

A Sustainable STEM Solution

Designing and Building a Frog Bog in your school

St Raphael's
Primary School
West Preston, Victoria

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Art Credit: Liana Elia,
Yr 6 student 2019, St Raphael's Primary School



“Problem Based Learning is a process of teaching and learning that focuses on problem based, project centered activities that produce a product for a client. PBL will be based on re-engineering processes that bring people from multiple disciplines together.”

Problem Based Learning

PBL Lab Stanford University

<https://pbl.stanford.edu>



How do **WE** take responsibility and care for endangered species in **OUR** Common Home?

Problem Based Learning: The Driving Question



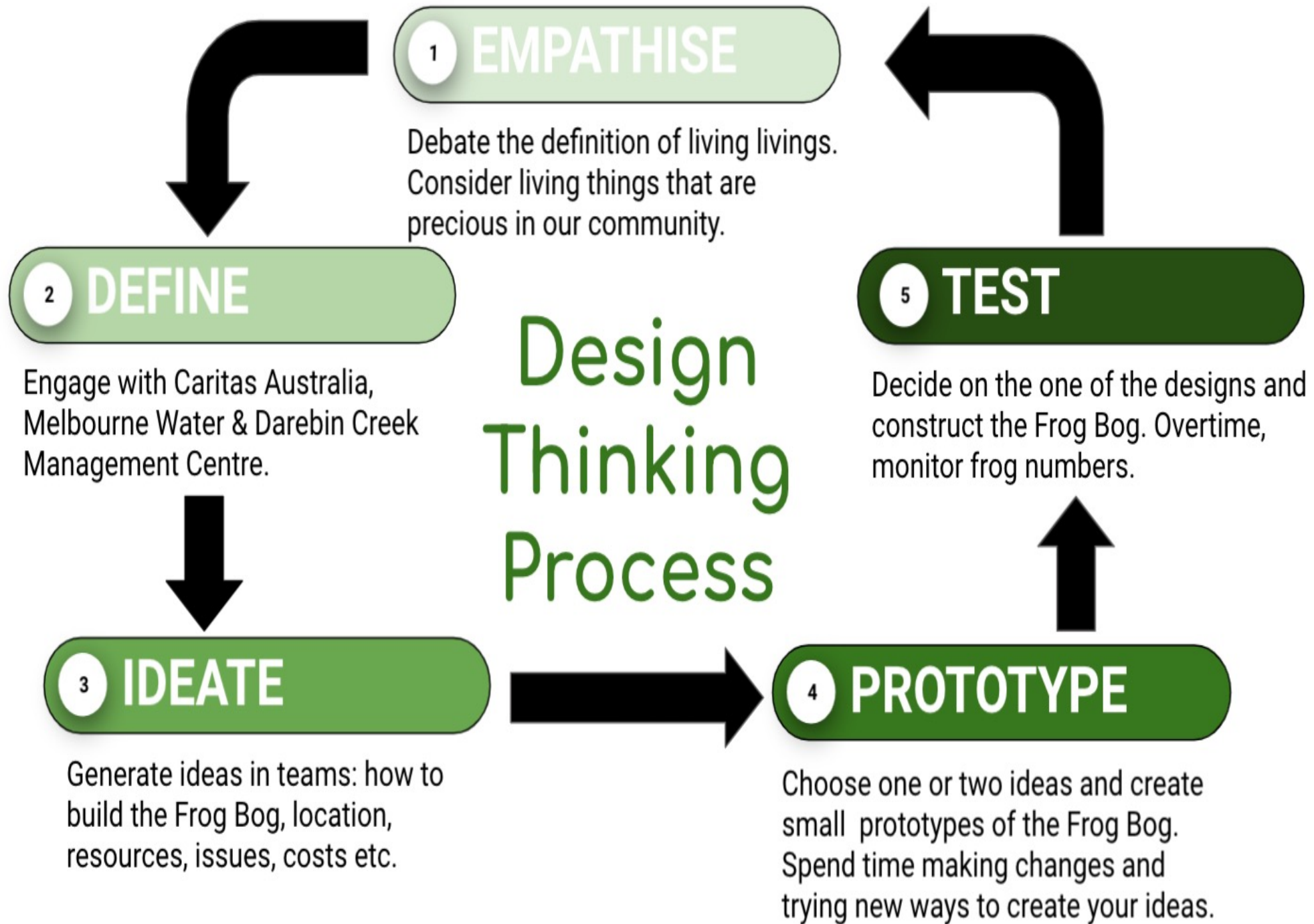


Problem Based Learning

Victorian Curriculum: Science Understanding	Victorian Curriculum: Science Inquiry Skills	Victorian Curriculum: Capabilities	Victorian Curriculum Cross-curricular Priorities	Religious Education Lens
<p>Level 5/6 Biological Sciences: Living things have structural features and adaptations that help them to survive in their environment.</p>	<p>Questioning and predicting.</p> <p>Planning and conducting.</p> <p>Recording and processing.</p> <p>Analysing and evaluating.</p> <p>Communicating.</p>	<p>Critical and creative thinking.</p> <p>Ethical</p> <p>Personal and social.</p>	<p>Sustainability</p> <p>Aboriginal and Torres Strait Islander histories and cultures.</p> <p>'Tiddalick dreamtime story'.</p>	<p>A STEM Design and Technology program to consider the costs and benefits of frogs, eco-systems and, Our Common Home with scientific, religious and Social Justice lenses (Laudato Si).</p>



The Design Thinking Process





Using Empathy Stage to engage

Move to the signed area of the room, if you agree or disagree with the following statements. Be prepared to explain your position!

Humans could survive without nature!

Every living organism is special!

Ecosystems are made up of living things!

Our Pope Francis calls us to care for Our Common Home!

Frogs are an important indicator of the health of our environment!

Habitat destruction is the greatest threat to frog populations!

A Frog Bog @ St Raphael's will benefit the local community!

Animals and plants only survive in healthy environments!



Engaging STEM Experts

- ✎✎ Student: Pet Frogs
- ✎✎ Sustainability Teacher & 5/6 HR Teachers
- ✎✎ School Maintenance staff
- ✎✎ Caritas Australia
- ✎✎ Melbourne Water
- ✎✎ La Trobe Indigenous Plant Nursery
- ✎✎ STEPS to Sustainability Conference
- ✎✎ Education Officers
- ✎✎ Darebin Creek Management Centre
- ✎✎ Merri Creek Management Centre



Additional opportunities:

- ✎ Neighbouring Primary Schools
- ✎ Family STEM presentation evening/day
- ✎ Local Council
- ✎ Student led Professional Learning: It takes a Spark STEM Conference
- ✎ Local newspaper and Television
- ✎ School Podcasts and Newsletters

Live FM Radio Broadcast



CEM STEM MAD

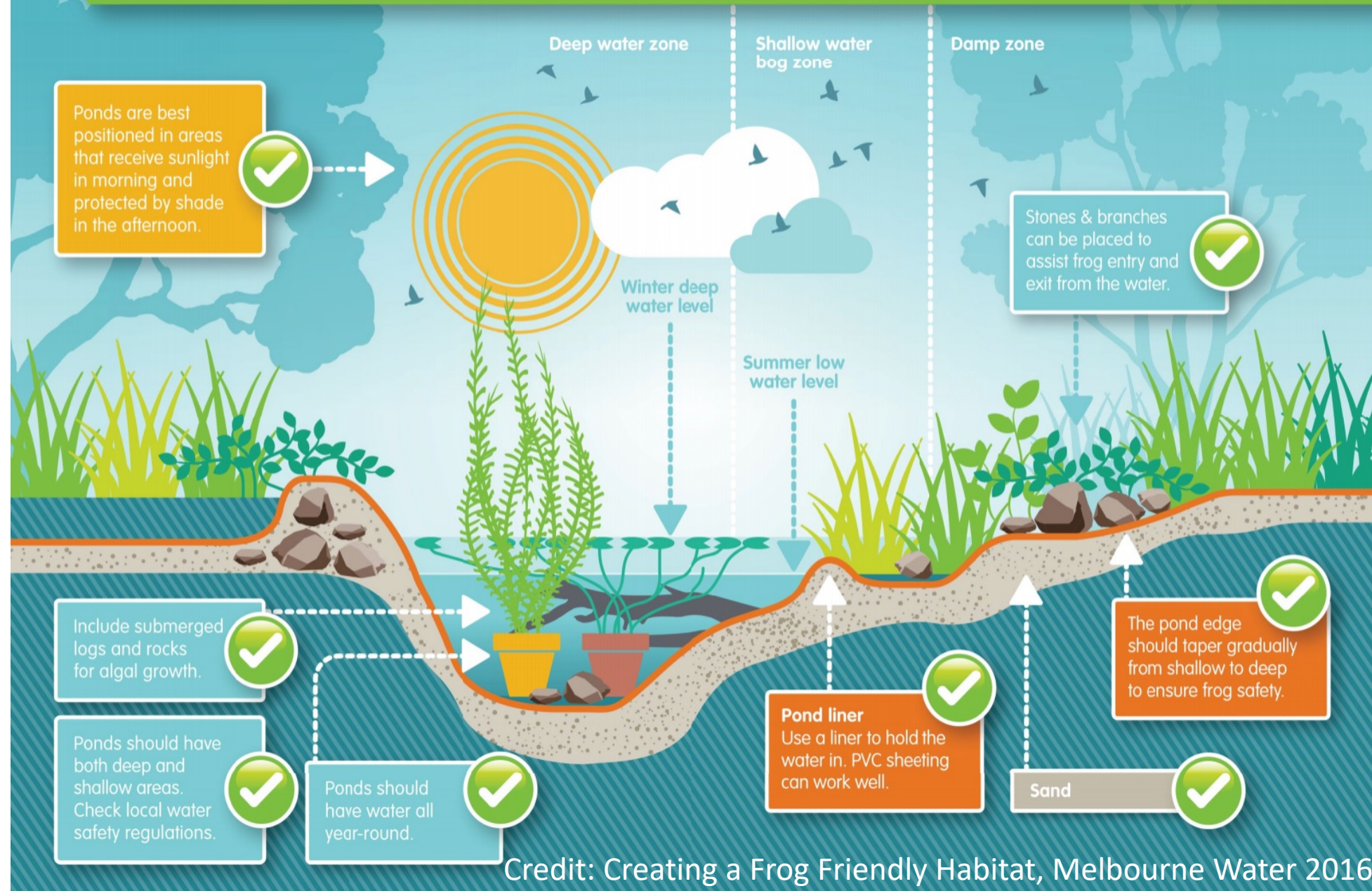


Finding an Audience



Problem Based Learning

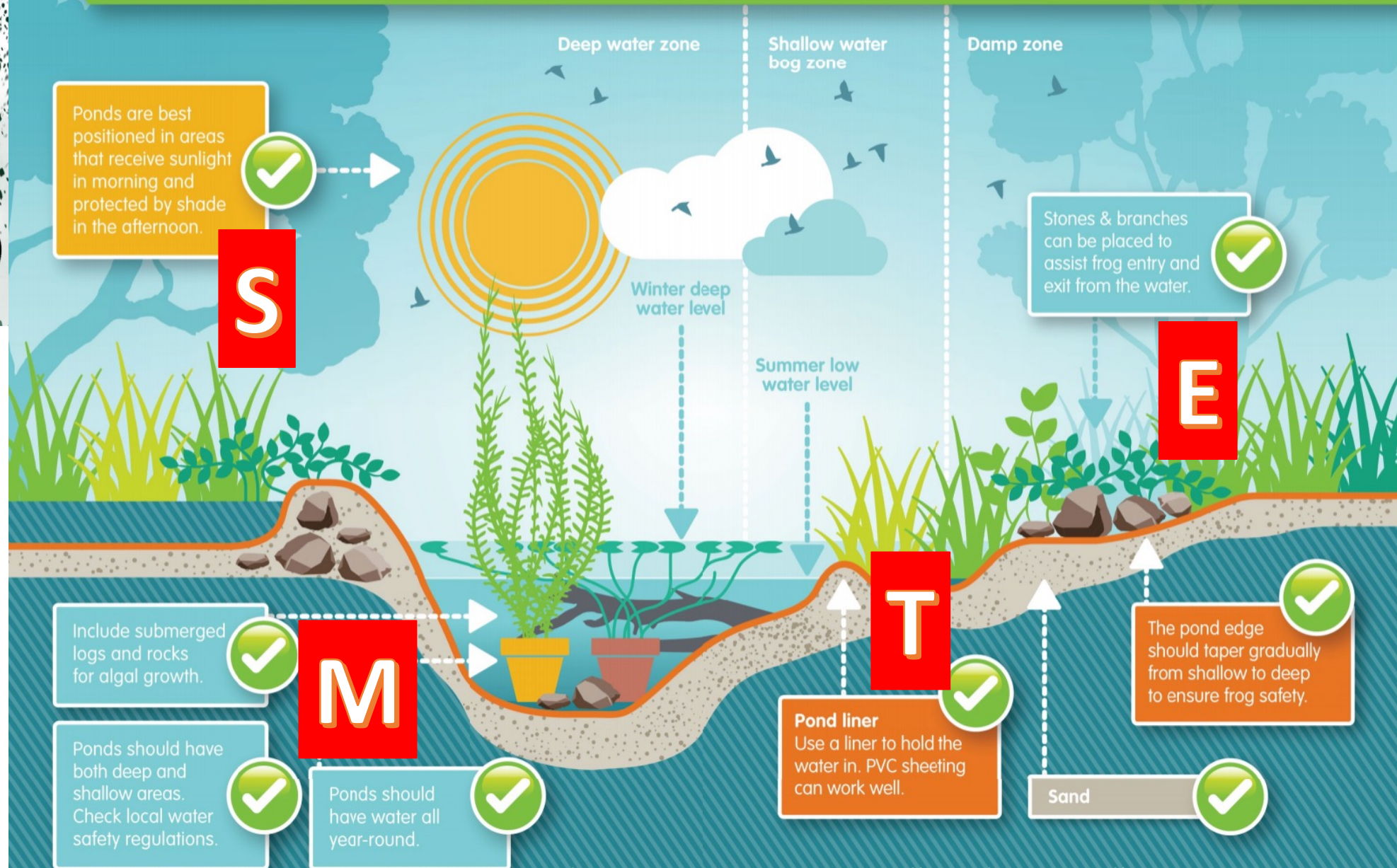
Design and construct your own frog friendly habitat





Problem Based Learning





Design and construct your own frog friendly habitat



Credit: Creating a Frog Friendly Habitat, Melbourne Water 2016



SWOT Analysis

<p style="text-align: center;">S</p> <p style="text-align: center;"></p> <p style="text-align: center;">Strengths</p>	<p style="text-align: center;">W</p> <p style="text-align: center;"></p> <p style="text-align: center;">Weaknesses</p>	<p style="text-align: center;">O</p> <p style="text-align: center;"></p> <p style="text-align: center;">Opportunities</p>	<p style="text-align: center;">T</p> <p style="text-align: center;"></p> <p style="text-align: center;">Threats</p>
<p>Student engagement.</p> <p>Cross-curricula opportunities.</p> <p>Authentic hands-on STEM learning.</p> <p>Empower students.</p> <p>Encourage STEM.</p> <p>Beyond Biological sciences.</p>	<p>Space limitations.</p> <p>Time limitations: Planning & Building.</p> <p>Lack of teacher confidence.</p> <p>Expense (\$1000.00).</p> <p>Need to be well resourced: gardening supplies.</p>	<p>Awareness raising: World Wetland Day. International Frog Day.</p> <p>Water Bug Investigation.</p> <p>Increase biodiversity in the school (Resource Smart Schools).</p> <p>Teacher & student collaboration</p> <p>Girls in STEM</p>	<p>Safety concerns: Pre, during and post build.</p> <p>A crowded curriculum.</p> <p>A forgotten project.</p> <p>Equal opportunities for students.</p>

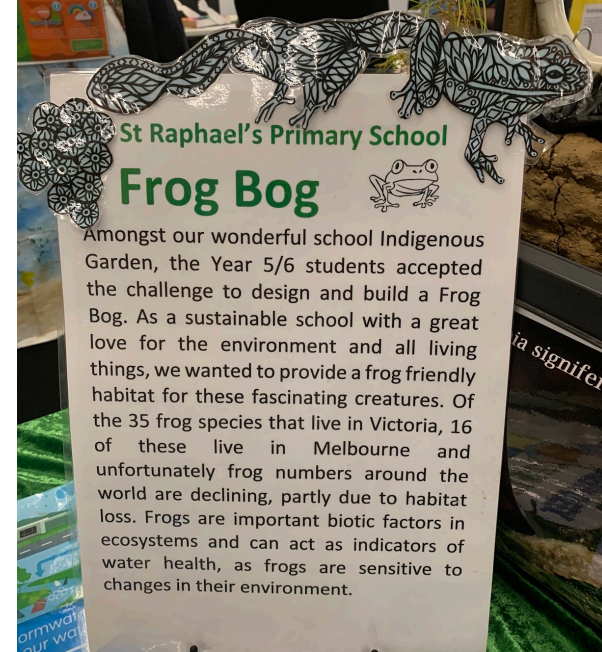


Our Frog Bog Journey



Best Engineered Product,
Primary and Secondary Category
Swinburne University, School of Engineering

Prize: Full day STEM immersion
with Felicity Furey,
Swinburne University, Hawthorn VICTORIA



Winners
STEM MAD
Showcase
2019





**Our Frog
Bog is
thriving!**



St Raphael's PS Frog Bog
Late 2019



St Raphael's PS Frog Bog
Early 2021