LARRAKEYAH PRIMARY SCHOOL
Pathways to Excellence

STEAM PEDAGOGICAL

FRAMEWORK

2022

STEAM PEDAGOGICAL FRAMEWORK

STEAM education at Larrakeyah Primary School is the learning of Science, Technology, Engineering, The Arts and Mathematics in an interdisciplinary or integrated approach. Students gain and apply knowledge, deepen their understanding and develop creative and critical thinking skills within an authentic context. STEAM is taught through inquiry and project-based learning from Transition – Year 6.

STEAM AND 21ST CENTURY LEARNING RESEARCH

The Australian Government regards high-quality Science, Technology, Engineering, Arts and Mathematics (STEAM) education as critically important for current and future productivity, as well as for informed personal decision making and effective community, national and global citizenship.

An education in STEAM also fosters a range of generic and quantitative skills and ways of thinking that enable individuals to see and grasp opportunities. These capabilities—including deep knowledge of a subject, creativity, problem solving, critical thinking and communication skills—are relevant to an increasingly wide range of occupations. They will be part of the foundation of adaptive and nimble workplaces of the future (Chief Scientist, 2014).

At Larrakeyah Primary School we have a whole school focus on 4 Essential 21st Century Learning Skills: Critical Thinking, Communication, Collaboration and Creativity, (the 4Cs). The 4Cs are embedded across all subject areas and Year levels and there is a common language used across the school for consistency.

The driving force behind 21st Century learning is preparing young students to be successful in today's world. Because the world is changing so rapidly, so too are the needs of students. The skills they learn should reflect the specific demands that they will encounter in a complex, competitive, knowledge-based, technology-driven society.

STEAM IN THE NORTHERN TERRITORY

STEAM in the Territory is a commitment to aligning work across all schools to the objectives established in the National STEM Action Plan and to implementing and supporting a range of initiatives that will assist students to develop skills essential for emerging industries.

An additional focus on The Arts within the Territory allows schools to expand their students' educational experiences in the area of Science, Technology, Engineering, The Arts and Mathematics.

The Strategy is aligned to the Education NT Strategy 2018–22 Action Plan's (Department of Education, 2017) commitment of a strong public education that gives every child and student an opportunity to engage, grow and achieve.

The Strategy supports the focus areas of: community engagement, differentiated support for schools, school leadership, quality teaching and data and accountability.

The key outcome is to achieve teacher and student excellence in STEAM education. Ongoing work will include:

- Building teacher capability to strengthen STEAM education.
- Increasing student engagement in STEAM education.
- Ensuring all young people in the NT are equipped with digital and coding skills.
- Expanding enterprise education and innovation programs so students receive advice and training in emerging industries.
- Implementing professional learning opportunities for teachers and trainers in STEAM education and pedagogy.
- Developing transversal skills in young people in the NT by supporting quality STEAM education opportunities.

Goals and Outcomes

The Strategy is in alignment with the actions and goals of the National STEM School Education Strategy (Education Council, 2015), and the Education NT Strategy 2018–22 Action Plan (Department of Education, 2017).

GOAL 1
Ensure all students finish school with strong foundational knowledge in STEM and related skills.

01
Increased student STEM ability, engagement, participation and aspiration.

05
A comprehensive and strong evidence base.

GOAL 2
Ensure that students are inspired to take on more challenging STEM subjects.

02
Increased teacher capacity and STEM teaching quality.

04
Effective partnerships with tertiary education providers, business and industry.

03
Provision of STEM education opportunities within school systems.

(STEM IN THE TERRITORY STRATEGY 2018–2022)

PLANNING FOR STEAM

Teachers are required to show in their programs how they are including STEAM Education based on the relevant content in Australian Curriculum Achievement Standards and content descriptors. Teachers will plan a STEAM unit of work each Term by integrating Key Learning Areas where natural and authentic links can be drawn. The STEAM units of work will provide students the opportunity to develop the 4Cs and will include a Common Student Assessment. The school curriculum map is a key resource for planning a STEAM unit of work.

STEAM COORDINATOR

There is a STEAM coordinator at Larrakeyah Primary School. The role of the STEAM coordinator is to:

- Create a whole school Curriculum Map linking KLAs to potential STEAM units of work.
- Assist teachers in the planning of STEAM units of work including Common Assessment Tasks.
- Provide teachers with the skills and resources required to deliver effective STEAM units of work.
- Facilitate professional development with the teacher and students.
- Team teach the STEAM unit with the teacher.
- Connect teachers with industry professionals relevant to their STEAM unit of work.
- Collaborate with Specialist Teachers to include STEAM opportunities in their teaching practice.
- Collaborate with the school community to foster links and encourage authentic integration of KLA's.
- Support staff with the assessment and data collection of STEAM Education.
- Lead staff and school community in Whole School STEAM Days.

STEAM EDUCATION

Transition – Year 6 are required to plan and deliver a STEAM unit of work from the current curriculum map each Term by integrating Key Learning Areas where natural and authentic connections can be drawn. Students will be assessed on their learning of the 4Cs at the end of the unit of work through a Common Assessment Task.

STEAM learning experiences involve explicit learning and teaching of curriculum content which is applied in project, problem or inquiry-based learning situations that are authentic and contextual.

For the connections across the curriculum to be valid, teachers choose content descriptions from their program which link to the identified purpose and connecting idea and then share the information with other team members.

Teachers will decide if the STEAM unit will take the place of what is usually taught for the relevant curriculum areas or if the unit will be an addition to the KLA units of work. In subjects with a higher number of lessons each cycle, a proportion of time can be dedicated to the unit, with other outcomes covered in remaining lessons. There may also be changes to assessment and reporting for this class. Teachers are responsible for ensuring all KLAs and achievement standards from the Australian Curriculum have been covered in their regular term programs.

Teachers should use the following model when planning and delivering their STEAM unit of Work.

- Knowing their students, their needs and interests: STEAM education caters for all students.
- Evaluating current teaching and learning sequences; developing an integrated sequence for the STEAM project.

- Choosing the connecting concepts, ideas or theme and mapping to an appropriate STEAM context.
- Designing the common student task and various assessment checkpoints for students to demonstrate learning.
- Targeting curriculum outcomes: highlighting skills students will require to be successful with the project work.
- Planning assessment of the common assessment task with explicit quality criteria and success checklists including the 4cs and using Micro Credentials to assess them.
- Planning teaching and learning strategies, sequences for explicit teaching of certain skills required for the project.
- Evaluating and modifying.
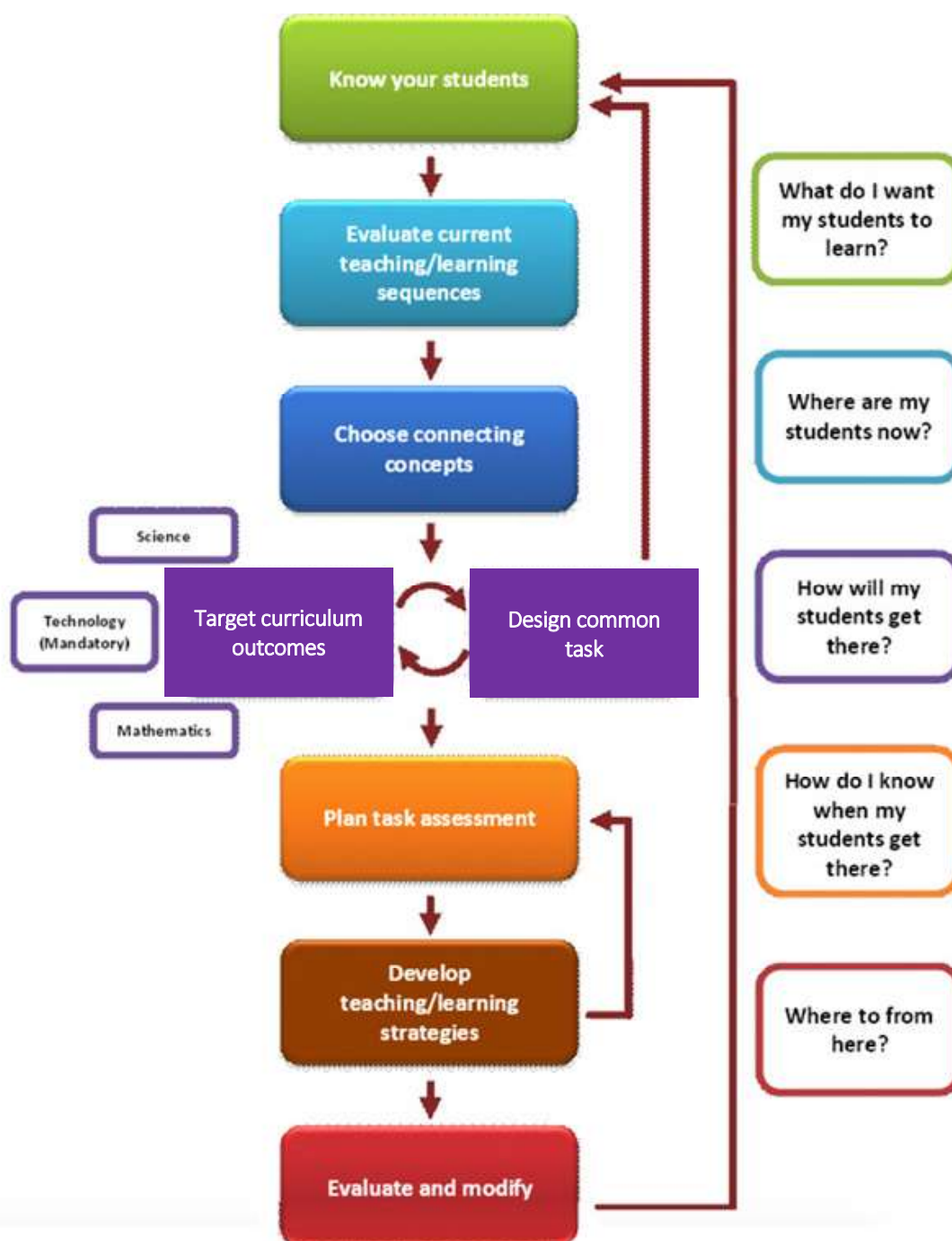
Considerations:

- Students have a voice in their learning, in regards to their project, mode of communication, findings/solution materials, investigations and strategies to be undertaken.
- Length of allocated class time needs to sustain deep thinking, investigation and an integrated approach.
- Co-creation of learning experiences and assessment tasks needs to include all stakeholders: classroom teacher, specialist teachers and students.
- Students have the opportunity to experience a variety of strategies, manipulate a variety of materials and develop skills in the use of a variety of tools and equipment.
- STEAM education is a way of thinking and doing which involves pedagogy, spaces, internal and external agencies.
- Results and/or products of project-based learning experiences need to be shared and presented to authentic audiences.
- Effective curriculum planning and programming for STEAM learning and engagement supports teachers to differentiate their practice in response to the varied ways students learn. Consideration needs to be given to learning across the curriculum and teachers having high expectations for all students.

STEAM EDUCATION ASSESSMENT

Teachers will plan formal and informal tasks within their own lessons, adhering to the principles of assessment for, and assessment of, learning. Teachers select the subject content descriptions appropriate to the unit of work and will use different strategies to assess that content, such as: journals, portfolios, reports, learning logs, in-class presentations, blogs, quizzes, mind-maps, etc.

Teachers plan what they are going to assess in the common task, and how to communicate the criteria explicitly to students. The common student task can be assessed on a broader level, with teachers choosing to assess any elements from the identified purpose.

Teachers can also assess students on the 4Cs Micro Credentials as they are crucial to all STEAM units of work.

- ☐ Communication – successfully shared skills and knowledge with their group about the problem
- ☐ Communication – communicated the group's final idea to an audience in a clear and concise manner
- ☐ Collaboration - shared skills and knowledge with their group to achieve a common goal
- ☐ Collaboration – worked in a small group to complete a role
- ☐ Creativity – independently thought outside the box and created an original idea to solve the problem
- ☐ Creativity – combined ideas with their group to create a combined idea to solve the problem
- ☐ Critical Thinking – ability to infer information from a Crime Scene to work out the problem
- ☐ Critical Thinking – came up with a variety of ideas to solve the problem, improving the design each time
- ☐ Critical Thinking – Ability to come up with a final design and evaluate its success

STEAM SPECIALIST CO TEACHING
STEAM INTEGRATION

In 2020 Larrakeyah Primary School will trial an integrated STEAM approach by using the Arts and ICT Specialist teachers as experts in their field collaborating with Classroom teachers during learning time to deliver integrated units of work guided by the 4's and Inquiry Cycle.

Since the trial ,every year we have continued with this program.

The Digital Technology Specialist teacher and The Arts Specialist teacher will collaborate with selected year levels on a combined project.

The STEAM Coordinator will initiate a meeting with all parties involved. This is after an area of learning has been identified as the focus. During this meeting, a timetable will be created as well as a brief lesson overview. Staff will collaborate together to come up with the end goal/result.

The teaching and learning of the STEAM Integration Unit of Work will begin in Term 2 Week 5 and will finish in Week 10. This is repeated in Term 4. The STEAM Pedagogical Framework, relevant scope and sequences and Australian Curriculum Achievement Standards, General Capabilities and Inquiry Questions are used to plan for the integrated unit of work and collaboration. The specialist teachers will meet with the classroom teachers to go over what they can provide for them and offer assistance in planning the integrated unit of work. Teachers will plan for an integrated unit of work.

The integrated STEAM unit of work is additional to teachers release time. This means teachers work collaboratively in a team-teaching environment throughout the project. Teachers learning from teachers.

Upon completion of the project, a showcase is held so students can share their work with the school community and celebrate their success.

STEAM RESOURCES

At Larrakeyah Primary School we have the following Makerspaces and resources that will support the STEAM Education Units of Work.

- Whole School STEAM Curriculum Map: Unmanaged Data - Teacher Public – Assessment and Curriculum - STEAM
- Makerspace - Room 11: Makerspace is ideal for hands on creation. It has an open space plan with minimal furniture designed for whole class construction and has a wet floor suitable for messy or wet STEAM activities. The room includes a selection of craft consumables for STEAM activities.
- STEAM Room: The STEAM room has modern furniture designed for a flexible learning environment and includes a SMART panel.
- STEAM Resource Room: Contains categorised STEAM resources.
- IPads: The IPads can be borrowed on the current booking system.
- VR Headsets: Stored in the STEAM Room, they can be borrowed on the current booking system.
- Little Bits: Stored in STEAM Room, they can be borrowed on the current booking system.
- Robotics: Stored in ICT Room, Bee Bots/Pro Bots/EV3 robots can be borrowed in consultation with the ICT teacher.
- Makey Makeys: Stored in ICT Room, can be borrowed in consultation with the ICT teacher.

EXAMPLES OF STEAM AT LPS

TERM 1	
Transition	**TASK**
	Students work in pairs to create a home for chicken/rabbit out of recycled and natural materials.
	21st Century Skills
	Critical Thinker – design a home that caters for a chicken/rabbits five basic needs
	Creative Learner – design a home that caters for a chicken/rabbits five basic needs. Meets the brief with sensible material choices.
	Collaborative Learner – Works in a group to create chicken/rabbits house. All members have a job.
	Communicator – Create a video explaining the things that chicken/rabbits need to survive how the house created caters for these things
	Links to Curriculum Map
	Mathematics (shapes and objects), Biological Science, Writing (Recount of design process),
	Industry Professional Links
	Bunnings, Parks and Wildlife