Preliminary Science

TEACHING & LEARNING SUPPLEMENT

INDEPENDENT SCHOOLS TASMANIA

TASMANIAN CATHOLIC education office

Tasmanian Government

Preliminary Science
Teaching and Learning Supplement

TABLE OF CONTENTS

Version 1.0 – 9/01/2019

ADVICE TO TEACHERS

This document helps to describe the nature and sequence of teaching and learning necessary for students to demonstrate achievement of course outcomes.

It suggests appropriate learning activities to enable students to develop the knowledge and skills identified in the course outcome statements.

Tasks should provide a variety and the mix of tasks should reflect the fact that different types of tasks suit different knowledge and skills, and different learning styles. Tasks do not have to be lengthy to make a decision about student demonstration of achievement of an outcome.

COURSE SPECIFIC ADVICE

This Teaching and Learning Supplement for Preliminary Science, Preliminary to Level 1 must be read in conjunction with the Preliminary Science, Preliminary to Level 1 course document. It contains advice to assist teachers delivering the course and can be modified as required. This Teaching and Learning Supplement is designed to support teachers new to, or returning to, teaching this course.

SEQUENCE OF CONTENT

Preliminary Science, Preliminary to Level 1, as with all *Australian Curriculum: Science* courses, is based around three interrelated Stands: Science as a Human Endeavour, Science Understanding and Science Inquiry Skills. The intention of the course is that these strands, and their sub-strands, reflect the world and can be delivered in any combination depending on context. For the purposes of organisation, this Supplement organises teaching and learning strategies by the sub-strands of Science Understanding: Biological sciences, Chemical sciences, Earth and Space sciences and Physical sciences with examples related to the other two strands. However, most activities lend themselves to more than one of these. This supplement contains illustrative tasks to exemplify how all aspects of the course can be delivered.

Course Delivery

It is recommended that learners have an opportunity to participate in a broad range of real-world activities that meet the requirements of this course. Sequence of delivery is dependent on teacher choice in additional to seasonal and other external constraints.

TEACHING AND LEARNING

Biological Sciences

EXAMPLES OF A LEARNING ACTIVITY

With co-active assistance, learners explore their own senses and the senses of other living things:

Stage 1 – Learners:

- Are exposed to and given the opportunity to react to a range of safe sensory experiences, such as:
  - » light – bright, dim, flashing, different colours
  - » sound – animals, machinery, birds, people, music
  - » smell – what can we smell in different places – inside and out
  - » taste – a range of different tastes
  - » touch – texture, warm, cold, tickle, hard, soft
  - » other – movement, balance.
- Interact with other living things and respond to how they react to different sensory experiences, for example:
  - » plants that change to the touch
  - » insects that avoid light
  - » dogs that like to be patted
  - » how do rats react to music?
  - » watching animals with their food.

Stage 2 – Learners:

- Make a simple choice to identify their senses or the source of the sensory experience using objects, visual aids, or indicating 'yes' or 'no' when exposed to and given the opportunity to react to a range of safe sensory experiences, such as:
  - » light – bright, dim, flashing, different colours
  - » sound – animals, machinery, birds, people, music
  - » smell – what can we smell in different places – inside and out
  - » taste – a range of different tastes
  - » touch – texture, warm, cold, tickle, hard, soft.
- Observe other living things and make simple observations about how they react to different safe sensory experiences, for example:
  - » plants that change to the touch
  - » insects that avoid light
  - » dogs that like to be patted
  - » how do rats react to music?
  - » watching animals with their food.

Stage 3 – Learners:

- Observe the sources of sensory experiences and the senses they use and records their observations one at a time using images.
- Observe and label, one at a time, the responses of living things to safe sensory experiences using images and/or pictures.

Stage 4 – Learners:

- Observe the sources of sensory experiences and the senses they use and record their observations using images and/or words.
- Observe and label the responses of living things to safe sensory experiences using images and/or pictures.

EXAMPLE OF A SCIENCE AS A HUMAN ENDEAVOUR LEARNING ACTIVITY

With co-active assistance, learners sow seeds and observe them grow:

Stage 1 – Learners:

- Direct their attention towards the sowing process and what equipment is needed.
- Have the opportunity to choose (accept or reject) a preferred seedling and place to plant it.
- Direct their attention towards their chosen plant and how it is changing.

Stage 2 – Learners:

- Explore, observe and tend to the plants as they grow.
- Use tools and equipment to help them provide for the needs of the plants.

Stage 3 – Learners:

- Observe and label individual changes in the plants as they grow.
- Name tools and equipment being used and their uses.

Stage 4 – Learners:

- Observe and label the life-cycle of a plant such as a bean.
- Choose an appropriate garden tool and use it correctly for a particular task.

EXAMPLE OF A SCIENCE INQUIRY SKILLS LEARNING ACTIVITY

With co-active assistance, learners explore and categorise living and non-living things

Stage 1 – Learners:

- Engage with and react to a range of non-living and living things.
- Are given the opportunity to accept or reject a range of non-living and living things and demonstrate a preference to experience further.

Stage 2 – Learners:

- Engage with and explore a range of non-living and living things.
- Are given the opportunity categorise these as living or non-living when asked yes/no questions.

Stage 3 – Learners:

- Engage with and explore a range of non-living and living things identifying how they decide whether something is living or non-living.
- Attempt to organise what they have explored into living and non-living things.

Stage 4 – Learners:

- Engage with and explore a range of non-living and living things, asking questions relating to how they know whether something is living or non-living.
- Categorise the items they have explored and some others from the world around them into living and non-living things.

Chemical sciences

EXAMPLES OF A LEARNING ACTIVITY:

With co-active assistance, learners mix, separate and react substances:

Stage 1 – Learners:

- Experience how the properties of everyday substances around them can change, for example:
  - » mixing – salt into water, cornflour and water, sand and water
  - » separating – juice from an orange, sand from water, salt from water by leaving the mixture in the sun
  - » reacting – vinegar and bicarbonate of soda, wet popping candy, wet sherbet.
- Identify which of these they would like to see again, for example, by seeking, reaching or directing attention towards the preferred activity.

Stage 2 – Learners:

- Explore how the properties of everyday substances around them can change by, for example:
  - » mixing – salt into water, flour and water, sand and water
  - » separating – juice from an orange, sand from water, salt from water by leaving the mixture in the sun
  - » reacting – vinegar and bicarbonate of soda, wet popping candy, wet sherbet.
- Identify which of these they would like to do again and make one change to the process to see what happens.

Stage 3 – Learners:

- Explore and label the properties of everyday substances as they change when mixed, separated or reacted.
- Experiment with a mixture, separation or reaction and observe what they find.

Stage 4 – Learners:

- Investigate mixtures, separation and reactions to categorise them into groups of properties such as solid/liquid.
- Complete their own experiment with mixtures, separation or reactions and communicate what they find.

EXAMPLE OF A SCIENCE AS A HUMAN ENDEAVOUR LEARNING ACTIVITY

With co-active assistance, learners explore and use tools in the garden:

Stage 1 – Learners:

- Direct their attention towards tools and equipment in the garden and how they are used.
- Explore and accept or reject tools; experiencing the properties of the accepted tool further.

Stage 2 – Learners:

- Explore the similarities and differences between tools in the garden.
- Given the properties of a tool identify whether it can be used for a task.

Stage 3 – Learners:

- Identify the similarities and differences between tools in the garden.
- Identify the properties of a tool that mean it can be used for a task.

Stage 4 – Learners:

- Organise tools into two groups by how they are used eg digging/cutting, watering/carrying.
- Link the properties of tools with their uses to makes choices.

EXAMPLE OF A SCIENCE INQUIRY SKILLS LEARNING ACTIVITY

With co-active assistance, learners explore how substances change with temperature and whether they can be changed back:

Stage 1 – Learners:

- Engage with and react to a range of substances being heated or cooled:
  - » heated – ice, wax, butter, egg white, ice-cream
  - » cooled – olive oil, water, molten wax, cooked egg, melted ice-cream.
- Are given the opportunity to accept or reject these to demonstrate a preference to explore further.

Stage 2 – Learners:

- Engage with and react to a range of substances being heated or cooled:
  - » heated – ice, wax, butter, egg white, ice-cream
  - » cooled – olive oil, water, molten wax, cooked egg, melted ice-cream.
- Are given the opportunity to categorise each of the changes to properties of these when asked yes/no questions.

Stage 3 – Learners:

- Engage with and explore a range of substances when they are heated and cooled to make observations about the effect of changes to temperature on the properties of each substance.
- Attempt to organise the changes to properties of each substance into two categories.

Stage 4 – Learners:

- Engage with and explore a range of substances when they are heated and cooled to make observations about the effect of changes to temperature on the properties of these substances.
- Use diagrams and words to help explain their observations of changes to temperature and properties of the substances.

Earth and space sciences

EXAMPLES OF A LEARNING ACTIVITY:

With co-active assistance, learners make observations and choices in relation to the weather:

Stage 1 – Learners:

- React to weather and how it changes in a variety of settings with attention directed to clothing choices.
- Direct their attention to changes in their routine due to changes in weather by responding to regular activities associated with different times of the day.

Stage 2 – Learners:

- Answer 'yes' or 'no' response to questions related to changes in the weather eg 'Is the weather today different from yesterday?' 'Do you think the weather will change after lunch?'
- Identify activities related to 'hot' or 'cold' weather by answering with a 'yes' or 'no' response.

Stage 3 – Learners:

- Respond to questions related to the weather eg 'Do you think it will rain?' 'Do you feel hot? 'Is it snowing?'
- Identify and sort pictures and objects into 'hot' and 'cold' weather activities.

Stage 4 – Learners:

- Use images of different clothes to put together a 'summer' and a 'winter' outfit.
- Link the time of day with routine events and objects using diagrams and words.

EXAMPLE OF A SCIENCE AS A HUMAN ENDEAVOUR LEARNING ACTIVITY

With co-active assistance, learners reflect on the differences in their lives between day and night:

Stage 1 – Learners:

- Respond to activities associated with different times of the day, for example, eating lunch, getting dressed to go to school, packing bags to go home.
- Direct their attention to different routines they have and things they use during the day and night.

Stage 2 – Learners:

- Identify the characteristics of day and night, for example, morning, evening, sun, moon, stars, sunrise, sunset.
- Identify different things they do and use related to day and night.

Stage 3 – Learners:

- Identify and name the characteristics of day and night and how they change, for example, morning, evening, sun, moon, stars, sunrise, sunset.
- Use tools and equipment (eg. telescope, thermometer, light meter) to explore the differences between day and night.

Stage 4 – Learners:

- Explore and observe the characteristics of day and night and how they change, for example, morning, evening, sun, moon, stars, sunrise, sunset.
- Explore with tools and equipment to make observations about changes related to night and day.

EXAMPLE OF A SCIENCE INQUIRY SKILLS LEARNING ACTIVITY

With co-active assistance, learners observe changes to their environment related to the seasons:

Stage 1 – Learners:

- Engage with and react to a range of objects and living things in their environment that change in response to the seasons.
- Are given the opportunity to accept or reject these to further experience some of these living things or objects.

Stage 2 – Learners:

- Engage with and explore a range of objects and living things in their environment that change in response to the seasons.
- Are given the opportunity categorise each of these as living or non-living when asked yes/no questions.

Stage 3 – Learners:

- Engage with and explore a range of objects and living things in their environment that change in response to the seasons.
- Attempt to organise what they have explored into categories.

Stage 4 – Learners:

- Engage with and explore a range of objects and living things in their environment that change in response to the seasons and ask questions about them in relation to these changes.
- Categorise what they have explored and observed to construct a seasonal cycle using diagrams and words.

Physical sciences

EXAMPLES OF A LEARNING ACTIVITY:

With co-active assistance, learners explore what are the different ways we move and how we do it:

Stage 1 – Learners:

- React to force by moving themselves (or being moved), causing movement, or watching others move or cause movement.
- Direct their attention to movement to accept or reject each one and experience further the ones they accepted.

Stage 2 – Learners:

- Identify the effects that simple physical actions have on their place in space.
- Identify how we use strategies and machines to move around: in the classroom, in the grounds, in the water, and around the community.

Stage 3 – Learners:

- Explore and communicate the effects that simple movements have on their place in space.
- Observe the strategies and machines we use to move around: in the classroom, in the grounds, in the water, and around the community using words that describe simple forces applied (eg 'fast', 'slow', 'push', 'pull').

Stage 4 – Learners:

- Investigate and communicate the effects that simple movements have on their place in space.
- Investigate and compare the strategies and machines we use to move around: in the classroom, in the grounds, in the water and around the community.

EXAMPLE OF A SCIENCE AS A HUMAN ENDEAVOUR LEARNING ACTIVITY

With co-active assistance, learners explore the different shapes of kitchen equipment and what they can do:

Stage 1 – Learners:

- Direct their attention to different shapes and how they move and then again with kitchen equipment.
- Explore and accept or reject equipment, experiencing the properties of the accepted tool further.

Stage 2 – Learners:

- Identify the effects of using different kitchen items to complete a task to make a preferred choice of tool.
- Identify the different ways kitchen items can change the shape of scone dough (eg, rolling pin, cutters, knives, fingers, fists, sieves).

Stage 3 – Learners:

- Explore using a range of kitchen items to communicate which piece of equipment they would use for a task.
- Explore and observe how different kitchen items can be used to make food a desired shape.

Stage 4 – Learners:

- Investigate and relate how the shape of a piece of equipment affects how well suited it is for a task in the kitchen.
- Communicate, step by step, how to make an apple pie (filling might be pre-made) referring to a piece of appropriate equipment for each step.

EXAMPLE OF A SCIENCE INQUIRY SKILLS LEARNING ACTIVITY

With co-active assistance, learners explore the best ways to stack everyday items:

Stage 1 – Learners:

- Engage with and react to a range of everyday objects that can be stacked.
- Are given the opportunity to accept or reject these to see how high the accepted objects can be stacked before falling down.

Stage 2 – Learners:

- Engage with and explore a range of everyday objects and choose one type to try and stack.
- Stack chosen objects as high as possible until the stack collapses.

Stage 3 – Learners:

- Engage with and explore a range of everyday objects and choose the best ones to try and stack.
- Stack these in as many different ways as they can think of and choose which stacking method is best.

Stage 4 – Learners:

- Engage with and explore a range of everyday objects and choose the best ones to try and stack; giving a reason for their choice.
- Experiment to construct the highest stack they can and communicate instructions using images and words so others can repeat their steps.

SUPPORTING STUDENT RESPONSES AND ELABORATIONS

Knowing your students – Key messages

Learning is a social collaborative undertaking that happens in a classroom community.

Developing positive and respectful relationships forms the basis for building strong classroom communities. An integral part of building those relationships lies in getting to know the backgrounds, talents, needs and aspirations of your students.

This can include an undertaking to:

- Find out their strengths, what they are passionate about and their goals.
- Know about their cultural and language background.
- Know about social disadvantage or trauma that may be part of their background.
- Understand their needs; including medical, personal, physical, communication, sensory and learning needs.
- Create opportunities for students to get to know one another and appreciate the diverse qualities they bring to the classroom.
- Model and teach about wellbeing, mutual support and respectful interactions.
- Find out where students are up to in their learning with respect to the curriculum.

Getting to know students with disability

Sometimes getting to know students with disability or complex health needs may seem a little daunting; however, getting to know the student as an individual, as well as their health and care needs, is key to personalising their learning programs. Start with the student and seek information from them in terms of their aspirations, support needs and details on what has worked well for them in the past. If the student is unable to convey this information, then the student's family are a key point of contact.

Note too that information such as existing Individual Education Plans, professional reports and anecdotal summaries may be stored in the Student Support System, providing a good outline of strengths, interests and needs. Check with the support staff in your school to help develop an up-to-date and complete picture of the student that can readily inform their teaching and learning programs.

Keep in mind that students with disability are heterogeneous, and expressions of any disability are likely to be different in any two students. Some students will not have an identified name for their disability other than 'global' or 'developmental' delay. Some students will have multiple disabilities.

What are the best sources of information?

If the student is not able to convey their needs, strengths and interests, the student's family will have a wealth of knowledge about their child and the disability. They can often direct you to good sources of information. Some schools use parents and their contacts to inform staff, and in some situations the student body about the disability.

Pre-assessment

As well as knowing who their students are as learners, it is important that teachers know where they are up to in their learning. This allows learning experiences to be planned so that they are challenging, without being so difficult that students feel overwhelmed.

Pre-assessment is formative assessment done with students before any teaching occurs. It is used to inform planning and to differentiate according to students' current level of understanding.

Thus, pre-assessment strategies and techniques allow teachers to gain insight into the background knowledge and skills that students already have relating to a topic before they teach it.

Carefully designed pre-assessment can ascertain students' current level of achievement and identify any gaps in essential knowledge or misunderstanding that they might have.

This information is used by the teacher to inform decisions about:

- where to begin the teaching and learning
- who needs revision and how much
- who needs scaffolding or teaching for missing essential skills
- the pace of learning
- who has already achieved significant aspects of the topic and requires extension/enrichment
- how groupings of students might be formed for the topic

The first step in planning for learning is to have an understanding of the curriculum scope and sequence for the learning area and the expected learning outcomes.

Identifying goals for learning

To support students to achieve greater learning independence, we need to communicate to them:

- what they are going to learn - learning intentions
- why they should learn it in the first place - reasons for learning
- how they will recognise when they have succeeded - success criteria

Pre-assessment techniques

There is an enormous range of both formal and informal pre-assessment techniques and tools available for teachers to use. The pre-assessment technique or tool a teacher selects will vary depending on:

- the nature of the content to be taught
- whether they need individual, small group or whole group information
- the time available and relative efficiency of different techniques.

Making adjustments to teaching

Using the information collected from pre-assessment tasks will include looking for common, powerful differences in student responses with respect to their current knowledge and skills, interests or preferred way of learning.

This information can be used as the basis for flexible groupings of students and to inform the design of the tasks that different groups engage with.

Formative assessment

When designing a program of work it is important that teachers find out what students already know, understand and can do, as well as uncovering any misconceptions they have developed. This will involve using the formative assessment strategies and tools.

Knowing your students: questions for reflection

- What information can I source from the student data that informs my understanding of my students; e.g. existing learning plans, curriculum assessment reports, attendance data, specialist reports, communication with parents and wellbeing data?
- What are some creative ways I can use existing school processes to know my students better?
- How can I make time and create opportunities to get to know my students?
- Which specialists may have relevant background information about my students?
- In what ways can I communicate positively and effectively with each student's family?
- What are my students' current interests and how can I tap into them?
- What are the priority individual's and group's needs?
- What are the dominant attitudes and dispositions that significantly impact on each student's engagement or attention? How might these be improved?
- In what activities do the students achieve success?
- What information can we gather from listening to student questions and watching their actions in class?

DIFFERENTIATION STRATEGIES FOR PERSONALISING LEARNING

Overview

Differentiated classroom learning recognises that some students require significant personalisation of their learning programs to be fully engaged and challenged.

Some students will require adjustments that extend and enrich their learning. Some will require considerable support and others may require targeted support or systematic teaching to overcome barriers such as learning English as an Additional Language or Dialect (EAL/D) to enable their engagement, learning and achievement.

Adjustments include any measure or action to promote access, engagement and optimise student learning outcomes. Adjustments and/or extensions vary according to the needs of the students. They may be minor or significant. In some instances, such as students with disability, they may be designed and developed as part of a collaborative planning meeting.

Adjustments can be made to:

- content (what is to be taught)
- process (how learning will occur)
- product (evidence of student learning).

Content differentiation – Key messages

Content can be differentiated through:

- Making adjustments to the content described in course documents.
- Choosing learning resources and stimulus materials that meet a student's preferred mode of learning and stage of development.
- Using technology to locate and provide content at a range of levels and in modes that engage and support learning.

Process differentiation – Key messages

"Note that differentiation relates more to addressing students' different phases of learning from novice to capable to proficient rather than merely providing different activities to different (groups of students)." (Hattie 2009)

TEACHING STRATEGIES

Teachers who differentiate select the most appropriate strategy for a task to facilitate each student's engagement and learning. This might happen when planning a lesson, or even in response to a student's needs during a lesson.

Differentiated teaching is often referred to as 'responsive' teaching, reflecting the way in which a teacher moves from using one mode to another as required.

TASK DESIGN

Teachers also design authentic and relevant tasks for students so they can actively engage with the concepts, information and skills identified in the curriculum.

Tasks that have a number of entry points and directions lend themselves well to differentiation.

Tasks can be differentiated by pre-planning prompts, questions and supports that will enable and support learning for those students experiencing difficulty, and that increase the degree of challenge and complexity for those students who need extension.

Effective process differentiation strategies for all students include:

PEOPLE

- Developing solid partnerships that support the student.
- Taking account of and valuing learner differences.
- Drawing on prior learning and extending background knowledge. For some students it may be important to supply them with background knowledge they are missing.
- Varying learning activities to promote and support different learning styles and preferences.
- Building opportunities for students to work in teams, sharing roles and building on from their individual strengths.
- Having fun with learning.

SCAFFOLDS

- Developing language and new vocabulary.
- Supporting learning with the provision of scaffolds.
- Clearly displaying learning intentions and key concepts/skills.
- Removing unnecessary distractions.
- Providing organisational support.
- Allowing time for students to process information and ask questions.
- Providing opportunities to practise the new skill or knowledge.
- Incorporating student interests and allowing them choice in some aspects of the learning or assessment.

ENVIRONMENTAL SUPPORTS

- Including visual cues in the environment and teaching all students to use these.
- Providing clear routines for smooth transitions and structured and predictable learning experiences.
- Explicitly teaching positive behaviours and encouraging students to apply the skills they learn.
- Providing multisensory inputs, actions and expressions.
- Providing models of problem solving, verbalise the thought processes and support with guided practice.
- Using concrete models and examples of what success looks like.
- Using human resources effectively at the planning and delivery stages - thinking about peers, teacher assistants, specialist staff, and other classroom teachers.
- Engaging technology to improve access to information, processing information and demonstrations of student understandings and skills.

ONGOING ASSESSMENT

- Encouraging students to plan, monitor and evaluate their own learning by checking and testing for understanding.
- Giving feedback that is timely, specific, clear and related to the learning intentions (What worked? What's needed? What next?).
- Allowing students opportunities to put the feedback into action.
- Providing opportunities to celebrate student success, and share work and learning.

Principles and strategies of task design

Designing group tasks ensures that every student can access and learn from a rich and varied curriculum and has to think about and apply essential ideas and skills. Some tasks may need to accommodate opportunities for some students to work on their personal goals as described in their Personalised Learning Plans.

There are some general principles and strategies that can be applied to task design that include:

- Know where students are up to in their learning.
- Prerequisite knowledge and skills.
- What they understand and misunderstand.
- The degree they have mastered or surpassed expectations.
- Which teaching strategies work well for them?
- Whether they can connect key ideas to their lives and experiences.
- Identify appropriate expectations (KUD) informed by the course content and assessment criteria.
- Plan to stretch students who are most advanced and scaffold the task for students requiring additional support to work with the key ideas and skills as identified learning goals (tiered task design).
- Address diverse levels of thinking and abilities through the use of tasks that have more than one right answer or way to solve a problem.
- Draw on a variety of media - ensure that written content is accessible to everyone.

Product differentiation – Key messages

A key principle of differentiation is that it removes barriers and limitations to learning.

This must also apply when it comes to enabling students to demonstrate what they really know, understand and can do, through the products they create.

A lack of skill with a tool or genre, such as a hand written essay, can mask the true level of understanding a student has developed.

For formative assessment purposes, alternatives may need to be considered to gain accurate insight into their learning progress.

Tasks that are differentiated to take account of each student's needs, strengths and interests may result in a range of different artefacts being produced.

When designing tasks and their associated products teachers can consider:

- A common learning task may be differentiated just in the products created through the learning.
- A student's level of skill with tools used to communicate their learning needs to be taken into account.

- Technology tools can be powerful enablers for differentiating the products that result from learning tasks.
- Providing choice and flexibility in the tool used to create products of learning allows students a voice in their learning.

The learning environment can also contribute to differentiation in significant ways.

Adjustments may be made to one of these aspects of learning, or to any combination that makes sense in the context.

Not every aspect of every lesson will be differentiated. Ideally it is targeted to have the most significant impact on a student's learning.

A teacher's skill in differentiating develops with:

- Experience in applying a broad repertoire of teaching strategies in flexible ways.
- Access to a range of resources for learning.
- Capacity to manage a classroom with diverse learning activities happening simultaneously.

Assistive Technologies - An Explanation

WHAT IS MAINSTREAM TECHNOLOGY?

Mainstream technology is described as products used widely in the mainstream such as laptops running Windows or Mac operating systems, iPads and Smart phones.

WHAT IS EDUCATIONAL TECHNOLOGY?

Educational technology aims to support the attainment of student learning goals. Technology tools can be powerful enablers for students in terms of processing information and showing their understanding or skill. Some examples of educational technology include: Interactive White Boards, digital storytelling, mind mapping and web based learning programs.

WHAT IS ASSISTIVE TECHNOLOGY?

Assistive technology is a term that covers a range of technology aimed at helping students with disability participate, communicate and achieve in teaching and learning programs. Despite the word 'technology' not all assistive technology is high tech. Assistive technology ranges from simple adaptive tools, such as calculators and pencil grips, to high tech tools like speech to text software.

Assistive technology is adapted to suit the needs of the student and includes tools such as:

- e-Books with audio files that can read text or put text from a computer screen into speech
- Timers - help students develop a sense of time for tasks and prepare for activity to activity transitions
- Seat cushions to help with sensory processing and attention issues
- Calculators
- Writing supports such as a pencil grip or a computer for typing
- Graphic organisers to help students plan their writing or capture and sort the main ideas from a reading or information presentation.

High Assistive Technologies include:

Language Acquisition through Motor Planning (LAMP) device, and switch- activated toys

The starting point for planning assistive technology supports for students is a conversation with the Physical Impairment Coordinator in your Learning Services.

Complete an ICT Information Technology Assessment Profile.

Once you have had a conversation with the Physical Impairment Coordinator in your Learning Services you may need to apply for technology supports.

The SETT Framework is another tool used to identify the most effective assistive technology decisions. This framework takes you through several steps that help clarify the student's strengths and needs, the environment/s, tasks required for active participation and the system of tools needed.

Teaching Strategies

- Getting to know your students
- Integrate to differentiate
- Evidence based teaching strategies:
  - » Clear lesson goals
  - » Show and tell
  - » Questioning to check for understanding
  - » Summarise new learning in a graphic way
  - » Practise
  - » Feedback
  - » Be flexible about how long it takes to learn
  - » Collaborate
  - » Strategies not just content
  - » Nurture metacognition
- Explicit teaching is an instructional strategy used by teachers to meet the needs of their students and engage them in unambiguous, clearly articulated teaching. Teachers plan for explicit teaching to make clear connections to curriculum content through a concise focus on the gradual and progressive steps that lead to a student's development and independent application of knowledge, understanding and skills of the course content.
- Information on explicit teaching is found at https://www.teachingacenglish.edu.au/explicit-teaching/overview/explict-overview.html
- Differentiating teaching and learning requires knowledge of each student's background and experiences, interests, readiness and learning needs. Teachers use this knowledge to plan and implement curriculum, teaching strategies, learning experiences and assessments that provide multiple pathways for learning for every student. This ensures all students have equitable access to curriculum and are able to demonstrate success.
- Knowing your students is the key to differentiating teaching and learning – what they know and can do, what they need to learn next and how best to teach them and monitor their progress. Information on differentiation is found at https://www.teachingacenglish.edu.au/differentiation/overview/differentiation.html and through the Good Teaching Resources: Differentiated Classroom Practice Learning for All at https://www.teachingacenglish.edu.au/differentiation/overview/differentiation.html

RESOURCES

Science is the very human process of observing and recognising, and then exploring and sharing patterns, in order to inquire into our shared world. Everyone interacts with the world and finds sharable and verifiable patterns; hence, anything in the physical and living world can be used as a resource for this course. The resources below are intended to provide ideas and stimulus for practical activities or pause for reflection on what might be used from current practice. Most questions we have as people about our world have a range of answers from simple and subjective to complex and objective. Learners' interest and ability should guide the depth of questioning and discovery of possible explanations. Resources should always be utilised with the question in mind: is this age-appropriate?

Books

Churchill (2013), *365 Simple Science Experiments with Everyday Materials*, Black Dog & Leventhal Publishers Inc

Websites

All URLs (website addresses) cited were accessed and checked for accuracy and appropriateness of content on 7 January 2019. However, due to the transient nature of material placed on the web, their continuing accuracy cannot be guaranteed.

Aboriginal and Torres Strait Islander Histories and Cultures in Science - https://www.australiancurriculum.edu.au/media/4199/acara_a4_fa.pdf

Kitchen Garden Foundation - https://www.kitchengardenfoundation.org.au/

Easy Science Projects Using Household Items - https://www.ranker.com/list/13-easy-science-projects-you-can-do-with-household-items/kelly-hadwin

How Force, Power, Torque and Energy Work - https://auto.howstuffworks.com/auto-parts/towing/towing-capacity/information/fpte.htm

How Stuff Works - https://www.howstuffworks.com/

Kitchen Science - https://www.sciencekiddo.com/kitchen-science/ or https://www.fizzicseducation.com.au/category/150-science-experiments/kitchen-chemistry-experiments/ or Google 'Ktchen Science'

Primary Connections - https://primaryconnections.org.au/ (these can be found in Scootle)

Science Elaborations for the Aboriginal and Torres Strait Islander Cross-curriculum priority https://www.australiancurriculum.edu.au/media/4200/new-content-elaborations-for-the-australian-curriculum-science-f-10.pdf