Brookstead

State School

Years 1-7 Science Program

2009-2011
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Authorisation, currency and scope

This science program forms part of a suite of Learning Area plans derived from the Mercalli State
School Curriculum Plan. Any aspect of this document must be consistent with the provision of that
whole school plan.

The Mercalli School Science Committee developed this document in November 2008 for use in the
school years 2009-2011. Like all other Mercalli State school plans, it will be reviewed (and
updated) annually by the Committee in association with the Head of Curriculum. A new plan will be
drafted in Term 4 of 2011 to take effect in 2012.

This Plan relates to Years 1 to 7. At this stage the science experiences selected by the Prep
teachers from the Early Years Curriculum Guide are not included within its scope. Teachers of
Prep and Year 1 will monitor both the current programs and the achievements of students with a
view to having a single P-7 program as soon as is feasible.

The “syllabus” on which this plan is based is the collection of Essential Learnings in Science for
Years 3, 5 and 7 within the QCAR Framework. As development work on the National Curriculum in
Science proceeds, any relevant additional material will be incorporated at the annual reviews.
School Context
Brookstead State School is an Education Queensland school serving a community on the outskirts of a medium-sized urban centre. It is organised into common-age groups with multiple drafts operating at each year level. Most students make the transition to Pittsworth State High School after Year 7.

The school’s mission is to offer holistic learning that considers each child’s academic, social, emotional and physical needs. Students are supported and encouraged to develop according to their readiness regardless of age or year level.

Teachers have the autonomy to provide units of work that offer developmentally appropriate learning experiences for their students. These learning experiences are determined after making judgments about each student’s current level of understanding and are based on careful observation and mapping of student progress.

As students develop:
- they are able to engage in increasingly more complex tasks;
- their perceptions and responses to the things around them increase in sophistication;
- they move towards increasingly symbolic representations to model their understandings of the world;
- their perceptions change from being undifferentiated to being increasingly differentiated;
- their ability to reason tends to grow from the immediate and personal to more generalised and shared;
- they move from a stage of egocentric behaviour to behaviour that is more socially oriented; and
- they progress through the general stages of growth and development according to their own individual and unique set of aptitudes.

Place of science in the curriculum
Scientific ways of thinking and solving problems are powerful tools for people to use as they seek explanations of how things work, or to understand why things are the way they are. Science education prepares students to make sense of the world by engaging them in authentic tasks that focus on the cognitive processes involved in investigating, understanding and communicating.

Science is integral to the balanced curriculum that Brookstead State School offers to all its students. Teachers facilitate class programs that will assist all students at all levels to:
- appreciate science as a way of knowing;
- develop effective ways of making sense of the world around them;
- enjoy and appreciate science by fostering a sense of inquiry and scientific literacy; and
- construct knowledge and understandings consistent with the intent of the syllabus.

A constructivist view of learning recognises that students actively construct their own cognitive understandings within a social context. In response, teaching takes account of students’ views, ideas and scientific explanations as well as their level of cognitive development. In this school curriculum program, teachers are encouraged to provide opportunities for their students to explore and challenge their own ideas.

Underpinning constructivist theories of learning is the view that meaning is actively constructed within the learner’s existing framework. As a powerful referent for teachers, it acknowledges that learners interpret ideas in terms of their prior knowledge and experiences.

Of greatest significance for stakeholders at Brookstead State School is that, for teachers to be effective, they must be responsive to students’ prior knowledge and plan purposeful activities at a level that builds on, and extends, prior knowledge and experiences.
Science and other Key Learning Areas

Learning science cannot be separated from the other areas of the curriculum. This science program needs to be considered in the light of our other Key Learning Area plans. In the course of a science unit, learners will need to use their literacy capabilities to read or view information to extract meaning and to represent their learning in writing. Collecting and manipulating data will necessarily involve measurement, computation, tabulation and other aspects of numeracy. Mastery of ICT skills can be required in many aspects of science learning.

Literacy and numeracy

The Brookstead State School Literacy and Numeracy Plan lists the literacy and numeracy indicators that will be addressed through the teaching and learning opportunities detailed in the Science programs. Detail about the literacy and numeracy indicators that the Science program allows students to develop can be found in each unit plan.

The units of work in this program seek to incorporate these opportunities seamlessly into the overall sequence of learning. However, recent research has demonstrated that many students need explicit teaching to ensure that they recognise the implicit demands of the task. Teachers should refer to the Numeracy and Literacy Links produced for each of the published units by Teaching and Learning Branch.

Cross-curriculum links

A science unit can also present opportunities to include other aspects of the curriculum. Science offers students a meaningful context for solving problems, thinking critically, making decisions and being creative. An approach where the context and purpose are clear enables teachers and students to explore the breadth of issues, knowledge, understandings and beliefs associated with the desired learnings. To ensure that the learning is effective, it should be planned for rather than being included incidentally during the teaching. The Essential Learning Cross linking charts from Teaching and Learning Branch include Essential Learnings from other Key Learning Areas where appropriate.

Professional Development

Brookstead State School acknowledges that students benefit from having all of its teachers engage in on-going professional development and receive continuing support to become more confident and effective as teachers of science. Very few teachers in Years 1 to 7 have an extensive background or specialised pre-service training in science; but all are able to deliver high quality science learning experiences with the appropriate support.

PrimaryConnections, the Professional Learning program devised by the Australian Academy of Science (AAS), provides the basis for our school-based activities. An overview of this program is available at http://www.science.org.au/primaryconnections/ or http://www.learningplace.com.au/deliver/content.asp?pid=34967

Ms X and Mr Y have been trained as Science Teacher Leaders (through Primary Connections) to assist you in the first instance. They may have a professional learning “package” that will meet your need or be able to assist you to devise a personalised learning and development program. The school is also able to access the services of our Regional PrimaryConnections Professional Learning Facilitator for more specialised needs.

Every teacher is invited to participate in the regular meetings of the Science Committee. This can be a very effective way to build your understanding of the place of science in our school.

An email discussion list (PRIMARYCONNECTIONSCURRICULUM DIVISION) has been set up and can be accessed through Education Queensland (EQ) Discussion lists. The list is a means of disseminating information about PrimaryConnections and primary science and sharing experiences across schools.
Teaching and Learning Model

Children learn science best when they construct personal explanations for questions that they regard as important. The vital role of the teacher is to structure learning experiences that prompt important questions and guide the learners to valued insights. Students use their prior knowledge to make sense of these new experiences and then make connections between new information and their prior knowledge.

Children come to our school having constructed ideas about key scientific concepts. In some cases, those ideas are very close to the scientific explanations. In other cases, their naïve beliefs may be very different until challenged to explore their understandings, students will hold on to their beliefs, even if they are contrary to accepted scientific understandings.

Making the connections between what students already know and new information can be assisted through progression through five inter-related phases, known as the 5Es constructivist learning model:

Engage

At the beginning of a unit, learners need to be mentally engaged with an activity or question. This phase captures their interest, provides an opportunity for them to express what they know about the concept or skill being developed, and helps them to make connections between what they know and the new ideas.

Explore

Children carry out hands-on activities in which they can explore the concept or skill under consideration. They grapple with the problem or phenomenon and describe it in their own words. This phase allows students to acquire a common set of experiences that they can use to help each other make sense of the new learning.

Explain

From this shared basis, learners and the teacher can develop explanations for the phenomenon they have experienced. Often this will involve the teacher introducing powerful concepts and new terms to enable the children to express their developing understanding.

Elaborate

Learners refine a skill or build a deeper understanding by applying what they have learned to new situations. Children will discuss and compare their ideas during this phase.

Evaluate

In the final phase, students review and reflect on their own learning and new understanding and skills. It is also when they provide evidence for changes to their understanding, beliefs and skills.

In effective science classrooms, the learners are active participants. They
- understand that the knowledge they have will influence their current learning, and are prepared to challenge their own beliefs and the beliefs of others
- recognise that understandings are dynamic and can be modified
- take responsibility for their own learning

In effective science classrooms, the teachers are active participants. They
- facilitate learning experiences, challenging students to think critically and creatively
- assist learners to develop understandings by using clear unambiguous language to explain ideas
- plan learning opportunities to meet the needs of the students, and assist all students to achieve the intended learnings
Resources

Curriculum materials for teachers

The PrimaryConnections Program includes a set of curriculum resources that complement the professional learning. Brookstead State School has adopted those resources as the basis for its Years 1-7 Science program. Those resources are based on the 5Es constructivist learning model that engages students in inquiry-based learning and working co-operatively. Each PrimaryConnections resource unit has a strong science and literacy focus, contains links to other curriculum areas and has assessment tasks embedded throughout.

PrimaryConnections is a national initiative. The authors of the units of work based their planning on learning outcomes selected from the National Scientific Literacy Progress Map. The Year level elaborations of the program later in this document show the relationships between those learning outcomes and the Queensland Curriculum, Assessment and Reporting (QCAR) Essential Learnings that guide our planning. (When the National Curriculum specifications are released by the Australian Curriculum, Assessment and Reporting Authority (ACARA), this section of the Plan will be updated to include that additional information).

Equipment and materials

Effective learning of science involves children in the direct manipulation of a range of equipment and materials in their investigations. It is not often that the equipment required is specialised but it does need to be available in a timely and organised fashion to ensure the smooth flow of science learning.

Each PrimaryConnections unit has a comprehensive materials list that can be used as the basis for preparing your classroom for a new unit and then as a final check before each lesson.

Brookstead State School has adopted a two-layer equipment management system. Each classroom is equipped with a stock of resources that will be used across several science units. You should ensure that this is kept topped up as materials are consumed. The class-based stock is complemented by centrally-stored (and maintained) kits of materials that are particular to individual units. Details of how these materials are to be borrowed and replenished will be discussed at a staff meeting at the beginning of each school year. Please speak to Mrs Z, who manages the system, about any operational issues.

Student learning resources

The printed PrimaryConnections curriculum resources are intended to be used by teachers not students. However, each unit does contain a number of reproducible templates (not worksheets) that may be used to structure and support student recording and subsequent discussion. Copies of all the templates for each unit have been downloaded from the AAS website and stored on the school intranet for ready access. If you modify any of those documents, please share the changes with your colleagues but also leave a copy of the original.

There are many children’s books for all ages that have a scientific theme or illustrate an aspect of science. Fiction and non-fiction print resources relevant to each unit of work recommended by AAS and EQ are being incorporated into the school collection. Check with the Teacher-Librarian for the latest information on holdings (including multiple copies).

Although science learning depends on first-hand investigation of objects, phenomena and events, the wise use of learning technology can enhance aspects of the learning process. Digital learning objects developed by The Learning Federation are available through the Curriculum Exchange where the cataloguing data will indicate suitability for particular topics and ages.
Safety

When students engage in scientific investigations, there will be risks of injury if correct procedures and safe practices are not followed. Teachers should be aware of the intended progress of every activity and of what could go wrong. The risks should be identified and strategies adopted to remove or minimise them.


Time allocation

The Brookstead State School Curriculum Plan specifies a time allocation for Science in hours per week as follows:

- Years 1–3  1 hour/week
- Years 4–7  2 hours/week.

Teachers should note that these times are above the minimum requirements set by Education Queensland (refer to "Time allocations for learning areas — Years 1 to 7 English, Mathematics and Science" on the school intranet). This decision to allocate additional time is based on our belief that the value of science learning experiences is contributing to the overall growth of the learners. The Science Committee anticipates that these allocations will be increased further with the introduction of the National Curriculum from 2011.

However, these figures represent average allocations. It is not intended that you schedule a fixed number of sessions per week.

There are some science topics (such as monitoring the growth of plants) that require a few minutes every day, while others (such as mapping the school grounds) can occupy an entire afternoon. The best way to approach some units may be to devote a number of whole days to them. Teachers need to be conscious of the actual demands of each of the science activities in the program and match the time allocation to that.
Program Overview.

The Brookstead State School program has been produced by allocating PrimaryConnections units to Year levels and then arranging units within the Year in the most appropriate order. In 2009, this means that there are three significant units of work in each Year. This is the minimum provision. Individual teachers (or Year-level teams) are encouraged to devise additional learning for the currently unallocated term. That could take the form of an additional unit of work or extending one or more of the existing units.

Any unit, whether drawn from this program or obtained from another source, must be justified by its capacity to assist learners to acquire the Essential Learnings in Science set out in the QCAR Framework. The detailed year-level plans that follow relate the stated curriculum intent of the PrimaryConnections unit authors (in the right-hand column) to the selected Essential Learnings (on the left). In a few cases, italicised entries describe learning opportunities recognised by Brookstead teachers that are not explicit in the printed text.

Although it is convenient to list the Essential Learnings to do with Knowledge and understanding and Ways of working separately, learners need to be able to use them together and so the Ways of working and Knowledge and understanding elements should be taught together (as planned by the authors of the units).

Each PrimaryConnections unit of work is derived from one of four organisers corresponding to four of the five areas of Knowledge and understanding

- Earth and beyond
- Life and living
- Energy and change
- Natural and processed materials

This principle focus is indicated by the colour of the cover, but teachers should note that many of the units incorporate important knowledge from another organiser and that this is indicated in the year-level plans that follow.

The fifth area of Knowledge and understanding (Science as a human endeavour) is applicable to all areas of science and so should be included in each unit of work. In several units (particularly those involving Natural and processed materials) there are also opportunities to adopt a strong Technology focus.

There are currently 19 published PrimaryConnections units of work that have been allocated across Years 1 to 7 in our school overview. Each unit was planned to be appropriate to one of four stages of learning that can be equated to pairs of year levels for a (typical) Brookstead student.

- Early Stage 1 (Prep – Year 1)
- Stage 1 (Years 2-3)
- Stage 2 (Years 4-5)
- Stage 3 (Years 6-7)

In all but one case (Weather in our world); units have been placed within their notional stage.

As additional units become available from the Australian Academy of Science, they will be assessed for their suitability for inclusion in the program. Two units from the school’s previous science program have been retained and modified to complement the PrimaryConnections units in Years 5 and 7. Check out our place is the unit of work through which a scientific perspective is brought to bear on the school-wide commitment to environmental sustainability.

Terrific tools and magnificent machines meets the concern that the PrimaryConnections suite of units does not currently address an area of physical science that is central to the Year 8 program at Pittsworth SHS. For details of the Years 8 and 9 program, see the materials provided by the Queensland Studies Authority (QSA) (at http://www.qsa.qld.edu.au/learning/7297.html).
<table>
<thead>
<tr>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Year 6</th>
<th>Year 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>What's inside?</td>
<td>On the move</td>
<td>Staying alive</td>
<td>Mental and Physical Health</td>
<td>Weather in my world</td>
<td>Materials world</td>
<td>Terrific tools and magnificent machines</td>
</tr>
<tr>
<td>Year 1</td>
<td>Year 2</td>
<td>Year 3</td>
<td>Year 4</td>
<td>Year 5</td>
<td>Year 6</td>
<td>Year 7</td>
</tr>
<tr>
<td>Safety and health</td>
<td>Schools are safer</td>
<td>Katar works</td>
<td>Plants in action</td>
<td>Check out our place</td>
<td>Poles are taller</td>
<td>Design solutions</td>
</tr>
<tr>
<td>Year 1</td>
<td>Year 2</td>
<td>Year 3</td>
<td>Year 4</td>
<td>Year 5</td>
<td>Year 6</td>
<td>Year 7</td>
</tr>
<tr>
<td>Psh-voil</td>
<td>Sounds sensational</td>
<td>Spots the difference</td>
<td>Spinning in space</td>
<td>Light Fantastic</td>
<td>It's electrifying</td>
<td>Earthquakes and volcanoes</td>
</tr>
<tr>
<td>Year 1</td>
<td>Year 2</td>
<td>Year 3</td>
<td>Year 4</td>
<td>Year 5</td>
<td>Year 6</td>
<td>Year 7</td>
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</table>
**Year 1**

During Year 1, the program will draw upon three Primary Connections units from Early Stage 1.
- **What’s it made of?**
- **On the move**
- **Staying alive**

<table>
<thead>
<tr>
<th>Essential Learnings</th>
<th>The students will:</th>
</tr>
</thead>
</table>
| **Natural and processed materials**  
  Materials have different properties and undergo different changes.  
  - Materials are categorised according to their observable properties  
  - Properties of familiar materials may be changed |  
  - Identify everyday materials and their properties.  
  - Compare the observable properties of everyday materials.  
  - Describe how changing a material can change its properties. |
| **Energy and change**  
  Energy can be used for different purposes.  
  - Forms of energy, including electricity, light, heat, movement and sound, have different applications |  
  - Identify and describe some ways in which humans and toys move.  
  - Identify and describe some parts that enable humans and toys to move.  
  - Group objects according to the way they move. |
| **Life and living**  
  Needs, features and functions of living things are related and change over time.  
  - Animals, plants and non-living things have different features/characteristics  
  - Living things depend on the environment and each other |  
  - Identify the basic needs for an animal to survive such as air, food, water and shelter.  
  - Identify the senses and describe how each sense helps us.  
  - Identify similarities and differences in the basic needs of an animal and a human.  
  - Use the senses to respond to and describe a stimulus. |
| **Science as a human endeavour**  
  Science is a part of everyday activities and experiences.  
  - Science has applications in daily life, including at home, at school, at work and in leisure time  
  - Science can impact on people and their environments  
  - Stewardship of the environment involves conserving natural resources  
  - Australian Indigenous knowledge of natural phenomena has developed over time as a result of people observing, investigating and testing in everyday life |  
  - Identify the basic needs for a human to survive such as air, food, water and shelter.  
  - **Find out about the science of toys.**  
  - **Find out how people use materials in their daily lives.**  
  - **Find out about conserving natural materials for future use and sustainability of materials.**  
  - **Find out how materials are used for making traditional tools and artefacts.**  
  - **Use of bush tucker to stay alive.** |
| **Ways of working**  
  Planning and conducting investigations. |  
  - Identify a variable for investigation.  
  - Follow directions to conduct simple investigations of the amount of water consumed by an animal and by humans.  
  - Make and share observations.  
  - Identify a variable that could be investigated in relation to the needs of an animal. |
### Essential Learnings

<table>
<thead>
<tr>
<th>Drawing conclusions that are supported by evidence,</th>
<th>The students will:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Draw conclusions from the investigation about amounts of water consumed by humans and animals.</td>
<td></td>
</tr>
<tr>
<td>• Draw conclusions from investigations about toys.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Communicate scientific ideas, data and findings</th>
<th>The students will:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Participate in discussions and use talk to: inquire, report on observations, clarify understanding and reflect on experience.</td>
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<tr>
<td>• Manipulate ideas and share understanding through the use of:</td>
<td></td>
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<tr>
<td>- factual recounts</td>
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<tr>
<td>- factual texts</td>
<td></td>
</tr>
<tr>
<td>- graphs</td>
<td></td>
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<tr>
<td>- ideas maps</td>
<td></td>
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<tr>
<td>- oral presentations</td>
<td></td>
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<tr>
<td>- reports</td>
<td></td>
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<tr>
<td>- science journals</td>
<td></td>
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<tr>
<td>- sorting diagrams</td>
<td></td>
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<tr>
<td>- storyboards</td>
<td></td>
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<tr>
<td>- tables</td>
<td></td>
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<tr>
<td>- T-charts</td>
<td></td>
</tr>
<tr>
<td>- word walls</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Reflect on learning</th>
<th>The students will:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reflect on entries in science journal</td>
<td></td>
</tr>
<tr>
<td>• Reflect on providing for the needs of humans and animals</td>
<td></td>
</tr>
<tr>
<td>• Compare movements made by humans and by different objects.</td>
<td></td>
</tr>
<tr>
<td>• Compare how materials are used for specific purposes.</td>
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</tr>
</tbody>
</table>

### Teaching literacy and numeracy

The Year 1 Science program will provide opportunities for students to demonstrate a range of literacy and numeracy indicators located within the organisers:

- Speaking and listening
- Reading and viewing
- Writing and designing
- Measurement.

The products that will enable students to demonstrate these indicators will include, but not be limited to:

- Factual texts
- Graphs
- Science journals
- Tables
- T-charts
- Word walls.

Specific detail about how the literacy and numeracy indicators can be demonstrated through the Year 1 Science program can be found in the unit plans.

### Assessable elements

- Knowledge and understanding
- Investigating
- Communicating
- Reflecting
Year 2
During Year 2, the program will draw upon the following Primary Connections units.
  - *Weather in my world*
  - *Schoolyard Safari*
  - *Push pull*

Note that *Weather in my world* is the final Early Stage 1 unit and is used as students make the transition to the more challenging Stage 1 materials.

<table>
<thead>
<tr>
<th>Essential Learnings</th>
<th>The students will:</th>
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</thead>
<tbody>
<tr>
<td><strong>Knowledge and Understanding</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Earth and beyond</strong></td>
<td></td>
</tr>
<tr>
<td>Changes in the observable environment influence life.</td>
<td>• Observe and describe features of the weather such as temperature, cloud cover, wind strength and rain using appropriate language and symbols.</td>
</tr>
<tr>
<td>o Earth and space experience recurring patterns and natural cycles of events, including seasons, weather and moon phases, and these can affect living things</td>
<td>• Identify activities that are suitable for particular weather conditions.</td>
</tr>
<tr>
<td>o Describe changes in weather conditions with time and location.</td>
<td>• Describe changes in weather conditions with time and location.</td>
</tr>
<tr>
<td><strong>Life and living</strong></td>
<td></td>
</tr>
<tr>
<td>Needs, features and functions of living things are related and change over time.</td>
<td>• Identify parts of a small animal used for movement, feeding and protection.</td>
</tr>
<tr>
<td>o Animals, plants and non-living things have different features/characteristics</td>
<td>• Identify conditions of a small animal's habitat, for example: moist, cool, dry or hot.</td>
</tr>
<tr>
<td>o Living things depend on the environment and each other</td>
<td>• Identify and describe the behaviour of small animals in a particular habitat.</td>
</tr>
<tr>
<td><strong>Energy and change</strong></td>
<td></td>
</tr>
<tr>
<td>Energy can be used for different purposes.</td>
<td>• Compare the structural features of two small animals.</td>
</tr>
<tr>
<td>o Pushes and pulls affect the shape and motion of objects</td>
<td>• Compare the habitats of different small animals.</td>
</tr>
<tr>
<td></td>
<td>• Identify the habitat conditions needed for the survival of a particular small animal.</td>
</tr>
</tbody>
</table>
### Essential Learnings

**Science as a human endeavour**

Science is a part of everyday activities and experiences.
- Science has applications in daily life, including at home, at school, at work and in leisure time.
- Science can impact on people and their environments.
- Stewardship of the environment involves conserving natural resources.
- Australian Indigenous knowledge of natural phenomena has developed over time as a result of people observing, investigating and testing in everyday life.

The students will:
- Identify clothes that are suitable for particular weather conditions.
- Find out how weather impacts on their daily lives including leisure activities.
- Explore use of insects in pollination of plants, weed control.
- Discuss how animal populations can be preserved in the schoolyard.
- Investigate examples of indigenous weather knowledge including seasonal calendars and variations in food sources.

### Ways of working

<table>
<thead>
<tr>
<th>Planning and conducting investigations.</th>
<th>The students will:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow directions to make simple tools for observing and describing weather conditions.</td>
<td></td>
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<tr>
<td>Identify some variables that can be investigated.</td>
<td></td>
</tr>
<tr>
<td>Follow directions to conduct simple investigations about small animals.</td>
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<tr>
<td>Identify basic elements of fair testing.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Drawing conclusions that are supported by evidence.</th>
<th>The students will:</th>
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<tbody>
<tr>
<td>Identify patterns in a simple graph.</td>
<td></td>
</tr>
<tr>
<td>Make, record and share observations and draw conclusions.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Communicate scientific ideas, data and findings.</th>
<th>The students will:</th>
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<tr>
<td>Participate in discussions and use talk to: inquire, report on observations, clarify understanding and reflect on experience.</td>
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<tr>
<td>Manipulate ideas and share understanding through the use of:</td>
<td></td>
</tr>
<tr>
<td>annotated drawings</td>
<td>role-plays</td>
</tr>
<tr>
<td>drawings.</td>
<td>science journals</td>
</tr>
<tr>
<td>factual texts</td>
<td>tables</td>
</tr>
<tr>
<td>graphs.</td>
<td>TWLH charts</td>
</tr>
<tr>
<td>ideas maps</td>
<td>word chains</td>
</tr>
<tr>
<td>labelled diagrams</td>
<td>word walls</td>
</tr>
<tr>
<td>maps</td>
<td>force arrow diagrams</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reflect on learning.</th>
<th>The students will:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reflect on entries in science journals.</td>
<td></td>
</tr>
<tr>
<td>Identify the habitat conditions for the survival of a particular small animal.</td>
<td></td>
</tr>
</tbody>
</table>

### Teaching literacy and numeracy

The Year 2 Science program will provide opportunities for students to demonstrate a range of literacy and numeracy indicators located within the organisers:
- Speaking and listening
- Writing and designing
- Measurement
- Chance and data.
The products that will enable students to demonstrate these indicators will include, but not be limited to:

- Graphs
- Investigation planners
- Labelled diagrams
- Science journals
- Tables
- Word walls.

Specific detail about how the literacy and numeracy indicators can be demonstrated through the Year 2 Science program can be found in the unit plans.

**Assessable elements**

- Knowledge and understanding
- Investigating
- Communicating
- Reflecting
### Year 3

During Year 3, the program will draw upon the following Primary Connections units.
- *Sounds sensational*
- *Waterworks*
- *Spot the difference*

<table>
<thead>
<tr>
<th>Essential Learnings</th>
<th>The students will:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Earth and beyond</strong></td>
<td>Identify and describe uses of water.</td>
</tr>
<tr>
<td>Changes in the observable environment influence life.</td>
<td>Identify sources of water.</td>
</tr>
<tr>
<td>o Materials of the earth can be used in various ways</td>
<td>Identify an action that can help to conserve water.</td>
</tr>
<tr>
<td>o Identify and describe uses of water.</td>
<td>Describe a way of transferring water from its source to its point of use.</td>
</tr>
<tr>
<td><strong>Energy and change</strong></td>
<td>Identify sources of sound.</td>
</tr>
<tr>
<td>Energy can be used for different purposes.</td>
<td>Describe some uses of sound.</td>
</tr>
<tr>
<td>o Forms of energy, including electricity, light, heat, movement and sound, have different applications</td>
<td>Describe characteristics of sound, for example, loud, soft, high, and low.</td>
</tr>
<tr>
<td><strong>Natural and processed materials</strong></td>
<td>Compare sounds in terms of loudness and pitch.</td>
</tr>
<tr>
<td>Materials have different properties and undergo different changes.</td>
<td>Explain how to change the pitch of a sound source.</td>
</tr>
<tr>
<td>o Materials are categorised according to their observable properties</td>
<td>Identify materials through which sound travels, for example, solids and water.</td>
</tr>
<tr>
<td>o Properties of familiar materials may be changed</td>
<td>Compare the transmission of sounds through different materials, for example, solids, water and sound absorbers.</td>
</tr>
<tr>
<td><strong>Science as a human endeavour</strong></td>
<td>Using familiar examples, describe vibrations as the cause of sound.</td>
</tr>
<tr>
<td>Science is a part of everyday activities and experiences.</td>
<td>Identify everyday materials and their properties.</td>
</tr>
<tr>
<td>o Science has applications in daily life, including at home, at school, at work and in leisure time</td>
<td>Observe and describe changes to the properties of everyday materials.</td>
</tr>
<tr>
<td>o Science can impact on people and their environments</td>
<td>Compare the observable properties of everyday materials.</td>
</tr>
<tr>
<td>o Stewardship of the environment involves conserving natural resources</td>
<td>Describe how changing a material can change its properties.</td>
</tr>
<tr>
<td>o Australian Indigenous knowledge of natural phenomena has developed over time as a result of people observing, investigating and testing in everyday life</td>
<td>Describe differences between own and others’ uses of water.</td>
</tr>
<tr>
<td>o Examine how water is made safe for human consumption.</td>
<td>Identify actions that can be taken to conserve water.</td>
</tr>
<tr>
<td>o Identify examples of the use of sounds to indicate danger.</td>
<td>Construct musical instruments based on traditional indigenous knowledge.</td>
</tr>
<tr>
<td>o Explore use of sound in medical procedures.</td>
<td></td>
</tr>
</tbody>
</table>
## Essential Learnings

<table>
<thead>
<tr>
<th>Ways of working</th>
<th>The students will:</th>
</tr>
</thead>
</table>
| **Planning and conducting investigations.** | • Follow directions to conduct simple investigations about water use in the home.  
• Follow directions to conduct simple investigations about sound.  
• Make, share and describe observations.  
• Identify patterns in a simple column graph.  
• Identify some variables to investigate. |
| **Drawing conclusions that are supported by evidence.** | • Draw conclusions, from observations made during investigations. |
| **Communicate scientific ideas, data and findings** | • Participate in discussions and use talk to: inquire, report on observations, clarify understanding and reflect on experience.  
• Manipulate ideas and share understanding through the use of:  
  - factual recounts  
  - factual texts  
  - graphs  
  - interviews  
  - labelled diagrams  
  - annotated drawings  
  - word chains  
  - maps  
  - role-plays  
  - science journals  
  - storyboards  
  - tables  
  - word walls |
| **Reflect on learning.** | • Reflect on entries in science journals.  
• Reflect on actions that can be taken to conserve water (and the impact of the actions on result). |

### Teaching literacy and numeracy

The Year 3 Science program will provide opportunities for students to demonstrate a range of literacy and numeracy indicators located within the organisers:

- Speaking and listening  
- Reading and viewing  
- Writing and designing  
- Chance and data.

The products that will enable students to demonstrate these indicators will include, but not be limited to:

- Annotated drawings  
- Graphs  
- Investigation planners  
- Science journals  
- Word chains  
- Word walls.

Specific detail about how the literacy and numeracy indicators can be demonstrated through the Year 3 Science program can be found in the unit plans.

### Assessable elements

- Knowledge and understanding  
- Investigating
• Communicating
• Reflecting
**Year 4**

During Year 4, the program will draw upon the following Primary Connections units.
- Smooth moves
- Material world
- Plants in action

<table>
<thead>
<tr>
<th>Essential Learnings</th>
<th>The students will:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Life and living</strong></td>
<td>• Describe changes to the seed during germination and to the seedling during its growth.</td>
</tr>
<tr>
<td>Living things have features that determine their interactions with the environment.</td>
<td>• Identify a number of conditions required for plants to grow.</td>
</tr>
<tr>
<td>Living things can be grouped according to their observable characteristics</td>
<td>• Identify parts of a seedling (for example, root, stem, leaves).</td>
</tr>
<tr>
<td>Structures of living things have particular functions</td>
<td>• Identify parts of a flower (for example, petals, stamens).</td>
</tr>
<tr>
<td>Reproductive processes and life cycles vary in different types of living things</td>
<td>• Explain the role of roots, stems, leaves, flowers and fruits.</td>
</tr>
<tr>
<td>Living things have relationships with other living things and their environment</td>
<td>• Explain the relationships between the stages and processes in the plant life cycle.</td>
</tr>
</tbody>
</table>

| **Natural and processed materials** | The students will: |
| Properties, changes and uses of materials are related. | • Describe and compare the properties of materials. |
| Materials are used for a particular purpose because of their specific properties | • Identify an appropriate use for a material based on its properties. |
| The properties of an object can differ from the properties of its component parts | • Explain why the properties of a material make it suitable for a particular use. |

<p>| <strong>Energy and change</strong> | The students will: |
| Actions of forces, and forms and uses of energy, are evident in the everyday world. | • Use force-arrows to show the direction in which forces are acting on an object. |
| The greater the force on an object, the greater the change in shape or motion | • Explain that forces can make things start moving. |
| Forces may act at a distance or may need to be in contact with an object to affect it | • Identify examples of forces that act in direct contact and at a distance. |
| Explain the effect of forces on the movement of an object. | • Explain the effects of forces on the movement of an object. |
| Use different-sized arrows to represent and compare different-sized forces acting on the direction of movement of an object. | • Explain that forces can make things stop moving. |
| Explain that a larger force has a greater effect on an object and a smaller force has less effect on the same object. |</p>
<table>
<thead>
<tr>
<th>Essential Learnings</th>
<th>The students will:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Science as a human endeavour</strong></td>
<td>• Select materials for various uses showing an awareness of consequences for humans and the environment.</td>
</tr>
<tr>
<td><strong>Science relates to students’ own experiences and activities in the community.</strong></td>
<td>• Relate scientific knowledge of plants to recreational gardening</td>
</tr>
<tr>
<td>o Science can help to make natural, social and built environments sustainable and may influence personal human activities</td>
<td>• Discuss the ethics of plant collecting for a range of purposes.</td>
</tr>
<tr>
<td>o Science can contribute to people’s work and leisure</td>
<td>• Examine examples of Indigenous use of plants as food sources, medicines, raw materials for manufacturing.</td>
</tr>
<tr>
<td>o Cultures from around the world, including those of Aboriginal people and Torres Strait Islander people, have contributed to scientific understanding.</td>
<td></td>
</tr>
</tbody>
</table>

- **Planning and conducting investigations.**
  - Identify some variables that can be investigated.
  - Make predictions.
  - Make and record measurements and observations.
  - Make non-standard measurements and record data in a table.
  - Make and record observations and measurements using tables and column graphs.
  - Display results in simple tables and graphs or as scientific diagrams.
  - Plan an investigation showing awareness of the need for fair testing.

- **Drawing conclusions that are supported by evidence.**
  - Display results from tests as a graph and summarise patterns in results.
  - Describe the relationship between two variables plotted as a column graph.
  - Identify and summarise patterns in results.

- **Communicate scientific ideas, data and findings**
  - Participate in discussions and use talk to: inquire, report on observations, clarify understanding and reflect on experience.
  - Manipulate ideas and share understanding through the use of:
    - annotated drawings
    - procedural texts
    - cross sections
    - role-plays
    - drawings.
    - science journals
    - factual texts
    - storyboards
    - force-arrow diagrams
    - summaries
    - glossaries
    - tables
    - graphs
    - timelines
    - labelled diagrams
    - TWLH charts
    - narratives
    - word walls
    - oral presentations.
    - writing questions

- **Reflect on learning.**
  - Reflect on entries in science journals.
Teaching literacy and numeracy

The Year 4 Science program will provide opportunities for students to demonstrate a range of literacy and numeracy indicators located within the organisers:

- Speaking and listening
- Reading and viewing
- Writing and designing
- Chance and data.

The products that will enable students to demonstrate these indicators will include, but not be limited to:

- Annotated diagrams
- Factual texts
- Graphs
- Oral presentations
- Science journals
- Word walls.

Specific detail about how the literacy and numeracy indicators can be demonstrated through the Year 4 Science program can be found in the unit plans.

Assessable elements

- Knowledge and understanding
- Investigating
- Communicating
- Reflecting
**Year 5**

During Year 5, the program will commence with a school-devised unit of work
- **Check out our place**
and draw upon the following Primary Connections units.
- **Spinning in space**
- **Light fantastic**

<table>
<thead>
<tr>
<th>Essential Learnings</th>
<th>The students will:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Earth and beyond</strong></td>
<td>• Describe the shapes and sizes, positions and movements of the Sun, Earth and Moon.</td>
</tr>
<tr>
<td>Changes and patterns in different environments and space have scientific explanations.</td>
<td>• Describe the apparent movement of the Sun across the sky from East to West.</td>
</tr>
<tr>
<td>• The earth, solar system and universe are dynamic systems</td>
<td>• Describes changes in shadows, and differences between day and night, and relates these changes to the spinning of the Earth.</td>
</tr>
<tr>
<td>• Explain how day and night occur on Earth.</td>
<td></td>
</tr>
<tr>
<td><strong>Energy and change</strong></td>
<td>• Identify several sources of light and their uses.</td>
</tr>
<tr>
<td>Actions of forces, and forms and uses of energy, are evident in the everyday world.</td>
<td>• Explain that light travels in straight lines.</td>
</tr>
<tr>
<td>• Energy can be transferred from one object to another</td>
<td>• Explain that we see objects when light reflects off the object into our eyes.</td>
</tr>
<tr>
<td>• Different forms of energy used within a community have different sources</td>
<td>• Compare the ability of transparent, translucent and opaque materials to transmit light.</td>
</tr>
<tr>
<td></td>
<td>• Draw a ray diagram to explain how light from a source is reflected off an object into the eye so that we see the object.</td>
</tr>
<tr>
<td></td>
<td>• Explain how transparent, translucent and opaque materials affect the transmission of light.</td>
</tr>
<tr>
<td><strong>Science as a human endeavour</strong></td>
<td><strong>Construct an optical instrument and explain how it operates.</strong></td>
</tr>
<tr>
<td>Science relates to students’ own experiences and activities in the community.</td>
<td><strong>Draw a constellation and write a story about its discovery or origin.</strong></td>
</tr>
<tr>
<td>• Scientific ideas can be used to explain the development and workings of everyday items.</td>
<td><strong>Record local Indigenous names of the Sun, Moon, stars and sky</strong></td>
</tr>
<tr>
<td>• Cultures from around the world, including those of Aboriginal people and Torres Strait Islander people, have contributed to scientific understanding</td>
<td></td>
</tr>
<tr>
<td><strong>Planning and conducting investigations.</strong></td>
<td>• Identify some variables that can be investigated.</td>
</tr>
<tr>
<td></td>
<td>• Plan an investigation showing awareness of the need for fair testing.</td>
</tr>
<tr>
<td></td>
<td>• Make measurements and observations.</td>
</tr>
<tr>
<td><strong>Ways of working</strong></td>
<td><strong>Record measurements in a table and display results in a column graph.</strong></td>
</tr>
<tr>
<td><strong>Drawing conclusions that are supported by evidence.</strong></td>
<td><strong>Summarise patterns in results</strong></td>
</tr>
</tbody>
</table>
Essential Learnings | The students will:
---|---
**Communicating scientific ideas, data and findings** | • Participate in discussions and use talk to: inquire, report on observations, clarify understanding and reflect on experience.
• Manipulate ideas and share understanding through the use of science journals graphs, word walls posters, labelled diagrams ray diagrams, role-plays drawings, tables oral presentations.

**Reflecting on learning.** | • Identify areas in which their understanding of the solar system has been changed.
• *Suggest possible future applications of optical systems.*

**Teaching literacy and numeracy**

The Year 5 Science program will provide opportunities for students to demonstrate a range of literacy and numeracy indicators located within the organisers:

- Speaking and listening
- Reading and viewing
- Writing and designing
- Measurement
- Chance and data.

The products that will enable students to demonstrate these indicators will include, but not be limited to:

- Graphs
- Oral presentations
- Posters
- Science journals
- Tables
- Word walls.

Specific detail about how the literacy and numeracy indicators can be demonstrated through the Year 5 Science program can be found in the unit plans.

**Assessable elements**

- Knowledge and understanding
- Investigating
- Communicating
- Reflecting
### Year 6
During Year 6, the program will draw upon the following Primary Connections units.
- **Package it better**
- **It’s electrifying**
- **Marvellous micro-organisms**

#### Essential Learnings

<table>
<thead>
<tr>
<th>Energy and change</th>
<th>The students will:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forces and energy can be identified and analysed to provide explanations that benefit community lifestyles and decision-making.</td>
<td>- Describe a circuit in terms of components that form a continuous path for the flow of electrons.</td>
</tr>
<tr>
<td>o Energy can be transferred and transformed</td>
<td>- Describe how energy is stored and transferred within an electric circuit.</td>
</tr>
<tr>
<td>Natural and processed materials</td>
<td>- Explain the characteristics of conductors and insulators in terms of categories of materials.</td>
</tr>
<tr>
<td>Properties, changes and uses of substances and mixtures are related to their particular composition.</td>
<td>- Explain differences between conductors and insulators in terms of electron flow through these materials.</td>
</tr>
<tr>
<td>o Properties of a material will vary according to the type and quantity of components that make up its structure</td>
<td>- Explain energy transfer within a circuit in terms of a flow of electrons.</td>
</tr>
<tr>
<td>o Chemical change produces new substances that have properties different from those of the original substances</td>
<td>- Explain that electrical energy is changed into other forms of energy in a circuit and is not used up—that is, energy is transformed and not destroyed.</td>
</tr>
<tr>
<td>o Physical change produces no new substances</td>
<td>Natural and processed materials</td>
</tr>
<tr>
<td>Properties, changes and uses of substances and mixtures are related to their particular composition.</td>
<td>- Explain that yeast obtains energy when it breaks down sugars, a process that releases a gas (carbon dioxide).</td>
</tr>
<tr>
<td>o Properties of a material will vary according to the type and quantity of components that make up its structure</td>
<td>- Explain that yeast grows faster at warm temperatures than when it is cold or hot.</td>
</tr>
<tr>
<td>o Chemical change produces new substances that have properties different from those of the original substances</td>
<td>- Explain that the gas produced by yeast forms pockets of gas in the dough and this makes bread rise.</td>
</tr>
<tr>
<td>o Physical change produces no new substances</td>
<td>- Describe the conditions that affect the growth of mould on food.</td>
</tr>
<tr>
<td>Knowledge and Understanding</td>
<td>- Explain that the pockets of (carbon dioxide) gas made by yeast in bread dough expand when heated in cooking, making the bread light.</td>
</tr>
<tr>
<td>Natural and processed materials</td>
<td>- Describe the characteristics of packages and the properties of materials used to make them.</td>
</tr>
<tr>
<td>Properties, changes and uses of substances and mixtures are related to their particular composition.</td>
<td>- Explain how and why materials are chosen for particular purposes.</td>
</tr>
<tr>
<td>o Properties of a material will vary according to the type and quantity of components that make up its structure</td>
<td>- Identify key design features and environmental effects of products and processes used to make packages.</td>
</tr>
<tr>
<td>o Chemical change produces new substances that have properties different from those of the original substances</td>
<td>- Identify design criteria that reflect the design brief.</td>
</tr>
<tr>
<td>o Physical change produces no new substances</td>
<td>- Explore relationships between the properties of materials and their use.</td>
</tr>
</tbody>
</table>
### Essential Learnings

<table>
<thead>
<tr>
<th>Science as a human endeavour</th>
<th>The students will:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science impacts on people, their environment and their communities.</td>
<td>• Explain options and reasons for the selection of materials and the design of a package.</td>
</tr>
<tr>
<td></td>
<td>• Generate package designs based on a design brief that takes into account some social and environmental implications.</td>
</tr>
<tr>
<td></td>
<td>• Suggest creative solutions to a package and safely deliver a fragile gift.</td>
</tr>
<tr>
<td></td>
<td>• Relate food spoilage to the nature of packaging employed.</td>
</tr>
<tr>
<td></td>
<td>• Examine materials used for packaging by Indigenous people in traditional lifestyles.</td>
</tr>
</tbody>
</table>

### Planning and conducting investigations.

<table>
<thead>
<tr>
<th>Ways of working</th>
<th>Planning and conducting investigations.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Formulate a question for investigation and make a prediction.</td>
</tr>
<tr>
<td></td>
<td>• Plan investigations involving a control, and repeat trials or replicates.</td>
</tr>
<tr>
<td></td>
<td>• Change one factor at a time and test sufficient samples to make reliable conclusions.</td>
</tr>
<tr>
<td></td>
<td>• Plan investigations and product evaluations using models and technical terms showing awareness of the need for fair testing.</td>
</tr>
<tr>
<td></td>
<td>• Make and record observations using a table.</td>
</tr>
</tbody>
</table>

### Drawing conclusions that are supported by evidence.

<table>
<thead>
<tr>
<th></th>
<th>Drawing conclusions that are supported by evidence.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Summarise and explain observations made during an investigation.</td>
</tr>
<tr>
<td></td>
<td>• Analyse patterns and make evidence based conclusions from results recorded in investigations and product evaluations.</td>
</tr>
<tr>
<td></td>
<td>• Formulate generalisations based on observations made during an investigation.</td>
</tr>
<tr>
<td></td>
<td>• Analyse and explain patterns in results recorded from investigations.</td>
</tr>
</tbody>
</table>

### Communicate scientific ideas, data and findings

<table>
<thead>
<tr>
<th>Ways of working</th>
<th>Communicate scientific ideas, data and findings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Participate in discussions and use talk to: inquire, report on observations, clarify understanding and reflect on experience.</td>
</tr>
<tr>
<td></td>
<td>• Manipulate ideas and share understanding through the use of:</td>
</tr>
<tr>
<td></td>
<td>annotated diagrams labelled diagrams</td>
</tr>
<tr>
<td></td>
<td>biographies oral presentations.</td>
</tr>
<tr>
<td></td>
<td>chronological lists procedural texts</td>
</tr>
<tr>
<td></td>
<td>circuit diagrams role-plays</td>
</tr>
<tr>
<td></td>
<td>design portfolios science journals</td>
</tr>
<tr>
<td></td>
<td>factual recounts summaries</td>
</tr>
<tr>
<td></td>
<td>flow charts tables</td>
</tr>
<tr>
<td></td>
<td>graphs TWLH charts</td>
</tr>
<tr>
<td></td>
<td>information reports word walls</td>
</tr>
<tr>
<td></td>
<td>interviews writing questions</td>
</tr>
</tbody>
</table>

### Reflect on learning.

<table>
<thead>
<tr>
<th>Ways of working</th>
<th>Reflect on learning.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Make suggestions for improving the investigation.</td>
</tr>
<tr>
<td></td>
<td>• Reflect on entries in science journals.</td>
</tr>
</tbody>
</table>
Teaching literacy and numeracy

The Year 6 Science program will provide opportunities for students to demonstrate a range of literacy and numeracy indicators located within the organisers:

- Speaking and listening
- Reading and viewing
- Writing and designing
- Space.

The products that will enable students to demonstrate these indicators will include, but not be limited to:

- Factual texts
- Labelled diagrams
- Procedural texts
- Reports
- Science journals
- Word walls.

Specific detail about how the literacy and numeracy indicators can be demonstrated through the Year 6 Science program can be found in the unit plans.

Assessable elements

- Knowledge and understanding
- Investigating
- Communicating
- Reflecting
**Year 7**

During Year 7, the program will include the school-devised unit
- **Terrific tools and magnificent machines**
and will draw upon the following Primary Connections units.
- **Change detectives**
- **Earthquake explorers**

<table>
<thead>
<tr>
<th>Essential Learnings</th>
<th>The students will:</th>
</tr>
</thead>
</table>
| **Earth and beyond**<br>Interactions and changes in physical systems and environments can be explained and predicted.  
  - Changes to the earth occur over varying time periods and can be interpreted using geological evidence | • Explain that the Earth’s surface is composed of tectonic plates that move.  
  • Identify how tectonic plates push into each other, pull apart from each other and slide past each other.  
  • Describe the scales that are used to measure earthquake magnitude and intensity.  
  • Explain that when tectonic plates push into each other, pull apart from each other and slide past each other energy builds up as stress in the plates.  
  • Explain how the sudden release of energy causes movement of the ground, which results in damage to buildings and structures.  
  • Explain why most large earthquakes occur at the edges of tectonic plates. |
| **Natural and processed materials**<br>Properties, changes and uses of substances and mixtures are related to their particular composition.  
  - Properties of a material will vary according to the type and quantity of components that make up its structure  
  - Chemical change produces new substances that have properties different from those of the original substances  
  - Physical change produces no new substances | • Explain that changes of state involve physical changes.  
  • Explain that physical changes do not produce new substances.  
  • Explain that chemical changes produce new substances and consume the original substances.  
  • Identify physical and chemical changes.  
  • Identify reversible and irreversible changes.  
  • Explain that physical changes involve changes in the movement and spacing of particles of a substance.  
  • Explain that substances produced by chemical changes have different properties from those used in the reaction. |
| **Science as a human endeavour**<br>Science impacts on people, their environment and their communities.  
  - Scientific knowledge has been accumulated and refined over time, and can be used to change the way people live  
  - Scientific knowledge can help to make natural, social and built environments sustainable, at a scale ranging from local to global  
  - Different cultures, including those of Aboriginal people and Torres Strait Islander people, have contributed to science and scientific practice | • Identify individuals and groups responsible for significant scientific breakthroughs.  
  • Develop plans to improve the sustainability of local environments.  
  • Propose means that could be used to predict, and protect against, natural disasters.  
  • Compare explanations for earthquakes proposed by a range of cultures through history. |
<table>
<thead>
<tr>
<th>Essential Learnings</th>
<th>The students will:</th>
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| **Planning and conducting investigations.** | • Use a physical model to represent, investigate and describe how to measure the magnitude of earthquakes.  
• Formulate a question for investigation and make a prediction.  
• Plan investigations showing an awareness of the need for fair testing.  
• Plan investigations involving a control, and repeat trials or replicates.  
• Make and record observations, and identify patterns in results.  
• Record results as a table and plot results as a column graph.  
• Plot results from an investigation as a line graph. |
| **Drawing conclusions that are supported by evidence.** | • Analyse and compare data of earthquake magnitude for Australia and neighbouring countries to investigate patterns in data.  
• Use secondary data to represent, investigate and describe the movement of the Earth’s tectonic plates.  
• Draw evidence-based conclusions about the location of large earthquakes at the edges of tectonic plates.  
• Analyse and explain patterns in results from an investigation. |
| **Communicate scientific ideas, data and findings** | • Participate in discussions and use talk to: inquire, report on observations, clarify understanding and reflect on experience.  
• Manipulate ideas and share understanding through the use of:  
  - cutaway diagrams (optional)  
  - drawings  
  - factual recounts  
  - factual texts  
  - glossaries  
  - graphs  
  - oral presentations  
  - procedural texts  
  - reports  
  - role-plays  
  - science journals  
  - storyboards  
  - summaries  
  - tables  
  - timelines  
  - TWLH charts  
  - Venn diagrams  
  - word walls |
| **Reflect on learning.** | • Make suggestions for improving the investigation.  
• Explain the importance of classification for identifying differences and similarities between things.  
• Reflect on science journal entries. |
Teaching literacy and numeracy

The Year 7 Science program will provide opportunities for students to demonstrate a range of literacy and numeracy indicators located within the organisers:

- Speaking and listening
- Reading and viewing
- Writing and designing
- Measurement.

The products that will enable students to demonstrate these indicators will include, but not be limited to:

- Factual texts
- Oral presentations
- Procedural texts
- Reports
- Science journals
- Word walls.

Specific detail about how the literacy and numeracy indicators can be demonstrated through the Year 7 Science program can be found in the unit plans.

Assessable elements

- Knowledge and understanding
- Investigating
- Communicating
- Reflecting
Assessment

Assessment at Brookstead State School is based upon the principle that to be effective it:

- focuses on students’ demonstrations of learning
- is representative, valid and reliable
- develops students’ capacities to monitor their own progress
- reflects current knowledge of child and adolescent development
- is an integral part of the learning process
- reflects social justice principles.

Each PrimaryConnections unit identifies a number of learning activities that can be used to gather information about the nature and the extent of student learning. As these activities form an integral part of the teaching and learning sequence, the alignment of the assessment with the curriculum expectations should be ensured. The assessment task should also be recognised by the learners as being both relevant and worthwhile.

The identified assessment tasks provide opportunities for students to demonstrate both Knowledge and understanding and the Ways of working. Both of these components must be incorporated into the assessment program for it to provide a valid measure of the valued student learning. The Assessable elements and the descriptors of quality are used to link the Essential Learnings and Standards and assist teachers to make judgments about student achievement.

Learners need the opportunity to develop new skills, practice them, make errors and be corrected before we make judgments on their performance. Each student’s science journal and other products will document that journey as the basis for regular feedback and explicit intervention where necessary. The teaching teams at each year level will meet regularly to identify the subset of possible assessment tasks on which reported judgments will be based for that year.

Attention must be paid to the fact that the published PrimaryConnections units are prepared for use in all states and so are generic. To meet the expectations of Brookstead State School assessment policy, each task must be examined for its capacity to provide evidence of achievement on one or more of the Assessable elements. The Essential Learnings support documents developed by the Teaching and Learning Branch make explicit the link between each lesson and the QCAR requirements. Refer to these in planning your overall assessment schedule.

Although doing good science demands careful attention to literacy (and numeracy) there are important aspects of science learning that can be assessed through products other than written texts. Be aware of opportunities to have the children show what they have learned through a variety of modes appropriate to the subject matter and the context. Models, posters, oral presentations or role-plays can all play a part in science assessment (provided their contribution to the Assessable elements is well understood).

Science progresses as much through collaboration as through individual effort. Student learning of science is no different. The assessment program should acknowledge the part played by group and collaborative work in teaching and learning. Reflection on how an investigation or an explanation might be improved (for example) is almost always more effective when shared. The person who may not be able to analyse the fault, can build on the contribution of another by suggesting a very creative solution. When using this type of evidence, teachers need to be clear (and to make explicit to the students) how the contribution of individuals will be recognised and rewarded.

At this stage in the development of our newly established science program, the school does not have a bank of student responses to science tasks that can be used to exemplify task-specific standards. Until we compile such a collection, teachers working to ensure consistency of judgment will need another evidence base. The Science Committee recommends that each teacher write a “typical” student response to each task selected and then together analyse them against the nominated assessable elements and the broad standards descriptors.
Examples of appropriate year-level standards in science from beyond our school can be obtained from the QSA Assessment Bank (at https://qcar.qsa.qld.edu.au/assessmentbank/html/index.html) and the SEAR project (at http://cms.curriculum.edu.au/sear/). A number of tasks from those sites have been downloaded and are available on the school intranet.