RWA Science Scope and Sequence – Year 6/Grade 5

RAFFLES WORLD ACADEMY

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SCIENCE
RWA SCOPE AND SEQUENCE

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MISSION AND CORE VALUES

Raffles World Academy (RWA) was founded in September 2008. It is an independent co-educational private international day school operated by Innoventures Educational Investments LLC (aka Innoventures Education). The school began its history as Raffles International School (West Campus) and changed its name to Raffles World Academy in September 2012. The Academy is authorised to provide IBPYP in KG1-G5, IBMYP curriculum in G6-10 and IB Diploma and Courses to G11-12. It is an IB World School and a centre for Cambridge International Examinations. The school also provides other programmes including College Board PSAT and SAT, Trinity, and Mother Tongue language programmes including CNED and DELF for French. Raffles World Academy is regulated by the Dubai Knowledge and Human development Authority (KHDA).

Our Guiding Statements

Our Vision

Providing world class education.

Our Mission

To empower students with a rigorous, holistic and international education for success in an ever-changing world.

Our Philosophy

To be recognized by the success of our students in achieving their personal goals

To make student development the centre of all school decisions

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To aspire to the highest internationally recognized performance standards

To build and celebrate a culture based on internationalism

To enable the staff to become life-long learners through the development of their professional practice

Our Core Values
Achievement | Collaboration | Integrity |Respect |Responsibility

The RWA Motto
Towards Excellence

The RWA Mascot
Arabian Stallion

The RWA definition of International-Mindedness:

International Mindedness begins when we are open to and curious about the world in which we live, respect our own culture and want to know about the culture of others. We progress to acknowledge our common humanity and to recognize and value diversity existing within our communities, whether local, national or global. We exercise our individual and collective responsibilities as world citizens to safeguard the planet we share, promote peace, challenge injustice and engage in improving welfare for all, especially the disadvantaged. We seek to develop a deep understanding of the complexity, diversity and motives that underpin human actions and interactions. We strive to foster mutual respect, dialogue and cooperation through being open and willing to see the world through the lens of all those who share it with us.
As an IB school, international-mindedness is embodied in our implementation of the IB Learner Profile, which challenges students to be communicators in multiple languages, principled in their promotion of international justice, risk-takers in the spirit of exploring new cultures, knowledgeable about world issues, thinkers about complex problems, caring and committed to service, inquirers about the world, open-minded toward other perspectives, balanced in their approach to life, and reflective about their own personal development.

IB MISSION STATEMENT

IB mission statement The International Baccalaureate aims to develop inquiring, knowledgeable and caring young people who help to create a better and more peaceful world through intercultural understanding and respect. To this end the organization works with schools, governments and international organizations to develop challenging programmes of international education and rigorous assessment. These programmes encourage students across the world to become active, compassionate and lifelong learners who understand that other people, with their differences, can also be right.

IB Learner Profile

The aim of all IB programmes is to develop internationally minded people who, recognizing their common humanity and shared guardianship of the planet, help to create a better and more peaceful world.

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IB learners strive to be:

Inquirers: They develop their natural curiosity. They acquire the skills necessary to conduct inquiry and research and show independence in learning. They actively enjoy learning and this love of learning will be sustained throughout their lives.

Knowledgeable: They explore concepts, ideas and issues that have local and global significance. In so doing, they acquire in-depth knowledge and develop understanding across a broad and balanced range of disciplines.

Thinkers: They exercise initiative in applying thinking skills critically and creatively to recognize and approach complex problems, and make reasoned, ethical decisions.

Communicators: They understand and express ideas and information confidently and creatively in more than one language and in a variety of modes of communication. They work effectively and willingly in collaboration with others.

Principled: They act with integrity and honesty, with a strong sense of fairness, justice and respect for the dignity of the individual, groups and communities. They take responsibility for their own actions and the consequences that accompany them.

Open-minded: They understand and appreciate their own cultures and personal histories, and are open to the perspectives, values and traditions of other individuals and communities. They are accustomed to seeking and evaluating a range of points of view, and are willing to grow from the experience.

Caring: They show empathy, compassion and respect towards the needs and feelings of others. They have a personal commitment to service, and act to make a positive difference to the lives of others and to the environment.

Risk-takers: They approach unfamiliar situations and uncertainty with courage and forethought, and have the independence of spirit to explore new roles, ideas and strategies. They are brave and articulate in defending their beliefs.

Balanced: They understand the importance of intellectual, physical and emotional balance to achieve personal well-being for themselves and others.

Reflective: They give thoughtful consideration to their own learning and experience. They are able to assess and understand their strengths and limitations in order to support their learning and personal development.

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Science within a transdisciplinary programme In the Primary Years Programme (PYP), science is viewed as the exploration of the biological, chemical and physical aspects of the natural world, and the relationships between them. Our understanding of science is constantly changing and evolving. The inclusion of science within the PYP leads learners to an appreciation and awareness of the world as it is viewed from a scientific perspective. It encourages curiosity and ingenuity and enables the student to develop an understanding of the world. Reflection on scientific knowledge also helps students to develop a sense of responsibility regarding the impact of their actions on themselves, others and their world.

It is recognized that teaching and learning science as a subject, while necessary, is not sufficient. Of equal importance is the need to learn science in context, exploring content relevant to students, and transcending the boundaries of the traditional subject area. The transdisciplinary themes provide the framework for a highly defined, focused, in-depth programme of inquiry, and as science is relevant to all the transdisciplinary themes, all planned science learning should take place within this framework. In return, the science knowledge and the application of that knowledge will enhance inquiries into the central ideas defined by the transdisciplinary themes.

It is worthwhile to note that spontaneous, student-initiated science inquiries will occur that are not directly related to any planned units of inquiry. These are valuable teaching and learning experiences in themselves and they provide teachers and students with the opportunity to apply the pedagogy of the PYP to authentic, of-the-moment situations.

The science component of the PYP should be characterized by concepts and skills rather than by content. However, schools should ensure that a breadth and balance of science content is covered through the units of inquiry. The knowledge component of science in the PYP is arranged into four strands: living things, Earth and space, materials and matter, and forces and energy.

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Science strands	
Living things	The study of the characteristics, systems and behaviours of humans and other animals, and of plants; the interactions and relationships between and among them, and with their environment.
Earth and space	The study of planet Earth and its position in the universe, particularly its relationship with the sun; the natural phenomena and systems that shape the planet and the distinctive features that identify it; the infinite and finite resources of the planet.
Materials and matter	The study of the properties, behaviours and uses of materials, both natural and human-made; the origins of human-made materials and how they are manipulated to suit a purpose.
Forces and energy	The study of energy, its origins, storage and transfer, and the work it can do; the study of forces; the application of scientific understanding through inventions and machines.

Developing a school's science scope and sequence

Unless a school has adopted the PYP sample programme of inquiry, the science content in its own scope and sequence will be different from the sample provided here. Some schools may need to reflect national, regional or local requirements within the units of inquiry that are developed and included in their programme of inquiry. These requirements will also need to be incorporated into their scope and sequence.

The science scope and sequence should ensure that schools are building developmentally appropriate units of inquiry. Moreover, as the programme of inquiry, PYP planners and scope and sequences form the basis of a school's written curriculum, the development of all these documents becomes an iterative process. For example, it may be that the process of planning and reflecting on the units of inquiry will highlight the need for more concept-driven learning outcomes in the scope and sequence. Similarly, it may become apparent when developing or revising the science scope and sequence document that science content has not been incorporated to the fullest extent possible in a school's programme of inquiry.

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All teaching and learning provides the opportunity to utilize and develop the transdisciplinar y skills identified in Making the PYP happen: A curriculum framework for international primary education (2007). In addition to these, the science component of the curriculum also provides opportunities for students to develop a range of science-specific skills and processes. In the list that follows, each of the science-specific skills (taken from the subject annex in Making the PYP happen: A curriculum framework for international primary education, 2007) is accompanied by examples of how these skills might manifest themselves in the classroom. These examples vary in their degree of complexity and are intended to show progression in the development of each skill. When developing their own science scope and sequence, schools may add their own relevant level of detail to illustrate each skill.

How to use the PYP science scope and sequence

This scope and sequence aims to provide information for the whole school community about the learning that is going on in the subject area of science through the transdisciplinary programme of inquiry. In addition, it is a tool that will support teaching, learning and assessment of science within the context of units of inquiry.

The sample programme of inquiry published in Developing a transdisciplinary programme of inquiry (2008) provides the context and the content for the PYP science scope and sequence. The subject-specific knowledge and skills identified in the subject area annex of Making the PYP happen: A curriculum framework for international primary education (2007) are also reflected in this document.
The scope and sequence document contains the following.

For each age range:

- overall expectations by age range.

For each unit selected from the PYP sample programme of inquiry:

- transdisciplinary theme
- central idea
- key concepts and related concepts
- lines of inquiry.

Specific reference to subject area knowledge and skills:

- knowledge strands for science

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- subject-specific skills for science
- possible learning outcomes for each unit of inquiry
- cross-reference to social studies scope and sequence document (where appropriate).

At the start of each age range, the overall expectations provide broad, summative descriptions of what a PYP student could have achieved in science by the end of each age range. The possible learning outcomes in the tables that follow are an extension of these overall expectations and relate directly to the units of inquiry from the PYP sample programme of inquiry. Verbs such as “analyse”, “describe” or “identify” are used at the start of each possible learning outcome in order to focus the planning, teaching and assessment on what is demonstrable and observable, and to place the focus on the conceptual understanding of a particular central idea.

The annotated diagram (figure 1) explains the content of the science scope and sequence.

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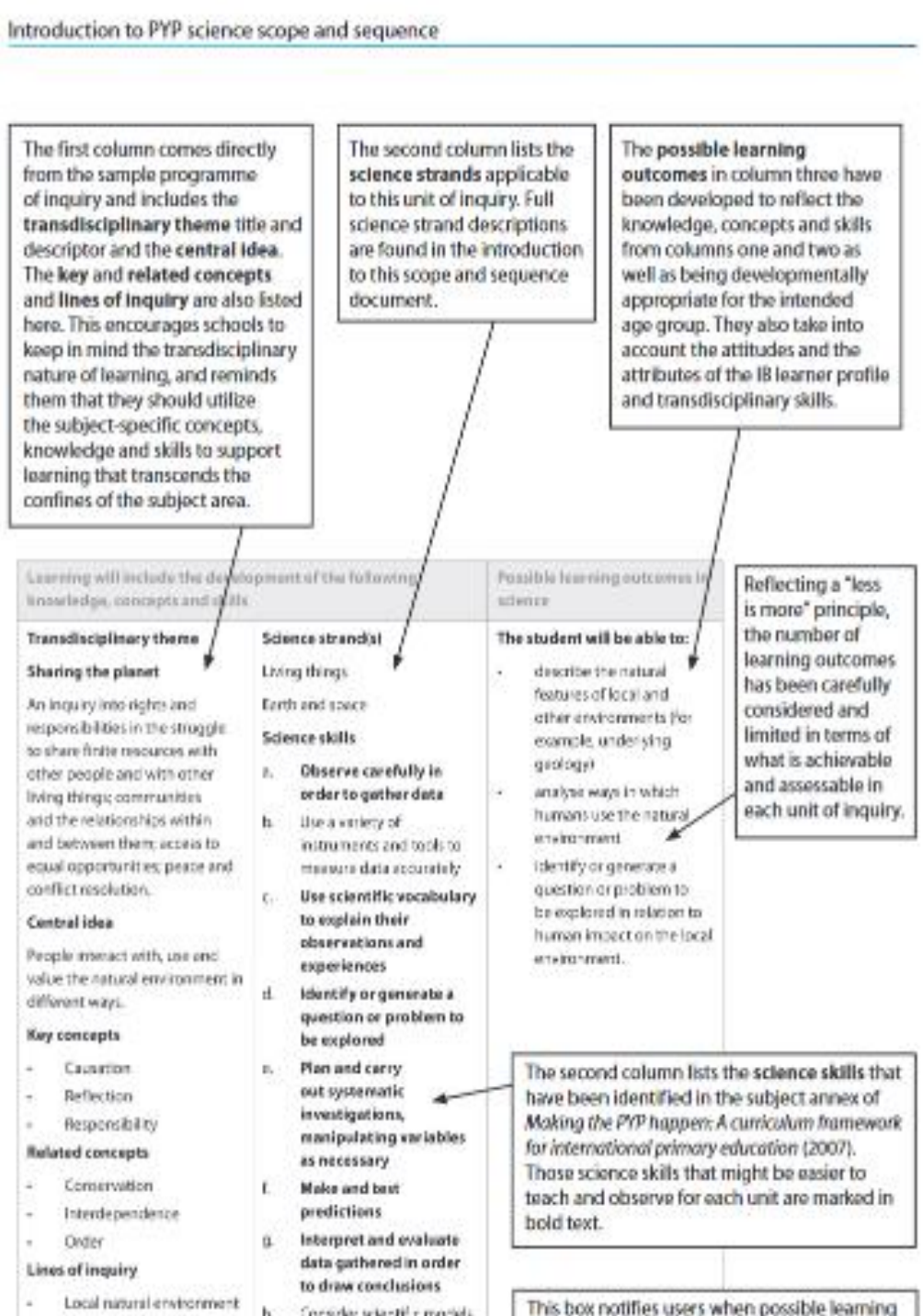

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Overall expectations in social studies: 3–5 years.

Students will develop their observational skills by using their senses to gather and record information, and they will use their observations to identify simple patterns, make predictions and discuss their ideas.
They will explore the way objects and phenomena function, and will recognize basic cause and effect relationships. Students will examine change over varying time periods and know that different variables and conditions may affect change. They will be aware of different perspectives, and they will show care and respect for themselves, other living things and the environment. Students will communicate their ideas or provide explanations using their own scientific experience and vocabulary.

Overall expectations in social studies for 5–7 years.

Students will develop their observational skills by using their senses to gather and record information, and they will use their observations to identify patterns, make predictions and refine their ideas. They will explore the way objects and phenomena function, identify parts of a system, and gain an understanding of cause and effect relationships. Students will examine change over varying time periods, and will recognize that more than one variable may affect change. They will be aware of different perspectives and ways of organizing the world, and they will show care and respect for themselves, other living things and the environment. Students will communicate their ideas or provide explanations using their own scientific experience.

Overall expectations in social studies for 7–9 years.

Students will develop their observational skills by using their senses and selected observational tools. They will gather and record observed information in a number of ways, and they will reflect on these findings to identify patterns or connections, make predictions, and test and refine their ideas with increasing accuracy. Students will explore the way objects and phenomena function, identify parts of a system, and gain an understanding of increasingly complex cause and effect relationships. They will examine change over time, and will recognize that change may be affected by one or more variables. They will examine how products and tools have been developed through the application of science concepts. They will be aware of different perspectives and ways of organizing the world, and they will be able to consider how these views and customs may have been formulated. Students will consider ethical issues in science-related contexts and use their learning in science to plan thoughtful and realistic action in order to improve their welfare and that of other living things and the environment. Students will communicate their ideas or provide explanations using their own scientific experience and that of others.

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Overall expectations in social studies for 9–12 years.

Students will develop their observational skills by using their senses and selected observational tools. They will gather and record observed information in a number of ways, and they will reflect on these findings to identify patterns or connections, make predictions, and test and refine their ideas with increasing accuracy. Students will explore the way objects and phenomena function, identify parts of a system, and gain an understanding of increasingly complex cause and effect relationships. They will examine change over time, and they will recognize that change may be affected by one or more variables. Students will reflect on the impact that the application of science, including advances in technology, has had on themselves, society and the environment. They will be aware of different perspectives and ways of organizing the world, and they will be able to consider how these views and customs may have been formulated. Students will examine ethical and social issues in science-related contexts and express their responses appropriately. They will use their learning in science to plan thoughtful and realistic action in order to improve their welfare and that of other living things and the environment. Students will communicate their ideas or provide explanations using their own scientific experience and that of others.

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Learning will include the development of the following knowledge, concepts and skills		Possible learning outcomes in social studies
Transdisciplinary theme Where we are in place and time **Unit 1 Central idea:** Migration can be a response to challenges, risks and opportunities. **Related Concepts:** Science: Food webs, habitat **Lines of Inquiry:** Types of migration Impacts of migration Migration through history	**Science strand(s)** Living Things **Science skills** • Make predictions of what will happen based on scientific knowledge. • Decide whether results support predictions • Use knowledge and understanding to carry out fair testing. • Collect sufficient evidence to test an idea. • Begin to evaluate repeated results. • Suggest explanations using scientific knowledge and understanding. • Identify factors that need to be taken into account in different contexts. • Measure volume, temperature, time, length and force • Use observations and measurement to test predictions and make links. • Use observations to test predictions • Consider how scientists have combined evidence from observation and measurement with creative thinking to suggest new ideas and explanations for phenomena. • Use tables, bar charts and line graphs to present results. • Evaluate repeated results • Decide when observations and measurements need to be checked	**The student will be able to:** • Investigate how different animals are found in different habitats and a suited to the environment they are found • Explore how humans have positive and negative effects on the environment – Loss of species and habitats • Know that food chains can be used to represent feeding relationships in a habitat

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	by repeating to give more reliable data. • Identify factors that are relevant to a particular situation. • Collect evidence and data to test ideas including predictions. • Choose which equipment to use. • Make a variety of relevant observations and measurements using simple apparatus correctly. • Discuss how to turn ideas into a form that can be tested. • Identify patterns in results and results that do not seem to fit a pattern. • Make predictions using scientific knowledge and understanding. • Use results to draw conclusions and to make further predictions. • Say if and how evidence supports any predictions made. • Suggest and evaluate explanations for predictions using scientific knowledge and understanding and communicate this. • Choose what evidence to collect to investigate a questions, ensuring that evidence is sufficient.	

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Learning will include the development of the following knowledge, concepts and skills		Possible learning outcomes in social studies
Transdisciplinary theme Who we are **Unit 2 Central idea:** Living things follow common life transitions **Related Concepts:** Science: Life Processes, plant reproduction, germination, light **Lines of Inquiry:** **L**ife processes of living things Comparing life processes Risks to life processes	**Science strand(s)** Living Things **Science skills** • Make predictions of what will happen based on scientific knowledge. • Decide whether results support predictions • Use knowledge and understanding to carry out fair testing. • Collect sufficient evidence to test an idea. • Begin to evaluate repeated results. • Suggest explanations using scientific knowledge and understanding. • Identify factors that need to be taken into account in different contexts. • Measure volume, temperature, time, length and force • Use observations and measurement to test predictions and make links. • Use observations to test predictions • Consider how scientists have combined evidence from observation and measurement with creative thinking to suggest new ideas and explanations for phenomena. • Use tables, bar charts and line graphs to present results. • Evaluate repeated results • Decide when observations and measurements need to be checked	**The student will be able to:** • Know life processes that are common to humans and animals including nutrition, movements, growth and reproduction • Recognize that flowering plants have a life cycle including pollination, fertilization, seed production, seed dispersal and germination • Know that plants reproduce • Investigate how seeds need water for germination • Know that plants need energy from light to grow • Observe how seeds can be dispersed in various ways • Observe that plants produce flowers that have male and female organs Observe that seeds are formed when pollen from the male organ fertilized the ovum (female)

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Learning will include the development of the following knowledge, concepts and skills		Possible learning outcomes in social studies
Transdisciplinary theme How the World Works **Unit 3 Central idea:** Energy may be conserved, transformed and used to support progress. **Related Concepts:** Science: Forms of energy, conservation of energy, electricity, **Lines of Inquiry:** Forms of energy sources Use and transformation Sustainable energy practices	**Science strand(s)** Materials and Matter **Science skills** • Make predictions of what will happen based on scientific knowledge. • Decide whether results support predictions • Use knowledge and understanding to carry out fair testing. • Collect sufficient evidence to test an idea. • Begin to evaluate repeated results. • Suggest explanations using scientific knowledge and understanding. • Identify factors that need to be taken into account in different contexts. • Measure volume, temperature, time, length and force • Use observations and measurement to test predictions and make links. • Use observations to test predictions • Consider how scientists have combined evidence from observation and measurement with creative thinking to suggest new ideas and explanations for phenomena. • Use tables, bar charts and line graphs to present results. • Evaluate repeated results • Decide when observations and measurements need to be checked	**The student will be able to:** • Can predict and test the effects of making changes to circuits including length and thickess of wire and the number and types of components • Can represent series of circuits with drawings and conventional symbols Know that metals are used for cables and wires and why plastics are used to cover wires and as covers for small plugs

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Learning will include the development of the following knowledge, concepts and skills		Possible learning outcomes in social studies
Transdisciplinary theme How we organize ourselves **Unit 4 Central idea:** Economics may determine and drive decisions. **Related Concepts:** Science: Properties of matter, solutions **Lines of Inquiry:** Spending and saving money Responsibilities of producers and consumers Ethical consumerism	**Science strand(s)** Earth and Space **Science skills** • Make predictions of what will happen based on scientific knowledge. • Decide whether results support predictions • Use knowledge and understanding to carry out fair testing. • Collect sufficient evidence to test an idea. • Begin to evaluate repeated results. • Suggest explanations using scientific knowledge and understanding. • Identify factors that need to be taken into account in different contexts. • Measure volume, temperature, time, length and force • Use observations and measurement to test predictions and make links. • Use observations to test predictions • Consider how scientists have combined evidence from observation and measurement with creative thinking to suggest new ideas and explanations for phenomena. • Use tables, bar charts and line graphs to present results. • Evaluate repeated results • Decide when observations and measurements need to be checked	**The student will be able to:** • Know that when a liquid is evaporated from a solution a solid is left over • Know that the boiling point of water is 100C and the meting point of ice is 0C • Explore how solids can be mixed and how it is possible to separate them again • Observe, describe, record and explain changes that occur when some solids are added to water • Explore how, when solids dissolve or react with water, they can be separated by filtering/Sieving

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Learning will include the development of the following knowledge, concepts and skills		Possible learning outcomes in social studies
Transdisciplinary theme How we express ourselves **Unit 6 Central idea:** Popular culture helps identify the values and beliefs of each generation **Related Concepts:** Science: Sound **Lines of Inquiry:** Popular (Pop) Culture What pop culture says about values of generations Pop culture's effect on identity popular culture in media	**Science strand(s)** Forces and Energy **Science skills** • Make predictions of what will happen based on scientific knowledge. • Decide whether results support predictions • Use knowledge and understanding to carry out fair testing. • Collect sufficient evidence to test an idea. • Begin to evaluate repeated results. • Suggest explanations using scientific knowledge and understanding. • Identify factors that need to be taken into account in different contexts. • Measure volume, temperature, time, length and force • Use observations and measurement to test predictions and make links. • Use observations to test predictions • Consider how scientists have combined evidence from observation and measurement with creative thinking to suggest new ideas and explanations for phenomena. • Use tables, bar charts and line graphs to present results. • Evaluate repeated results • Decide when observations and measurements need to be checked	**The student will be able to:** • Demonstrate the sound travels through materials • Investigate how well sound travels through different materials • Demonstrate that vibrations cause sound • Investigate how sounds can be loud or soft

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	by repeating to give more reliable data. • Identify factors that are relevant to a particular situation. • Collect evidence and data to test ideas including predictions. • Choose which equipment to use. • Make a variety of relevant observations and measurements using simple apparatus correctly. • Discuss how to turn ideas into a form that can be tested. • Identify patterns in results and results that do not seem to fit a pattern. • Make predictions using scientific knowledge and understanding. • Use results to draw conclusions and to make further predictions. • Say if and how evidence supports any predictions made. • Suggest and evaluate explanations for predictions using scientific knowledge and understanding and communicate this. • Choose what evidence to collect to investigate a questions, ensuring that evidence is sufficient.	