Science Curriculum Framework

Grades 1 to 7

Introduction

Welcome to the Acacia Science Curriculum Framework, an integrated framework for Grades 1 to 7 combining the Cambridge Science Curriculum Framework and the Zambian Integrated Science Syllabus. This framework is based primarily on the Cambridge curriculum, and contains the full Cambridge Science Curriculum Framework from Stages 1 to 7. This framework also covers all content from the Grades 4 to 7 of the Zambian syllabus to fully prepare students for success in the Grade 7 Zambian National Exams.

This framework provides a comprehensive set of progressive learning objectives for science. The objectives detail what the learner should know or what they should be able to do in science in each year of primary education. They provide a structure for teaching and learning and a reference against which learners' ability and understanding can be checked. The Cambridge Science curriculum is presented in four content areas:

1. **Scientific enquiry**
2. **Biology**
3. **Chemistry**
4. **Physics.**

Scientific enquiry is about considering ideas, evaluating evidence, planning investigative work and recording and analysing data. The Scientific enquiry objectives underpin Biology, Chemistry and Physics, which are focused on developing confidence and interest in scientific knowledge. Environmental awareness and some history of science are also incorporated. The Cambridge Science curriculum framework provides a solid foundation upon which the later stages of education can be built.

About the Cambridge Curriculum

The Cambridge Curriculum is founded on the values of the University of Cambridge and best practice in schools. The curriculum is dedicated to developing learners who are confident, responsible, innovative and engaged. Each curriculum framework for English, mathematics and science is designed to engage learners in an active and creative learning Journey. The Cambridge curriculum has been carefully designed to develop deep subject knowledge, conceptual understanding and higher order thinking skills, and provides a clear framework for progression from one stage to the next.

Safety issues

An essential part of this programme is that learners develop skills in scientific enquiry. This includes the collection of primary data by experiment. Scientific experiments are engaging and provide opportunities for first hand exploration. However, they must, at all times, be conducted with the utmost respect for safety, specifically:

- It is the responsibility of the teacher in charge to adhere and conform to any national, regional and school regulation in place with respect to safety of scientific experimentation.
- It is the responsibility of the teacher in charge to make a risk assessment of the hazards involved with any particular class or individual when undertaking a scientific experiment that conforms to these regulations

How this framework was developed

This framework contains the full Cambridge Science Curriculum Framework from Stages 1 to 7 and covers all content from the Grades 4 to 7 of the Zambian syllabus. To develop this framework, the objectives of the Zambian syllabus were mapped against those of the Cambridge syllabus. Where an objective from the Zambian syllabus is covered by an objective from the Cambridge syllabus, a reference to the Zambian Syllabus code is included after the Cambridge objective in brackets, e.g. C5Bp1 Know that plants need energy from light for growth. (Z4.4.2) .

Where an objective from the Zambian syllabus is not covered by the Cambridge objectives, a supplementary objective has been added. These supplementary objectives are highlighted in bold. e.g **A4Bh5.1 Identify traditional and conventional medicines for common ailments (Z4.2.3)**

There are many similarities in content between the two curricula. However in several cases where the learning objectives are similar, the grade at which the content was delivered differs. In such cases we have tried to follow the timing of the Cambridge curriculum, so as to ensure the development of deep subject knowledge and coherent progression. This is why you might find, for example, that an objective from Grade 7 of the Zambian syllabus is mapped to an objective at Grade 5 in the Acacia Curriculum Framework, or visa versa. Deep subject knowledge is important in order to develop the ability to solve problems, to apply understanding to new situations and to enable learners to progress to the next stage. Where it has been judged that an objective from the Zambian curriculum would most appropriately be taught as part of the Personal, Social and Health Education (PSHE) or the Social Studies (Geography) framework, this has been indicated in this document under the heading PSHE. Our frameworks have been carefully designed to ensure students are fully prepared for success in the Zambian Grade 7 exams. For full details of how the Acacia Curriculum Framework covers the Zambian syllabus please see the relevant curriculum mapping document.

Note on codes
Each learning objective has a unique curriculum framework code taken from the source curriculum. We have prefixed the codes with letters to identify the source curriculum as follows:

C - Learning objective code from the Cambridge e.g. e.g. C1Bp1
Z - Learning objective code from the Zambian e.g. Z1.1.1
A - new learning objective developed for the integrated Acacia curriculum e.g. A1Bh1

Grade 1

Scientific enquiry

Ideas and evidence

- C1Ep1 Try to answer questions by collecting evidence through observation.

Plan investigative work

- C1Ep2 Ask questions and contribute to discussions about how to seek answers.
- C1Ep3 Make predictions.
- C1Ep4 Decide what to do to try to answer a science question.

Obtain and present evidence

- C1Eo1 Explore and observe in order to collect evidence (measurements and observations) to answer questions.
- C1Eo2 Suggest ideas and follow instructions.
- C1Eo3 Record stages in work.

Consider evidence and approach

- C1Eo4 Make comparisons.
- C1Eo5 Compare what happened with predictions.
- C1Eo6 Model and communicate ideas in order to share, explain and develop them.

Biology

Plants

- C1Bp1 Know that plants are living things.
- C1Bp2 Know that there are living things and things that have never been alive.
- C1Bp3 Explore ways that different animals and plants inhabit local environments.
- C1Bp4 Name the major parts of a plant, looking at real plants and models.
- C1Bp5 Know that plants need light and water to grow.
- C1Bp6 Explore how seeds grow into flowering plants.

Humans and animals

- C1Bh1 Recognise the similarities and differences between each other.
- C1Bh2 Recognise and name the main external parts of the body.
- C1Bh3 Know about the need for a healthy diet, including the right types of food and water.
- C1Bh4 Explore how senses enable humans and animals to be aware of the world around them.

- C1Bh5 Know that humans and animals produce offspring which grow into adults.

Chemistry

Material properties

- C1Cp1 Use senses to explore and talk about different materials.
- C1Cp2 Identify the characteristics of different materials.
- C1Cp3 Recognise and name common materials.
- C1Cp4 Sort objects into groups based on the properties of their materials.

Physics

Forces

- C1Pf1 Explore, talk about and describe the movement of familiar things.
- C1Pf2 Recognise that both pushes and pulls are forces.
- C1Pf3 Recognise that when things speed up, slow down or change direction there is a cause.

Sound

- C1Ps1 Identify many sources of sound.
- C1Ps2 Know that we hear when sound enters our ear.
- C1Ps3 Recognise that as sound travels from a source it becomes fainter.

Grade 2

Scientific enquiry

Ideas and evidence

- C2Ep1 Collect evidence by making observations when trying to answer a science question.
- C2Ep2 Use first hand experience, e.g. observe melting ice.
- C2Ep3 Use simple information sources.

Plan investigative work

- C2Ep4 Ask questions and suggest ways to answer them.
- C2Ep5 Predict what will happen before deciding what to do.
- C2Ep6 Recognise that a test or comparison may be unfair.

Obtain and present evidence

- C2Eo1 Make suggestions for collecting evidence.
- C2Eo2 Talk about risks and how to avoid danger.
- C2Eo3 Make and record observations.
- C2Eo4 Take simple measurements.
- C2Eo5 Use a variety of ways to tell others what happened.

Consider evidence and approach

- C2Eo6 Make comparisons.
- C2Eo7 Identify simple patterns and associations.
- C2Eo8 Talk about predictions (orally and in text), the outcome and why this happened.
- C2Eo9 Review and explain what happened.

Biology

Living things in their environment

- C2Be1 Identify similarities and differences between local environments and know about some of the ways in which these affect the animals and plants that are found there.
- C2Be2 Understand ways to care for the environment. Secondary sources can be used.
- C2Be3 Observe and talk about their observation of the weather, recording reports of weather data.

Chemistry

Material properties

- C2Cp1 Recognise some types of rocks and the uses of different rocks.
- C2Cp2 Know that some materials occur naturally and others are man-made.

Material changes

- C2Cc1 Know how the shapes of some materials can be changed by squashing, bending, twisting and/or stretching.
- C2Cc2 Explore and describe the way some everyday materials change when they are heated or cooled.
- C2Cc3 Recognise that some materials can dissolve in water.

Physics

Light and dark

- C2Pl1 Identify different light sources including the sun.
- C2Pl2 Know that darkness is the absence of light.
- C2Pl3 Be able to identify shadows.

Electricity

- C2Pm1 Recognise the components of simple circuits involving cells (batteries).
- C2Pm2 Know how a switch can be used to break a circuit.

The Earth and beyond

- C2Pb1 Explore how the sun appears to move during the day and how shadows change.
- C2Pb2 Model how the spin of the Earth leads to day and night, e.g. with different sized balls and a torch.

Grade 3

Scientific enquiry

Ideas and evidence

- C3Ep1 Collect evidence in a variety of contexts to answer questions or test ideas.

Plan investigative work

- C3Ep2 Suggest ideas, make predictions and communicate these.
- C3Ep3 With help, think about collecting evidence and planning fair tests.

Obtain and present evidence

- C3Eo1 Observe and compare objects, living things and events.
- C3Eo2 Measure using simple equipment and record observations in a variety of ways.
- C3Eo3 Present results in drawings, bar charts and tables.

Consider evidence and approach

- C3Eo4 Draw conclusions from results and begin to use scientific knowledge to suggest explanations.
- C3Eo5 Make generalisations and begin to identify simple patterns in results.

Biology

Plants

- C3Bp1 Know that plants have roots, leaves, stems and flowers.
- C3Bp2 Explain observations that plants need water and light to grow.
- C3Bp3 Know that water is taken in through the roots and transported through the stem.
- C3Bp4 Know that plants need healthy roots, leaves and stems to grow well.
- C3Bp5 Know that plant growth is affected by temperature.

Humans and animals

- C3Bh1 Know life processes common to humans and animals include nutrition (water and food), movement, growth and reproduction.
- C3Bh2 Describe differences between living and non-living things using knowledge of life processes.
- C3Bh3 Explore and research exercise and the adequate, varied diet needed to keep healthy.

- C3Bh4 Know that some foods can be damaging to health, e.g. very sweet and fatty foods.
- C3Bh5 Explore human senses and the ways we use them to learn about our world.
- C3Bh6 Sort living things into groups, using simple features and describe rationale for grouping

Chemistry

Material properties

- C3Cp1 Know that every material has specific properties, e.g. hard, soft, shiny.
- C3Cp2 Sort materials according to their properties.
- C3Cp3 Explore how some materials are magnetic but many are not.
- C3Cp4 Discuss why materials are chosen for specific purposes on the basis of their properties.

Physics

Forces and motion

- C3Pf1 Know that pushes and pulls are examples of forces and that they can be measured with forcemeters.
- C3Pf2 Explore how forces can make objects start or stop moving.
- C3Pf3 Explore how forces can change the shape of objects.
- C3Pf4 Explore how forces, including friction, can make objects move faster or slower or change direction.
- **A3Pf5 Name two types of force; describe what forces can do; explain ways in which animals or machines can help us to push or pull. (Z4.5.1)**

Grade 4

Scientific enquiry

Ideas and evidence

- C4Ep1 Collect evidence in a variety of contexts.
- C4Ep2 Test an idea or prediction based on scientific knowledge and understanding.

Plan investigative work

- C4Ep3 Suggest questions that can be tested and make predictions; communicate these.
- C4Ep4 Design a fair test and plan how to collect sufficient evidence.
- C4Ep5 Choose apparatus and decide what to measure.

Obtain and present evidence

- C4Eo1 Make relevant observations and comparisons in a variety of contexts.
- C4Eo2 Measure temperature, time, force and length.
- C4Eo3 Begin to think about the need for repeated measurements of, for example, length.
- C4Eo4 Present results in drawings, bar charts and tables.

Consider evidence and approach

- C4Eo5 Identify simple trends and patterns in results and suggest explanations for some of these.
- C4Eo6 Explain what the evidence shows and whether it supports predictions. Communicate this clearly to others.
- C4Eo7 Link evidence to scientific knowledge and understanding in some contexts.

Biology

Humans and animals

- C4Bh1 Know that humans (and some animals) have bony skeletons inside their bodies.
- C4Bh2 Know how skeletons grow as humans grow, support and protect the body.
- C4Bh3 Know that animals with skeletons have muscles attached to the bones.
- C4Bh4 Know how a muscle has to contract (shorten) to make a bone move and muscles act in pairs.
- C4Bh5 Explain the role of drugs as medicines.
- **A4Bh5.1 Identify traditional and conventional medicines for common ailments (Z4.2.3)**

- **A4Bh6 Explain the importance of water in the body, explain the effects of dehydration and explain how to prevent and treat dehydration (Z4.2.2)**

Living things in their environment

- C4Be1 Investigate how different animals are found in different habitats and are suited to the environment in which they are found.
- C4Be2 Use simple identification keys.
- **A4Be2a Classify vertebrate and invertebrate animals (Z3.4.2)**
- **A4Be2b Explain how to control the wild animal population in the Game Management Areas (GMA); explain threats to wildlife; state the importance of conserving wildlife.**
- C4Be3 Recognise ways that human activity affects the environment e.g. river pollution, recycling waste. (Z4.3.4.1, Z4.3.4.2)
- **A4Be4 Identify different types of pollution, identify the sources pollution in the community; explain ways of conserving natural resources (Z4.3.4)**

Chemistry

States of matter

- C4Cs1 Know that matter can be solid, liquid or gas.
- C4Cs2 Investigate how materials change when they are heated and cooled.
- C4Cs3 Know that melting is when a solid turns into a liquid and is the reverse of freezing.
- C4Cs4 Observe how water turns into steam when it is heated but on cooling the steam turns back into water.
- **A4Cs5 Describe what heat is; determine the temperature of human body; boiling water; and air inside and outside the classroom; distinguish good and bad conductors of heat; identify materials which are good insulators; explain the uses of good and bad conductors of heat. (Z5.5.2)**
- **A4Cs6 Demonstrate the existence of air; explain the uses of air; explain advantages and disadvantages of strong winds. (Z4.5.2)**

Physics

Sound

- C4Ps1 Explore how sounds are made when objects, materials or air vibrate and learn to measure the volume of sound in decibels with a sound level meter.
- C4Ps2 Investigate how sound travels through different materials to the ear.
- **A4Ps2a Identify the basic parts of an ear and state the function of ears (Z4.1.2)**
- C4Ps3 Investigate how some materials are effective in preventing sound from travelling through them.
- C4Ps4 Investigate the way pitch describes how high or low a sound is and that high and low sounds can be loud or soft. Secondary sources can be used.

- C4Ps5 Explore how pitch can be changed in musical instruments in a range of ways.
- **C4Ps6 Explain what sound is; demonstrate how sound is produced; describe how sound travels from one place to another. (Z6.5.2)**

Electricity and magnetism

- C4Pm1 Construct complete circuits using switch, cell (battery), wire and lamps.
- C4Pm2 Explore how an electrical device will not work if there is a break in the circuit.
- C4Pm3 Know that electrical current flows and that models can describe this flow, e.g. particles travelling around a circuit.
-
- C4Pm4 Explore the forces between magnets and know that magnets can attract or repel each other.
- C4Pm5 Know that magnets attract some metals but not others.
- **C4Pm6 Explain what magnets do; identify different types of magnets; identify magnetic & nonmagnetic materials; Identify the poles of a magnet; demonstrate the laws of repulsion and attraction; relate the poles of a magnet to the earth's north and south poles (Z4.5.3)**

PHSE

The following objectives from the Zambian Integrated Science Curriculum will be covered as part of PHSE framework

- **Z4.2.1 Personal Hygiene: Describe the care for eyes, ears feet and skin.**

Grade 5

Scientific enquiry

Ideas and evidence

- C5Ep1 Know that scientists have combined evidence with creative thinking to suggest new ideas and explanations for phenomena.
- C5Ep2 Use observation and measurement to test predictions and make links.

Plan investigative work

- C5Ep3 Make predictions of what will happen based on scientific knowledge and understanding, and suggest and communicate how to test these.
- C5Ep4 Use knowledge and understanding to plan how to carry out a fair test.
- C5Ep5 Collect sufficient evidence to test an idea.
- C5Ep6 Identify factors that need to be taken into account in different contexts.

Obtain and present evidence

- C5Eo1 Make relevant observations.
- C5Eo2 Measure volume, temperature, time, length and force.
- C5Eo3 Discuss the need for repeated observations and measurements.
- C5Eo4 Present results in bar charts and line graphs.

Consider evidence and approach

- C5Eo5 Decide whether results support predictions.
- C5Eo6 Begin to evaluate repeated results.
- C5Eo7 Recognise and make predictions from patterns in data and suggest explanations using scientific knowledge and understanding.
- C5Eo8 Interpret data and think about whether it is sufficient to draw conclusions.

Biology

Humans and Animals

- **A5Bh1 Air and water borne Diseases: Name common airborne and water borne diseases in Zambia; Describe symptoms of common air borne and water borne diseases; Describe how to prevent air and water borne diseases (Z5.2.2)**
- **A6Bh2 Malaria: Identify causes of malaria; State the symptoms of malaria; Describe ways of preventing and treating of malaria (Z5.2.3)**
- **A6Bh3 HIV and AIDS and STIs: Describe ways in which STIs and HIV are transmitted; Identify ways of preventing the spread of HIV and STIs; Describe the care and treatment for AIDS patients. (Z5.2.6)**
- **A5Bh4 Fresh Air: Explain the importance of good ventilation; Explain ways of providing good ventilation in buildings; Demonstrate ways of treating a suffocated person. (Z5.2.1)**

Plants

- C5Bp1 Know that plants need energy from light for growth. (Z4.4.2.2)
- **A5Bp1a Describe the process by which plants make food (photosynthesis); test for the presence of starch in a leaf; investigate how water and mineral salts reach the leaves (Z6.4.1)**
- C5Bp2 Know that plants reproduce.
- C5Bp3 Observe how seeds can be dispersed in a variety of ways
- **A5Bp3a Describe what seed dispersal is; describe ways in which seeds are dispersed; explain the importance of seed dispersal (Z7.4.4)**
- C5Bp4 Investigate how seeds need water and warmth for germination, but not light. (Z4.4.2.1)
- C5Bp5 Know that insects pollinate some flowers.
- C5Bp6 Observe that plants produce flowers which have male and female organs; seeds are formed when pollen from the male organ fertilises the ovum (female). (Z4.4.1)
- **A5Bp5a Identify the parts of a flower; explain the functions of the parts of the flower (Z7.4.1)**
- **C5Bp5b Describe pollination; Identify the agents of pollination; describe fertilization in flowering plants. (Z7.4.2)**
- C5Bp7 Recognise that flowering plants have a life cycle including pollination, fertilisation, seed production, seed dispersal and germination.
- **A5Np8 Grow maize seeds to maturity (Z4.4.2.3)**
- **A5Bp9 Classify soil samples according to types; describe how soil fertility can be improved; explain why natural methods of improving soil fertility are better than artificial ones (Z4.3.3)**
- **A5Bp10 Explain what organic and inorganic fertilizers are; demonstrate how to prepare compost manure; explain the importance of maintaining a supply of composted materials; explain the advantages and disadvantages of chemical fertilizers in Agriculture (Z5.3.2)**

- **A5Np11 Explain the importance of water in the soil; mention ways in which water can be retained in the soil; demonstrate the drainage rates of soils. (Z5.3.1)**
- **A5Np12 5.4.1.3 Identify common pests and parasites in the local environment; describe the harm caused by pests and parasites on plants and animals; explain how pests and parasites can be controlled using local plant materials and commercial chemicals; explain how chemical pesticides can cause harm to the environment. (Z5.4.1)**

Chemistry

States of matter

- C5Cs1 Know that evaporation occurs when a liquid turns into a gas.
- C5Cs2 Know that condensation occurs when a gas turns into a liquid and that it is the reverse of evaporation.
- C5Cs3 Know that air contains water vapour and when this meets a cold surface it may condense.
- C5Cs4 Know that the boiling point of water is 100°C and the melting point of ice is 0°C.
- C5Cs5 Know that when a liquid evaporates from a solution the solid is left behind.
- **A5Cs6 Describe the composition of air; state the physical properties of air; demonstrate that air has weight and occupies space. (Z6.5.1)**

Physics

Light

- C5Pl1 Observe that shadows are formed when light travelling from a source is blocked.
- C5Pl2 Investigate how the size of a shadow is affected by the position of the object.
- C5Pl3 Observe that shadows change in length and position throughout the day.
- C5Pl4 Know that light intensity can be measured.
- C5Pl5 Explore how opaque materials do not let light through and transparent materials let a lot of light through.
- C5Pl6 Know that we see light sources because light from the source enters our eyes.
- **A5Pl6a Identify the basic parts of the eye and state the function of eyes (Z4.1.1)**
- C5Pl7 Know that beams/rays of light can be reflected by surfaces including mirrors, and when reflected light enters our eyes we see the object.
- C5Pl8 Explore why a beam of light changes direction when it is reflected from a surface.
- **A5Pl9 Demonstrate the movement of light in a straight line; investigate the passage of light through different materials (Z4.5.4)**

The Earth and beyond

- C5Pb1 Explore, through modeling, that the sun does not move; its apparent movement is caused by the Earth spinning on its axis.
- C5Pb2 Know that the Earth spins on its axis once in every 24 hours.
- C5Pb3 Know that the Earth takes a year to orbit the sun, spinning as it goes.
- C5Pb4 Research the lives and discoveries of scientists who explored the solar system and stars.

PHSE

The following objectives from the Zambian Integrated Science Curriculum will be covered as part of PHSE framework.

- **Z5.1.2 Puberty: Identify male and female parts of the body; Describe changes that occur at puberty in human beings.**
- **Z5.2.7 Harmful Substances and their effects: Mention the substances which are harmful to the human body; State the harmful effects of substance abuse on the body; Explain the effects of drinking alcohol**

Grade 6

Scientific enquiry

Ideas and evidence

- C6Ep1 Consider how scientists have combined evidence from observation and measurement with creative thinking to suggest new ideas and explanations for phenomena.
- C6Ep2 Collect evidence and data to test ideas including predictions.

Plan investigative work

- C6Ep3 Discuss how to turn ideas into a form that can be tested.
- C6Ep4 Make predictions using scientific knowledge and understanding.
- C6Ep5 Choose what evidence to collect to investigate a question, ensuring that the evidence is sufficient.
- C6Ep6 Identify factors that are relevant to a particular situation.
- C6Ep7 Choose which equipment to use.

Obtain and present evidence

- C6Eo1 Make a variety of relevant observations and measurements using simple apparatus correctly.
- C6Eo2 Decide when observations and measurements need to be checked by repeating to give more reliable data.
- C6Eo3 Use tables, bar charts and line graphs to present results.

Consider evidence and approach

- C6Eo4 Make comparisons.
- C6Eo5 Evaluate repeated results.
- C6Eo6 Identify patterns in results and results that do not appear to fit the pattern.
- C6Eo7 Use results to draw conclusions and to make further predictions.
- C6Eo8 Suggest and evaluate explanations for predictions using scientific knowledge and understanding and communicate these clearly to others.
- C6Eo9 Say if and how evidence supports any prediction made.

Biology

Humans and animals

- C6Bh1 Use scientific names for some major organs of body systems.
- C6Bh2 Identify the position of major organs in the body.
- C6Bh3 Describe the main functions of the major organs of the body.
- C6Bh4 Explain how the functions of the major organs are essential.

- **A6Bh5 Identify the parts of the skin and state the functions of the skin (Z4.1.3)**
- **A6Bh6 State the function and describe the structure of the heart and demonstrate how to take the pulse (Z5.1.1)**
- **A6Bh7 Describe the composition of blood, the functions of blood in the body and how blood circulates in the body (Z6.1.1)**
- **A6Bh8 List foods which are good sources of vitamins and minerals; explain the importance of vitamins and minerals in a diet, explain the importance of eating a variety of foods; explain the importance of food labelling and packaging; identify common deficiency diseases in the communities; interpret children's clinic cards in relation to dietary intake (Z6.2.1)**

Living things in their environment

- C6Be1 Explore how humans have positive and negative effects on the environment, e.g. loss of species, protection of habitats.
- C6Be2 Explore a number of ways of caring for the environment, e.g. recycling, reducing waste, reducing energy consumption, not littering, encouraging others to care for the environment.
- **C6Be2a Explain the importance of forests to people and other forms of life; explain the effects of human activities on forests; describe ways of conserving forests (Z4.3.1)**
- C6Be3 Know how food chains can be used to represent feeding relationships in a habitat and present these in text and diagrams.
- C6Be4 Know that food chains begin with a plant (the producer), which uses energy from the sun.
- C6Be5 Understand the terms producer, consumer, predator and prey.
- C6Be6 Explore and construct food chains in a particular habitat.
- **A6Be7 Identify different types of nonflowering plants; Identify use of ferns and fungi (Z5.4.1)**
- **A6Be8 Identify the different types of invertebrate animals; investigate the**
- **basic structure of insect; explain the difference between insects and spiders; state ways in which insects are useful (Z5.4.2)**
- **A6Be9 Identify the different types of vertebrate animals; describe adaptations shown by vertebrate animals; describe the life cycle of vertebrate animals; state ways of conserving vertebrate animals (Z6.4.3)**
- **A6Be10 List the main animals kept by farmers in the community; explain why some animals are kept in certain area only; State the importance of animals in the community. (Z4.4.3)**
- **A6Be11 Explain the basic needs of livestock; explain the importance of cleanliness in the care of livestock; find out the advantages of keeping livestock together; find out the disadvantages of crowding livestock. (Z6.4.2)**

Chemistry

Material changes

- C6Cc1 Distinguish between reversible and irreversible changes.
- C6Cc2 Explore how solids can be mixed and how it is often possible to separate them again.
- C6Cc3 Observe, describe, record and begin to explain changes that occur when some solids are added to water.
- C6Cc4 Explore how, when solids do not dissolve or react with water, they can be separated by filtering, which is similar to sieving.
- C6Cc5 Explore how some solids dissolve in water to form solutions and, although the solid cannot be seen, the substance is still present.
- **A6Cc6 Demonstrate the separation of an insoluble solid from water; demonstrate the separation of a soluble substance from water; demonstrate the separation of iron filings from sand (Z7.3.1)**

Physics

Forces and motion

- C6Pf1 Distinguish between mass measured in kilograms (kg) and weight measured in newtons, noting that kilograms are used in everyday life.
- C6Pf2 Recognise and use units of force, mass and weight and identify the direction in which forces act.
- C6Pf3 Understand the notion of energy in movement.
- C6Pf4 Recognise friction (including air resistance) as a force which can affect the speed at which objects move and which sometimes stops things moving.
- **A6Pf5 Identify instruments used to compare how heavy objects are; demonstrate the effect of gravity on objects; distinguish between mass and weight (Z5.5.4)**
- **A6Pf6 Explain what simple machine is; identify six kinds of simple machines used in the home and school; demonstrate the use of simple machines in doing work (Z5.5.5**)
- **A6Pf7 Identify various instruments and apparatus used to measure volume; Measure the volume of liquids; measure the volume of various regular and irregular solid objects.**
- **A6Pf8 Show the effect of pressure on objects; explain why tools and implements should be sharp; explain why water tanks are placed on a higher level; demonstrate that air exerts pressure; explain why pumping a bicycle tube becomes more difficult as the tube gets inflated. (Z6.5.3)**

Sound

- **A6Ps1 State methods of communication; explain the importance of communication; describe how sound waves are used in communication; demonstrate how the volume of sound can be increased. (Z6.5.4)**

Electricity and magnetism

- C6Pm1 Investigate how some materials are better conductors of electricity than others.
- C6Pm2 Investigate how some metals are good conductors of electricity while most other materials are not.
- C6Pm3 Know why metals are used for cables and wires and why plastics are used to cover wires and as covers for plugs and switches.
- C6Pm4 Predict and test the effects of making changes to circuits, including length or thickness of wire and the number and type of components.
- C6Pm5 Represent series circuits with drawings and conventional symbols.
- **A6Pm6 State what electricity can do; identify sources of electricity; identify electrical appliances used at home, school and in the community; identify good and bad conductors of electricity; describe the uses of good and bad conductors of electricity; explain methods of conserving electricity in homes and schools. (Z5.5.1)**
- **A6Pm7 Demonstrate how to construct a simple electric circuit; distinguish between a series and parallel circuit; describe the action of a switch in a circuit. (Z7.5.2)**
- **A6Pm8 Identify the causes of lightning, explain the effects of lightning on plants, animals and buildings; demonstrate how to prevent damage from lightning; state the importance of lightning in farming (Z7.5.3)**

PSHE

The following objectives from the Zambian Integrated Science Curriculum will be covered as part of PHSE framework.

- **Z6.1.2 Features of pregnancy: Describe features of Pregnancy; Identify signs and symptoms of Pregnancy.**
- **Z6.1.3 Health risks: Identify health and social consequences of teenage pregnancy; Identify health risks associated with early sexual debut.**
- **6.2.2 Effects of harmful substance: Explain how substance abuse can ruin the lives of people; Explain how substance addicts can be helped.**
- **6.2.3 Living with HIV and AIDS: Describe the challenges of living with HIV and AIDS**

Social Studies (Geography)

The following objectives from the Zambian Integrated Science Curriculum will be covered as part of Geography element of the Social Studies framework.

- **Z6.3.1 The water cycle: Describe the water cycle System; Describe the process of evaporation and condensation; State the effects of the water cycle in everyday life**

Grade 7

Scientific enquiry

Ideas and evidence

- C7Ep1 Be able to talk about the importance of questions, evidence and explanations
- C7Ep2 Make predictions and review them against evidence

Plan investigative work

- C7Ep3 Suggest ideas that may be tested
- C7Ep4 Outline plans to carry out investigations, considering the variables to control, change or observe
- C7Ep5 Make predictions referring to previous scientific knowledge and understanding
- C7Ep6 Identify appropriate evidence to collect and suitable methods of collection
- C7Ep7 Choose appropriate apparatus and use it correctly

Obtain and present evidence

- C7Eo1 Make careful observations including measurements
- C7Eo2 Present results in the form of tables, bar charts and line graphs
- C7Eo3 Use information from secondary sources

Consider evidence and approach

- C7Ec1 Make conclusions from collected data, including those presented in a graph, chart or spreadsheet
- C7Ec2 Recognise results and observations that do not fit into a pattern, including those presented in a graph, chart or spreadsheet
- C7Ec3 Consider explanations for predictions using scientific knowledge anD understanding and communicate these
- C7Ec4 Present conclusions using different methods

Biology

Plants

- C7Bp1 Recognise the positions, and know the functions of the major organs of flowering plants, e.g. root, stem, leaf
- ***Recap content taught at Grade 5 (C5Bp1 to C5Bp7)***
- **A7Bp2 Explain why plants produce seeds; Explain the importance of improving seed varieties (Z7.4.3)**
- **A7Bp3 Explain what plant propagation is; tate methods of plant propagation; demonstrate how some plants are propagated in the local area. (Z7.4.5)**

Humans as organisms

- C7Bh1 Explore the role of the skeleton and joints and the principle of antagonistic muscles
- C7Bh2 Recognise the positions and know the functions of the major organ systems of the human body. Secondary sources can be used
- **A7Bh2a Describe digestion, identify the organs of the**
- **digestive system, identify parts of the alimentary canal where digested food is absorbed, explain what happens to undigested food (Z7.1.1, C8Bh3)**
- C7Bh3 Research the work of scientists studying the human body
- **A7Bh4 Identify fruits used as food; identify seeds used as food; state the importance of fruits in improving health (Z7.2.2)**

Cells and organisms

- C7Bc1 Identify the seven characteristics of living things and relate these to a wide range of organisms in the local and wider environment
- C7Bc2 Know about the role of micro-organisms in the breakdown of organic matter, food production and disease, including the work of Louis Pasteur (Z7.2.1.2)
- **A7Bc2a Distinguish between a virus and a bacterium and explain how viruses and bacteria can affect health; identify common diseases of the skin; explain the prevalence of diseases in relation to the provision of health services (Z7.2.1)**
- C7Bc3 Identify the structures present in plant and animal cells as seen with a simple light microscope and/or a computer microscope
- C7Bc4 Compare the structure of plant and animal cells
- C7Bc5 Relate the structure of some common cells to their functions. Secondary sources can be used
- C7Bc6 Understand that cells can be grouped together to form tissues, organs and organisms

Living things in their environment

- C7Be1 Describe how organisms are adapted to their habitat, drawing on locally occurring examples. Secondary sources can be used
- C7Be2 Draw and model simple food chains
- C7Be3 Discuss positive and negative influence of humans on the environment, e.g. the effect on food chains, pollution and ozone depletion
- C7Be4 Discuss a range of energy sources and distinguish between renewable and non-renewable resources. Secondary sources can be used
- **A7Be5 Identify sources of water in the village and towns; Identify different types of water treatment systems; State the importance of water treatment; Describe ways of conserving water (Z7.3.2)**

Variation and classification

- C7Bv1 Understand what is meant by a species
- C7Bv2 Investigate variation within a species. Secondary sources can be used
- C7Bv3 Classify animals and plants into major groups, using some locally occurring examples

Chemistry

States of matter

- C7Cs1 Show in outline how the particle theory of matter can be used to explain the properties of solids, liquids and gases, including changes of state

Material properties

- C7Cp1 Distinguish between metals and non-metals
- **C7Cp1a Identify types of metals and non-metals (Z7.5.5)**
- **C7Cp2 Identify minerals mined in Zambia; list the properties of copper; explain how copper is extracted and refined; identify items made from copper within Zambia; explain the importance of making copper items within Zambia; describe the impact of mining on the environment (Z7.5.6)**

Material changes

- 7Cc1 Use a pH scale.
- 7Cc2 Understand neutralisation and some of its applications
- 7Cc3 Use indicators to distinguish acid and alkaline solutions

The Earth

- 7Ce1 Observe and classify different types of rocks and soils
- 7Ce2 Research simple models of the internal structure of the Earth
- 7Ce3 Examine fossils and research the fossil record
- 7Ce4 Discuss the fossil record as a guide to estimating the age of the Earth
- 7Ce5 Learn about most recent estimates of the age of the Earth

Physics

Forces and motion

- C7Pf1 Describe the effects of forces on motion, including friction and air resistance
- C7Pf2 Describe the effect of gravity on objects. Secondary sources can be used

Energy

- C7Pe1 Understand that energy cannot be created or destroyed and that energy is always conserved
- C7Pe2 Recognise different energy types and energy transfers
- **A7Pe3 Explain what energy is; identify different types of energy; explain how energy is converted from one (Z7.5.1)**

The Earth and beyond

- C7Pb1 Describe how the movement of the Earth causes the apparent daily and annual movement of the sun and the stars
- C7Pb2 Describe the relative position and movement of the planets and the sun in the solar system
- C7Pb3 Discuss the impact of the ideas and discoveries of Copernicus, Galileo and more recent scientists
- C7Pb4 Understand that the sun and other stars are sources of light and that planets and other bodies are seen by reflected light
- **A7Pb5 Describe the solar system; explain the differences between the sun and its Planets; state the source of light in the solar system; state the reasons for seasons and day and night; compare the movement of the earth and the moon; describe the formation of solar and lunar eclipses; state uses of solar energy (Z7.5.4)**

Long Term Planning Overview

Overview of the English taught programme of study by term, for Grade 1 to 7, taken from the Cambridge Schemes of Work (v.2018). Please see Schemes of Work for more details.

	Term 1	Term 2	Term 3
Grade 1	Unit 1.1 Us and our senses Unit 1.2 What is it made of?	Unit 1.3 Living and Growing Unit 1.4 Pushes and Pulls	Unit 1.5 Growing Plants Unit 1.6 Making Sounds
Grade 2	Unit 2.1 Light and Dark Unit 2.2 Electricity	Unit 2.3 Changing materials Unit 2.4 Looking at rocks	Unit 2.5 Day and night Unit 2.6 Plants and animals around us
Grade 3	Unit 3.3 Flowering Plants* Unit 3.4 Forces and friction*	Unit 3.1 Life processes* Unit 3.2 Materials*	Unit 3.5 The senses Unit 3.6 Keeping healthy
Grade 4	Unit 4.1 Skeleton and Muscles Unit 4.2 Solids, Liquids and Gases	Unit 4.3 Magnets and Materials Unit 4.4 Habitats	Unit 4.5 Making circuits Unit 4.6 Sound
Grade 5	Unit 5.3 The life cycle of a flowering plant* Unit 5.4 Investigating plant growth*	Unit 5.1 The way we see things* Unit 5.2 Evaporation and condensation* **Unit 5.7 Health and disease****	Unit 5.5 Earth's movement Unit 5.6 Shadows
Grade 6	Unit 6.1 Human organs and systems Unit 6.2 Reversible and irreversible changes	Unit 6.3 Food chains Unit 6.4 Conductors and insulators	Unit 6.5 Caring for the environment Unit 6.6 Mass and weight
Grade 7	Unit 7.1 Living things Unit 7.2 Solids, liquids and gases Unit 7.3 Energy transfers	Unit 7.4 Acids and bases Unit 7.5 The Earth and beyond Unit 7.6 Microorganisms and disease	Unit 7.7 Putting things into groups Unit 7.8 Habitats and environments Unit 7.9 Forces and their effects

**Indicates that the taught order of the units within a grade had been changed to align with the local seasons.*
***Additional unit to cover Acacia objectives A5Bh1 - A5Bh4*