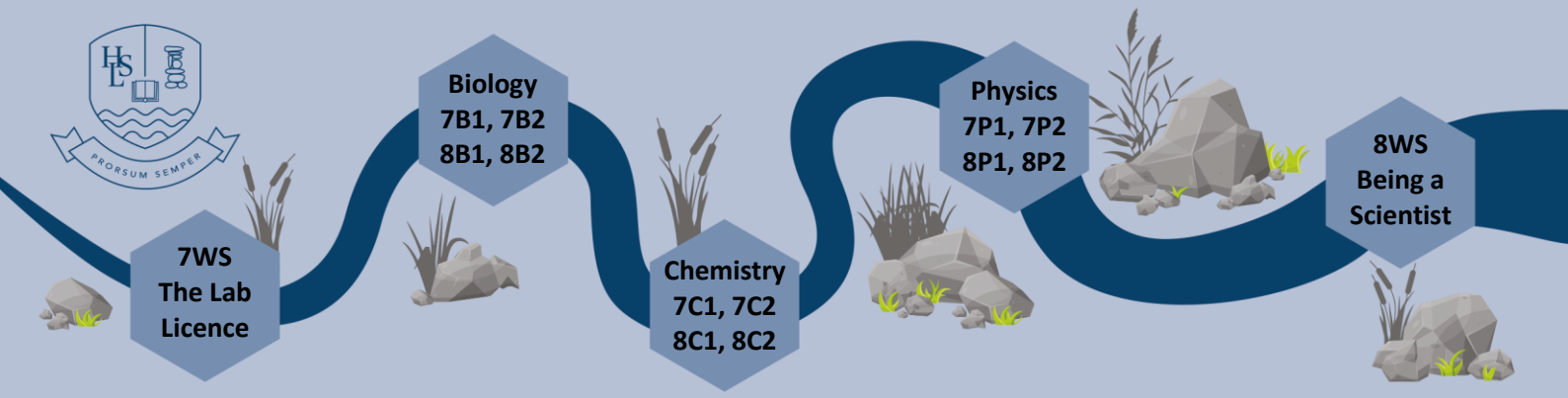
More recommendations at:
https://www.hsl.gloucs.sch.uk/literacy-and-recommended-reading

How can parents help?

Encourage students to use the topic resources on the VLE, the Year 7 Science Basics booklet and the CGP KS3 Science Study Guide provided.

Extend students' understanding using appropriate YouTube channels [e.g. Cognito, PrimroseKitten, KhanAcademy, FuseSchool, AmoebaSisters, Freesciencelessons, AsapScience, Crash Course, SciShow, Veritasium, Kurzgesagt – In a Nutshell, BBC Earth Lab, TED-Ed, Royal Society of Chemistry] and relevant Science-related films, series, and documentaries on various streaming services.

Take an interest – be curious and ask students about their learning.



Science	Year 7	Autumn Term

7WS Working Scientifically Topic – The Lab Licence

Topic Outline & Aims (Intent)

1. Safety and Risk: How can we stay safe in Science?
2. Equipment and Measuring: How do we use equipment in Science?
3. Hypothesis and Variables: How do scientists investigate their observations?
4. Method and Prediction: How do scientists plan an experiment?
5. Recording Results: How do scientists record the results of an experiment?
6. Drawing Graphs: How do scientists graph the results of an experiment?
7. Conclusion and Evaluation: How do scientists decide if their results are valid?
8. Revision and Review: How can you revise and review what you have learned?

Key Skills and Knowledge taught through this topic (Intent)

- ✓ Identify lab rules; Define hazard, risk and precaution; Identify hazard symbols; Identify hazards, risks and precautions in a risk assessment.
- ✓ Identify science equipment / apparatus; Define accurate and measurement; Describe how to measure accurately using equipment in science.
- ✓ Describe what scientists do; Define hypothesis; State a hypothesis for different investigations; Define and identify the different variables in science investigations.
- ✓ Identify what a method should include; Define prediction; Plan and predict the result of an experiment.
- ✓ Identify what a results table should include; Follow a method to carry out an experiment; Record accurate results; Calculate a mean.
- ✓ Describe how to draw a scatter graph; Draw a scatter graph of your results; Identify which type of graph to draw.
- ✓ Define conclusion and evaluation; Describe what an experiment shows using results as evidence; Explain how an experiment could be improved.
- ✓ Review what you have learned in 7WS The Lab Licence topic; Identify ways that you can revise and review what you have learned in Science.

Prior Learning (Context)

KS2: Science Programmes of Study

- ➢ Working scientifically (page 25)

Future Learning (Context)

KS3: Science Programmes of Study

- ➢ Working Scientifically throughout each topic (pages 4-5)

KS4: Science Programmes of Study

- ➢ The development of scientific thinking (page 5)
- ➢ Experimental skills and strategies (page 5)
- ➢ Analysis and evaluation (page 6)
- ➢ Vocabulary, units, symbols and nomenclature (page 6)

National Curriculum Links (Context)

KS3: Science Programmes of Study

- ➢ Scientific attitudes (page 4)
- ➢ Experimental skills and investigations (page 4)
- ➢ Analysis and evaluation (page 4)
- ➢ Measurement (pages 5)

RRSA Links

ARTICLE 12: Respect for the views of the child. ARTICLE 13: Freedom of expression.
ARTICLE 28: Right to education. ARTICLE 29: Goals of education.

British Values Links

MUTUAL RESPECT: Working together with tolerance and mutual understanding, treating each other with respect.
THE RULE OF LAW: Understanding and following lab rules and the laws of nature.
INDIVIDUAL LIBERTY: Thinking independently and expressing views appropriately with confidence in a safe, supporting environment.

Eco-Schools Links

GLOBAL CITIZENSHIP: Taking an active role in your community and making our planet more peaceful, sustainable and fair.

Assessment of Learning (Impact)

- Individual questioning and lesson activities
- Classwork in student folders with Review lesson
- Practical activities carried out throughout topic
- Main practical activity to receive The Lab Licence

Reading / Enrichment

Richard Hammond's Blast Lab – Richard Hammond
Think Like a Scientist: Ask Questions! Read! Understand! – Susan Martineau and Vicky Barker
How To: Absurd Scientific Advice for Common Real-World Problems – Randall Munroe
Recommended Reading List.

Key Vocabulary (Literacy)

Hazard; Risk; Precaution; Accurate; Measurement; Hypothesis; Prediction; Independent variable; Dependent variable; Control variable; Conclusion; Evaluation.

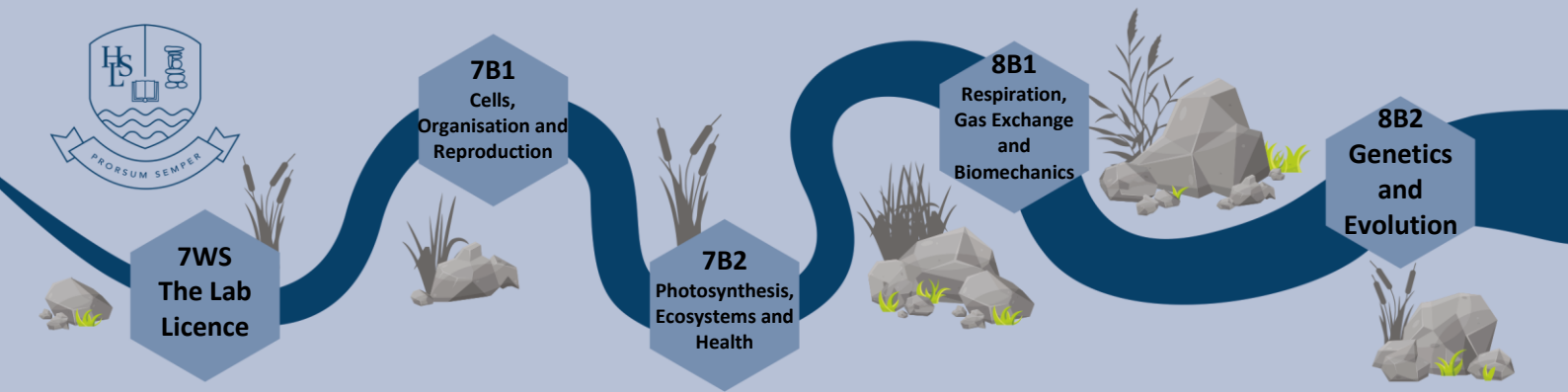
Complete topic glossary provided.

Numeracy Opportunities

Making measurements; Comparing size; Converting units; Calculating averages and percentages; Rounding results; Drawing and analysing scatter graphs.

Career Links

Statistician; Risk Manager; Manufacturer; Safety Manager; Operations Manager; Editor; Quality Engineer; Teacher; Financial Modeler; Health and Safety Officer; Research Scientist.



Science	Year 7	Autumn Term

7B1 Biology Topic 1 – Cells, Organisation and Reproduction

Topic Outline & Aims (Intent)

1. Cells: What are cells?
2. Microscopy: How can a microscope be used to view cells?
3. Unicellular Organisms: What are unicellular organisms?
4. Specialised Cells and Organisation: What are specialised cells?
5. Flowers and Pollination: How are flowers adapted for pollination?
6. Fertilisation, Seed Formation and Dispersal: How do plants reproduce sexually?
7. Gametes and Reproductive Systems: What is the structure of the human reproductive systems?
8. Puberty and the Menstrual Cycle: What changes occur during puberty?
9. Fertilisation, Gestation and Birth: What happens during gestation?

Key Skills and Knowledge taught through this topic (Intent)

- ✓ Define cells; Identify the parts of an animal and a plant cell; Describe the functions of animal and plant organelles; Compare animal and plant cells.
- ✓ Define microscopy; Describe how to prepare a microscope slide of cells; Describe how to use a microscope to view and draw cells.
- ✓ Define unicellular organisms; Define eukaryotic and prokaryotic cells; Describe the structures of bacteria, yeast, euglena and protozoa.
- ✓ Define a specialised cell; Describe the structure and adaptations of specialised animal and plant cells; Describe the levels of cell organisation.
- ✓ Recall the organs of a plant; Describe the structure and function of a flower; Define pollination; Compare animal-pollinated and wind-pollinated flowers.
- ✓ Describe the process of fertilisation in plants; Explain how seeds and fruits form from flowers; Investigate different types of seed dispersal.
- ✓ Define gamete; Describe the structure and adaptations of human gametes; Describe the structure and function of the male and female human reproductive systems.
- ✓ Define puberty; Describe changes that occur during puberty; Define the menstrual cycle; Describe what happens during each stage of the menstrual cycle.
- ✓ Describe the stages of gestation that occur following fertilisation; Describe the function of the placenta and amniotic fluid; Describe the stages of birth.

Prior Learning (Context)

KS2: Science Programmes of Study

- ➢ Living things and their habitats (pages 27, 31)
- ➢ Plants (page 16)

Future Learning (Context)

KS3: Science Programmes of Study

- ➢ Structure and function of living organisms (pages 5-6)
- ➢ Material cycles and energy (pages 6-7)
- ➢ Interactions and interdependencies (page 7)
- ➢ Genetics and evolution (page 7)

KS4: Science Programmes of Study

- ➢ Cell Biology (pages 7-8)
- ➢ Coordination & control (page 8)

National Curriculum Links (Context)

KS3: Science Programmes of Study

- ➢ Cells and organisation (page 5)
- ➢ Reproduction (page 6)

RRSA Links

ARTICLE 1: Definition of the child.
ARTICLE 6: Life, survival and development.
ARTICLE 12: Respect for the views of the child.
ARTICLE 13: Freedom of expression.
ARTICLE 28: Right to education.
ARTICLE 29: Goals of education.

British Values Links

MUTUAL RESPECT: Working together with tolerance and mutual understanding, treating each other with respect.
THE RULE OF LAW: Understanding and following lab rules and the laws of nature.
INDIVIDUAL LIBERTY: Thinking independently and expressing views appropriately with confidence in a safe, supporting environment.

Eco-Schools Links

BIODIVERSITY: Maintaining a high level of plant, insect and animal life locally and globally.

Assessment of Learning (Impact)

- Individual questioning, lesson and homework activities
- Classwork in student folders with Review lesson
- Practical activities carried out throughout topic
- 7B1 Standard Homework 1 and 2 with Feedback lesson
- 7B1 Topic Test with Revision and Feedback lessons

Reading / Enrichment

The Incredible Human Journey – Alice Roberts
How to Grow a Human – Philip Ball
Celebrate Your Body (and Its Changes, Too!) – Sonya Renee Taylor
Recommended Reading List.

Key Vocabulary (Literacy)

Cells; Microscopy; Unicellular organisms; Eukaryotic cells; Prokaryotic cells; Specialised cell; Pollination; Gamete; Puberty; Menstrual cycle.

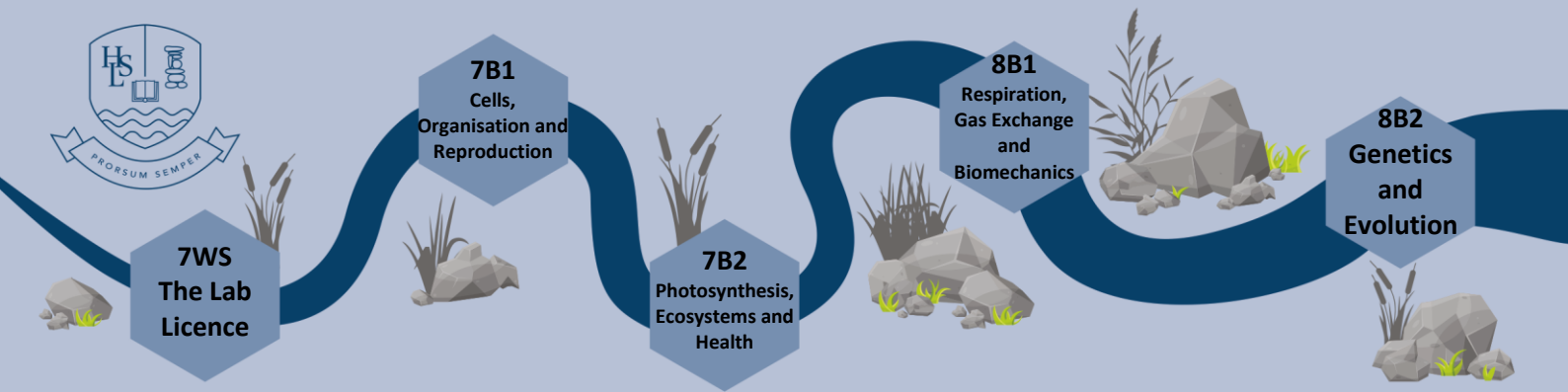
Complete topic glossary provided.

Numeracy Opportunities

Identifying magnification; Making measurements; Comparing size; Converting units; Calculating averages and percentages; Rounding results; Drawing and analysing results tables and scatter graphs.

Career Links

Cell Biologist; Geneticist; Zoologist; Microbiologist; Pathologist; Conservationist; Horticulturist; Ecologist; Agronomist; Midwife; Gynaecologist; Obstetrician; Embryologist; Doctor; Nurse; Teacher; Research Scientist.



Science	Year 7	Spring Term

7B2 Biology Topic 2 – Photosynthesis, Ecosystems and Health

Topic Outline & Aims (Intent)

1. Photosynthesis and Plant Nutrition: How do plants grow?
2. Food Chains: What do food chains show?
3. Food Webs and Energy: What do food webs show?
4. Interdependence and Biomagnification: What can affect food webs?
5. Human Nutrition: Which nutrients do humans need?
6. Energy Requirements: Why do humans have different energy requirements?
7. Unbalanced Diets: What are the consequences of an unbalanced diet?
8. The Digestive System: What is the structure and function of the human digestive system?
9. Adaptations of the Digestive System: What are the adaptations of the human digestive system?
10. Bacteria in Digestion: Why are bacteria important in digestion?
11. Health and Recreational Drugs: How do recreational drugs affect health?

Key Skills and Knowledge taught through this topic (Intent)

- ✓ Define photosynthesis; Describe how leaves are adapted for photosynthesis; Identify what else plants need to grow.
- ✓ Describe what food chains show; Identify keywords used to describe organisms in a food chain; Identify where the energy comes from in a food chain.
- ✓ Describe what food webs show; Define interdependence; Describe what happens to the energy along a food chain.
- ✓ Describe examples of interdependence; Define biomagnification; Describe examples of biomagnification.
- ✓ Define a balanced diet; Name the main food groups that humans need; Explain why humans need each food group; Identify food sources and examples of each main food group.
- ✓ Explain why different people have different energy requirements; Compare the energy content of different foods.
- ✓ Name body conditions caused by an unbalanced diet; Describe the symptoms and effects of body conditions caused by an unbalanced diet.
- ✓ Identify the parts of the human digestive system; Describe the function of each part of the human digestive system.
- ✓ Define digestion; Identify two types of digestion; Describe adaptations of the human digestive system.
- ✓ Label the structure of a bacterial cell; Explain why bacteria are important in digestion; Name substances that can affect bacterial growth.
- ✓ Define health; Define recreational drugs; Identify how recreational drugs are classified; Describe how recreational drugs affect health.

Prior Learning (Context)

KS2: Science Programmes of Study

- Plants (page 16)
- Animals, including humans (page 17, 21, 27, 31)

Future Learning (Context)

KS3: Science Programmes of Study

- Cellular respiration (page 7)
- Gas exchange systems (page 6)
- The skeletal and muscular systems (page 5)
- Inheritance, chromosomes, DNA and genes (page 7)

KS4: Science Programmes of Study

- Cell Biology and Transport Systems (pages 8)
- Photosynthesis and Ecosystems (page 9)
- Health, disease & the development of medicines (page 8)

National Curriculum Links (Context)

KS3: Science Programmes of Study

- Photosynthesis (page 6)
- Relationships in an ecosystem (page 7)
- Nutrition and digestion (pages 5-6)
- Health (page 6)

RRSA Links

ARTICLE 6: Life, survival and development.
ARTICLE 12: Respect for the views of the child.
ARTICLE 13: Freedom of expression.
ARTICLE: Health and health services.
ARTICLE 28: Right to education.
ARTICLE 29: Goals of education.

British Values Links

MUTUAL RESPECT: Working together with tolerance and mutual understanding, treating each other with respect.
THE RULE OF LAW: Understanding and following lab rules and the laws of nature.
INDIVIDUAL LIBERTY: Thinking independently and expressing views appropriately with confidence in a safe, supporting environment.

Eco-Schools Links

BIODIVERSITY: Maintaining a high level of plant, insect and animal life locally and globally.
LITTER: Reducing litter, which harms wildlife and costs millions to clear each year.

Assessment of Learning (Impact)

- Individual questioning, lesson and homework activities
- Classwork in student folders with Review lesson
- Practical activities carried out throughout topic
- 7B2 Standard Homework 1 and 2 with Feedback lesson
- 7B2 Topic Test with Revision and Feedback lessons

Reading / Enrichment

Where the Wild Things Grow – David Hamilton
Fourteen Wolves – Catherine Barr
Recommended Reading List.

Key Vocabulary (Literacy)

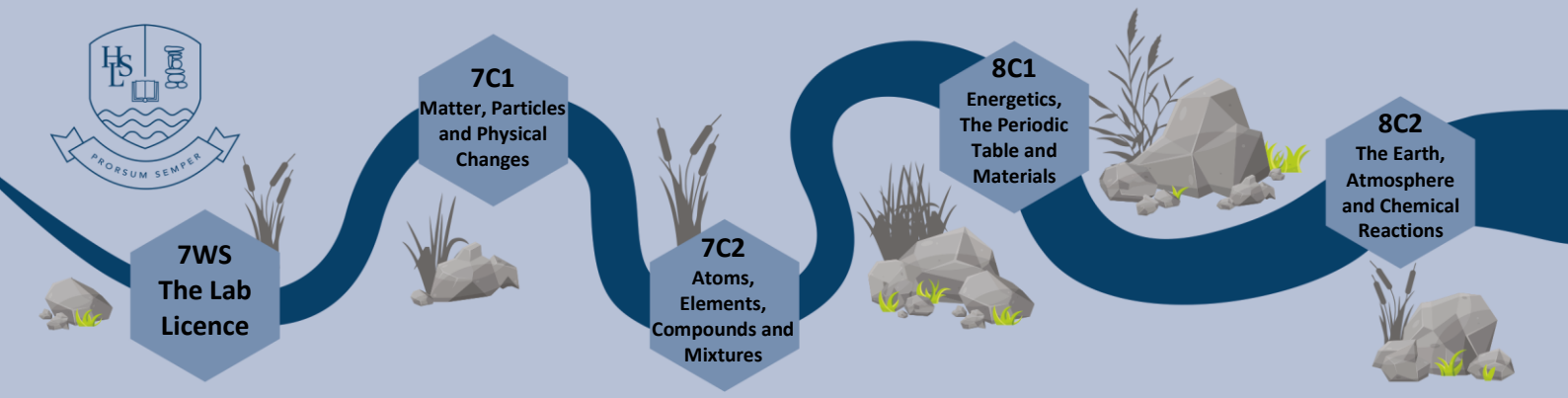
Photosynthesis; Producers; Prey; Consumers; Predator; Digestion; Interdependence; Stimulant; Biomagnification; Depressant.
Complete topic glossary provided.

Numeracy Opportunities

Making measurements; Comparing size; Converting units; Calculating averages and percentages; Rounding results; Drawing and analysing figures.

Career Links

Dietician; Nutritionist; Zoologist; Conservationist; Horticulturist; Ecologist; Agronomist; Doctor; Nurse; Teacher; Research Scientist.



Science	Year 7	Autumn Term

7C1 Chemistry Topic 1 – Matter, Particles and Physical Changes

Topic Outline & Aims (Intent)

1. States of Matter: What are the states of matter?
2. Particles: What are particles?
3. Density and Pressure: What causes density and pressure?
4. Changes of State: When do substances change state?
5. Sublimation: When do substances changes state?
6. Evaporation: What affects the speed of evaporation?
7. Physical Changes: What are physical changes?
8. Ice Investigation: Which substances affect the melting point of ice?
9. Melting Ice: Which substances affect the melting point of ice?

Key Skills and Knowledge taught through this topic (Intent)

- ✓ Identify three states of matter; Describe the properties of solids, liquids and gases; Identify physical changes of state.
- ✓ Define a particle; Describe the particle arrangements in solids, liquids, and gases; Explain the changes in particle arrangements during physical changes of state.
- ✓ Define density; Investigate the density of different substances; Explain the ice-water density anomaly; Describe what causes pressure in gases.
- ✓ Define the melting point and boiling point of a substance; Interpret heating and cooling graphs; Investigate the freezing point of a substance.
- ✓ Define sublimation; Explain why certain substances sublime; Investigate the sublimation of a substance.
- ✓ Define evaporation; Investigate a factor affecting the evaporation of a substance; Describe the difference between evaporation and boiling.
- ✓ Define physical changes; Investigate physical changes; Describe the difference between physical and chemical changes.
- ✓ Recall the definition of melting point; Describe how to melt ice; Investigate whether substances affect the melting point of ice.
- ✓ Recall the definitions of anomaly and mean; Describe how to draw a bar graph; Draw a graph to show the results of the ice investigation.

Prior Learning (Context)

KS2: Science Programmes of Study

- States of matter (page 21)
- Properties and changes of materials (page 28)

Future Learning (Context)

KS3: Science Programmes of Study

- Atoms, elements and compounds (page 8)
- Pure and impure substances (page 8)
- Chemical reactions (page 8)
- Energetics (page 8)
- The Periodic Table (page 9)
- Materials (page 9)
- Earth and atmosphere (page 9)

KS4: Science Programmes of Study

- Structure, bonding and the properties of matter (page 12)
- The structure of matter (page 16)

National Curriculum Links (Context)

KS3: Science Programmes of Study

- The particulate nature of matter (page 8)
- Particle model (page 13)
- Energy in matter (page 13)
- Physical changes (page 12)

RRSA Links

ARTICLE 12: Respect for the views of the child. ARTICLE 13: Freedom of expression.
ARTICLE 28: Right to education. ARTICLE 29: Goals of education.

British Values Links

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INDIVIDUAL LIBERTY: Thinking independently and expressing views appropriately with confidence in a safe, supporting environment.

Eco-Schools Links

WATER: Valuing and preserving our most important natural resource.

Assessment of Learning (Impact)

- Individual questioning, lesson and homework activities
- Classwork in student folders with Review lesson
- Practical activities carried out throughout topic
- 7C1 Standard Homework 1 and 2 with Feedback lesson
- 7C1 Topic Test with Revision and Feedback lessons

Reading / Enrichment

All About Chemistry (Big Questions) – Robert Winston
Horrible Science Collection – Nick Arnold
The Fascinating Science Book for Kids: 500 Amazing Facts! – Kevin Kurtz
Recommended Reading List.

Key Vocabulary (Literacy)

Solid; Liquid; Gas; Particle; Density; Gas Pressure; Melting point; Boiling point; Sublimation; Evaporation; Physical changes; Anomaly; Mean.

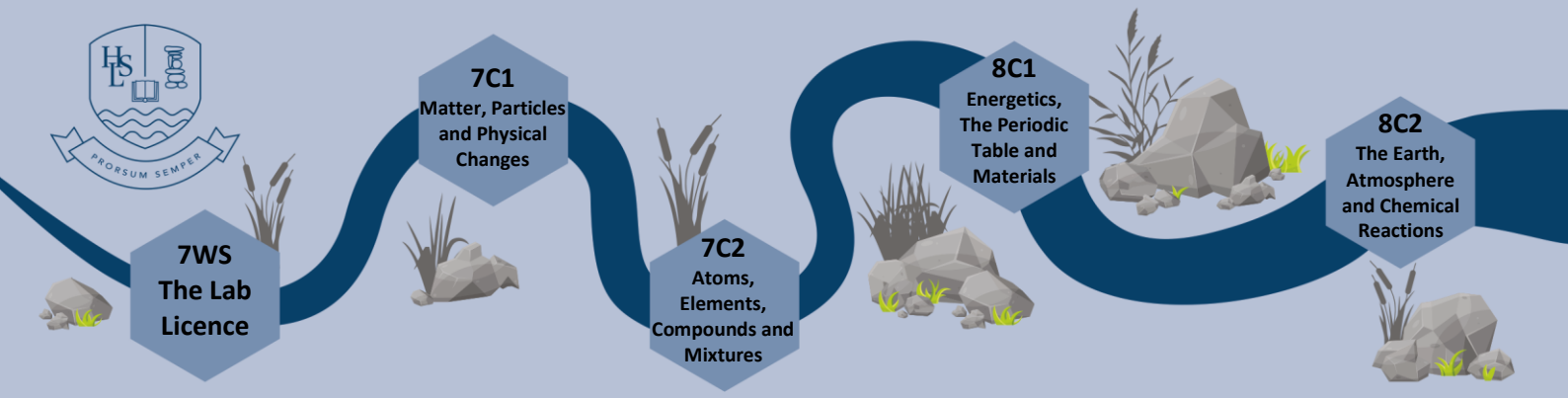
Complete topic glossary provided.

Numeracy Opportunities

Making measurements; Comparing size; Converting units; Calculating averages and percentages; Rounding results; Drawing and analysing results tables, bar graphs and scatter graphs.

Career Links

Analytical Chemist; Surveyor; Engineer; Chemical Engineer; Environmental Chemist; Research Scientist; Teacher.



Science	Year 7	Spring Term

7C2 Chemistry Topic 2 – Atoms, Elements, Compounds and Mixtures

Topic Outline & Aims (Intent)

1. Atoms and Elements: What are atoms and elements?
2. Molecules and Compounds: What are molecules and compounds?
3. Conservation of Mass: What is the law of conservation of mass?
4. Pure Substances and Mixtures: What are pure substances and mixtures?
5. Dissolving: What happens when substances dissolve?
6. Diffusion: What is diffusion?
7. Separating Mixtures: How can mixtures be separated?
8. Chromatography: What is chromatography used for?
9. Filtration and Evaporation: What are filtration and evaporation used for?
10. Distillation: What is distillation used for?

Key Skills and Knowledge taught through this topic (Intent)

- ✓ Define atom; Describe the structure of an atom; Define element; Describe how elements are represented.
- ✓ Define molecule; Describe how molecules are represented; Define compound; Compare the properties of elements and their compound.
- ✓ Consolidate the meaning of conservation; State the Law of Conservation of Mass; Explain why mass is always conserved in a chemical reaction.
- ✓ Define a pure substance; Define a mixture; Describe how to identify pure substances.
- ✓ Define keywords relating to dissolving; Describe what happens when substances dissolve; Identify factors affecting the solubility of different substances.
- ✓ Define diffusion; Explain factors affecting the rate of diffusion.
- ✓ Describe how different mixtures can be formed; Identify methods used to separate mixtures.
- ✓ Describe how to use paper chromatography to separate mixtures; Analyse the results of chromatograms.
- ✓ Describe how to use filtration to separate mixtures; Describe how to use evaporation to separate mixtures.
- ✓ Define distillation; Describe how to use distillation to separate mixtures.

Prior Learning (Context)

KS2: Science Programmes of Study

- ➢ Properties and changes of materials (page 28-29)

Future Learning (Context)

KS3: Science Programmes of Study

- ➢ Chemical reactions (page 8)
- ➢ Energetics (page 8)
- ➢ The Periodic Table (page 9)
- ➢ Materials (page 9)
- ➢ Earth and atmosphere (page 9)

KS4: Science Programmes of Study

- ➢ Atomic structure and the Periodic Table (page 11)
- ➢ Atomic structure (page 16)
- ➢ Chemical analysis (page 13)

National Curriculum Links (Context)

KS3: Science Programmes of Study

- ➢ Particle model (page 13)
- ➢ Atoms, elements and compounds (page 8)
- ➢ Pure and impure substances (page 8)

RRSA Links

ARTICLE 12: Respect for the views of the child. ARTICLE 13: Freedom of expression.
ARTICLE 28: Right to education. ARTICLE 29: Goals of education.

British Values Links

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INDIVIDUAL LIBERTY: Thinking independently and expressing views appropriately with confidence in a safe, supporting environment.

Eco-Schools Links

ENERGY: Reducing energy use and investigating greener energy sources.
WASTE: Refusing, reducing, reusing, repairing, recycling.

Assessment of Learning (Impact)

- Individual questioning, lesson and homework activities
- Classwork in student folders with Review lesson
- Practical activities carried out throughout topic
- 7C2 Standard Homework 1 and 2 with Feedback lesson
- 7C2 Topic Test with Revision and Feedback lessons

Reading / Enrichment

The Disappearing Spoon: And Other True Tales…from the Periodic Table – Sam Kean
Ingredients: The Strange Chemistry of Plants, Poisons and Processed Foods – George Zaidan
Recommended Reading List.

Key Vocabulary (Literacy)

Atom; Element; Molecule; Compound; Reactants; Products; Conservation of Mass; Mixture; Dissolving; Solute; Solvent; Solution; Filtration; Residue; Filtrate; Evaporation.

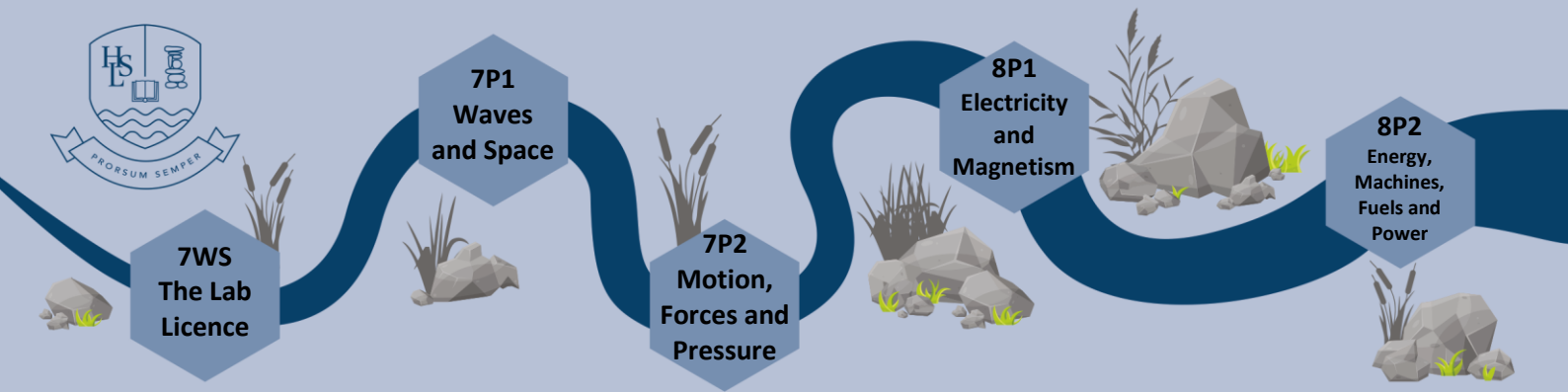
Complete topic glossary provided.

Numeracy Opportunities

Making measurements; Comparing size; Converting units; Using and rearranging equations; Calculating averages and percentages; Rounding results; Drawing, labelling and analysing accurate scientific diagrams, results tables, bar graphs and scatter graphs.

Career Links

Particle Physicist; Chemical Engineer; Environmental Chemist; Materials Scientist; Manufacturing Biotechnologist; Teacher; Chemical Mixer; Research Scientist.



Science	Year 7	Autumn Term

7P1 Physics Topic 1 – Waves and Space

Topic Outline & Aims (Intent)

1. Waves: What are waves?
2. Sound: What is sound?
3. Sound Propagation: How does sound propagate?
4. Hearing: How do humans hear sound?
5. Using Sound: How do humans use sound?
6. Light Reflection: How does light travel?
7. Light Refraction: How does light refract?
8. Colour: What makes coloured light?
9. Lenses: How can we use lenses?
10. Seeing: How do humans see?
11. Earth: What causes days, years and seasons on Earth?
12. Gravity: What is the effect of gravity?
13. Stars: What is the life cycle of stars?
14. The Solar System: What is in our solar system?

Key Skills and Knowledge taught through this topic (Intent)

- ✓ Define waves; Define longitudinal waves; Describe the structure of transverse waves; Define superposition.
- ✓ Define sound waves; Describe the structure of longitudinal waves; Describe how sound waves can change.
- ✓ Define sound propagation; Explain why sound travels at different speeds through matter; Describe how sound can be reflected and absorbed.
- ✓ Identify the parts of the human ear; Describe how humans can hear sound; Investigate the human auditory range.
- ✓ Identify some ways that humans use sound; Describe how sounds are detected and produced using music technology; Describe how humans use ultrasound.
- ✓ Describe how light waves travel; State what happens to light when it hits an object; Investigate how light waves are reflected.
- ✓ Explain what affects the speed of light; Investigate how light waves are refracted; Explain how light waves are refracted through different substances.
- ✓ Investigate the dispersion of white light; Identify the primary and secondary colours of light; Explain how objects appear different colours; Explain how coloured filters change light.
- ✓ Identify how humans use lenses; Explain the effect of converging lenses on light; Explain the effect of diverging lenses on light.
- ✓ Identify the parts of the human eye; Describe how human eyes detect light; Describe similarities and differences between human eyes and cameras.
- ✓ Describe what causes day and night on Earth; Describe what causes years and seasons on Earth; Describe what causes months on Earth.
- ✓ Describe gravity, mass and weight; Describe how mass and distance affect gravity; Calculate weight and gravitational field strength on different planets.
- ✓ Describe the Sun; Describe the life cycle of a star like our Sun; Describe the life cycle of a much larger star.
- ✓ Describe the objects found in our solar system; Define a light year.

Prior Learning (Context)

KS2: Science Programmes of Study

- Sound (page 22)
- Light (pages 18, 33)
- Earth and space (page 29)

Future Learning (Context)

KS3: Science Programmes of Study

- Energy (pages 9-10)
- Motion and forces (pages 10-11)
- Electricity and electromagnetism (page 12)

KS4: Science Programmes of Study

- Wave motion (page 15)
- Forces and motion (page 15)
- Space physics (pages 16-17)

National Curriculum Links (Context)

KS3: Science Programmes of Study

- Observed waves (page 11)
- Sound waves (page 11)
- Energy and waves (page 11)
- Light waves (pages 11-12)
- Space physics (page 13)

RRSA Links

ARTICLE 12: Respect for the views of the child. ARTICLE 13: Freedom of expression.
ARTICLE 23: Children with a disability. ARTICLE 24: Health and health services.
ARTICLE 28: Right to education. ARTICLE 29: Goals of education

British Values Links

MUTUAL RESPECT: Working together with tolerance and mutual understanding, treating each other with respect.
THE RULE OF LAW: Understanding and following lab rules and the laws of nature.
INDIVIDUAL LIBERTY: Thinking independently and expressing views appropriately with confidence in a safe, supporting environment.

Eco-Schools Links

ENERGY: Reducing energy use and investigating greener energy sources.

Assessment of Learning (Impact)

- Individual questioning, lesson and homework activities
- Classwork in student folders with Review lesson
- Practical activities carried out throughout topic
- 7P1 Standard Homework 1 and 2 with Feedback lesson
- 7P1 Topic Test with Revision and Feedback lessons

Reading / Enrichment

Astrophysics for Young People in a Hurry – Neil Degrasse Tyson
Unlocking the Universe – Stephen Hawking and Lucy Hawking
Beyond the Sky: You and the Universe – Dara O Briain
Recommended Reading List.

Key Vocabulary (Literacy)

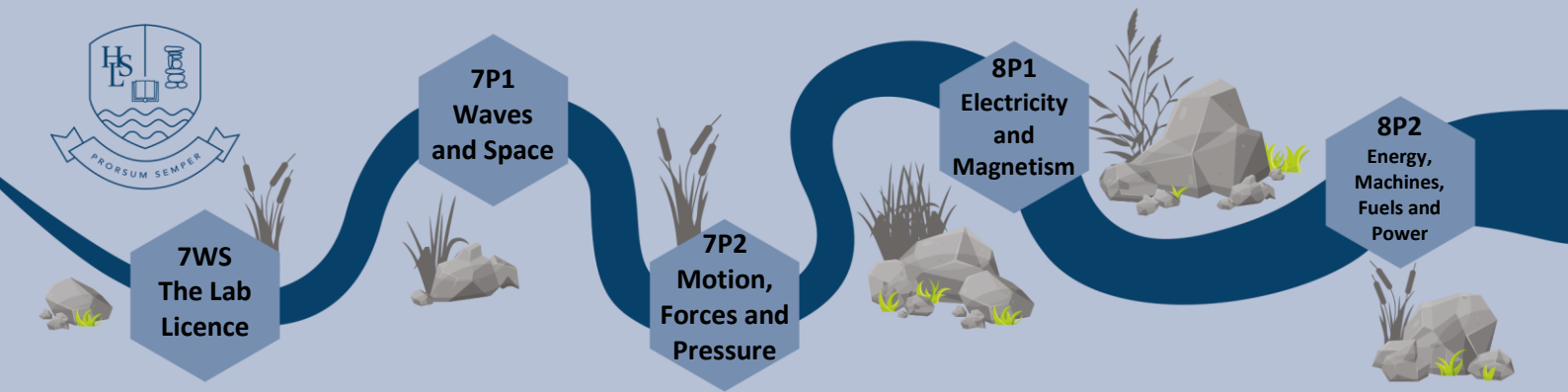
Waves; Longitudinal waves; Transverse waves; Superposition; Sound; Ultrasound; Sound propagation; Light; Reflection; Refraction; Dispersion; Lenses; Days; Years; Seasons; Months; Gravity; Mass; Weight; Sun; Star; Light year.
Complete topic glossary provided.

Numeracy Opportunities

Making measurements; Comparing size; Converting units; Using and rearranging equations; Calculating averages and percentages; Rounding results; Drawing and analysing accurate scientific diagrams, results tables, and scatter graphs.

Career Links

Oceanographer; Audiologist; Optician; Lighting Designer; Light and Sound Technician; Earth Scientist; Seismologist; Astronaut; Astrophysicist; Astronomer; Teacher; Meteorologist; Radiologist; Research Scientist.



Science	Year 7	Summer Term

7P2 Physics Topic 2 – Motion, Forces and Pressure

Topic Outline & Aims (Intent)

1. Speed: How is speed calculated?
2. Graphing Speed: How is speed represented on a graph?
3. Forces: What are forces?
4. Friction: What is friction?
5. Weight: What is weight?
6. Electromagnetism: What affects electromagnetic forces?
7. Drag: What affects drag forces?
8. Springs: How can different forces affect springs?
9. Work Done: How can work done be calculated?
10. Unbalanced Forces: What happens when forces are unbalanced?
11. Forces and Velocity: What is the difference between speed, velocity and acceleration?
12. Moments: How can moments be calculated?
13. Pressure: How can pressure be calculated?
14. Gas Pressure: What causes gas pressure?
15. Liquid Pressure: What causes liquid pressure?

Key Skills and Knowledge taught through this topic (Intent)

- ✓ Define speed; Calculate speed; Rearrange the speed equation to calculate distance or time.
- ✓ Describe the relative motion of objects; Interpret distance-time graphs; Represent speed on a distance-time graph.
- ✓ Define forces; Describe the effect of forces on objects; Calculate resultant forces; Describe examples of different forces.
- ✓ Describe friction; State different types of friction; Describe factors affecting friction.
- ✓ Describe gravity, mass and weight; Describe how mass and distance affect gravity; Calculate weight, mass, and gravity on different planets.
- ✓ Recall non-contact forces; Describe what affects magnetic force; Describe what affects electrostatic force.
- ✓ Define drag; Identify what causes drag forces; Describe what affects the size of drag forces.
- ✓ Describe how different forces can affect springs; Identify how springs can vary.
- ✓ Define work done; Calculate work done.
- ✓ Identify forces acting in certain directions; Describe the effect of unbalanced forces on objects.
- ✓ Describe the difference between speed and velocity; Define acceleration; Calculate acceleration.
- ✓ Define moment; Calculate moments; Identify if a moment is clockwise or anticlockwise.
- ✓ Define pressure; Calculate pressure; Identify objects designed to increase or reduce pressure.
- ✓ Recall the properties of solids, liquids and gases; Describe what causes pressure in gases.
- ✓ Describe what causes pressure in liquids.

Prior Learning (Context)

KS2: Science Programmes of Study

- Forces (pages 19 and 30)

Future Learning (Context)

KS3: Science Programmes of Study

- Energy (pages 9-10)
- Electricity and electromagnetism (page 12)

KS4: Science Programmes of Study

- Forces (page 15)
- Forces and motion (page 15)

National Curriculum Links (Context)

KS3: Science Programmes of Study

- Describing motion (page 10)
- Forces (page 10)
- Balanced forces (page 11)
- Forces and motion (page 11)
- Pressure in fluids (page 11)

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Eco-Schools Links

WATER: Valuing and preserving our most important natural resource
TRANSPORT: Promoting and encouraging sustainable transport.

Assessment of Learning (Impact)

- Individual questioning, lesson and homework activities
- Classwork in student folders with Review lesson
- Practical activities carried out throughout topic
- 7P2 Standard Homework 1 and 2 with Feedback lesson
- 7P2 Topic Test with Revision and Feedback lessons

Reading / Enrichment

Archimedes and the Door of Science – Jeanne Bendick
The Way Things Work Now: A Visual Guide to the World of Machines – David Macaulay
Feynman – Jim Ottaviani
Recommended Reading List.

Key Vocabulary (Literacy)

Speed; Force; Contact forces; Normal reaction; Tension; Upthrust; Thrust; Friction; Drag; Non-contact forces; Gravitational force; Mass; Weight; Work done; Moment; Pressure.

Complete topic glossary provided.

Numeracy Opportunities

Making measurements; Comparing size; Converting units; Using and rearranging equations; Calculating averages, resultant forces and percentages; Rounding results; Drawing and analysing accurate scientific diagrams, results tables, and scatter graphs.

Career Links

Motor Vehicle Technician; Test and Analysis Engineer; Statistical Mechanic; Accelerator Operator; Thermal Hydraulic Tester; Systems Engineer; Astronaut; Teacher; Physicist; Sports Therapist; Research Scientist.