



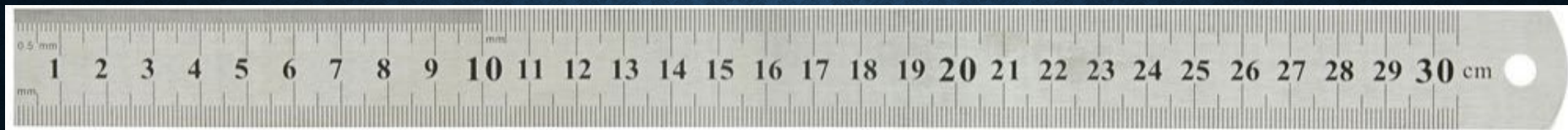
STEM

Challenges



Acknowledgement Of Country

Period of time Aboriginals have inhabited Australia



Time since Europeans arrived



About Me

- STEM (Design and Technology) teacher
- 5 years of experience teaching STE(A)M
- Teach at Northern Bay College, Geelong



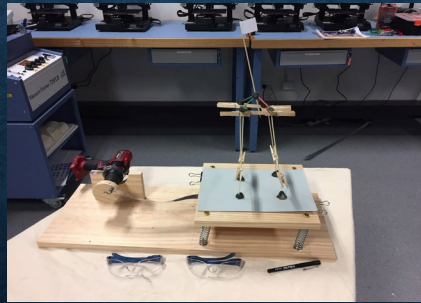
Workshop Outline

- What a STEM Challenge is & when to do one
- Structure of a STEM Challenge
- My favourite STEM Challenges
- STEM Challenge materials on a budget



What is a STEM Challenge?

To access these [Click Here](#)



What is a STEM Challenge?

- Challenge/Problem solved through ‘Design Thinking’
- Incorporates elements of STE(A)M
- Provide an opportunity for Hands-On Learning
- Engages the students in their learning
- Puts those soft skills into practice

When to do a STEM Challenges

- Start or end of term STEM activity (1-2hrs)
- Year level (stepup) activity (3-4hrs)
- Scienceweek activities (3 x 1-2 hr rotations)
- Professional Practice Days (3 x 2 hr sessions)
- After school program
- Other ideas?!!! Please throw them in the CHAT!

Structure of a STEM Challenge

1. The Hook
2. Challenge Statement
3. Design Brief
4. Design Stage
5. Building/Testing Stage
6. Conclusion/Final Discussion



1. The Hook



What can
make a
good hook?

2. Challenge Statement

Create a craft, with the materials provided, that will hover in the wind tube for at least 6 seconds

2. Challenge Statement



What makes
a good
Challenge
Statement?

2. Challenge Statement (My preference)

Create a marble run to go the length of the board X

Keep the marble on the run for at least 10 seconds X

Keep the marble on the board for as long as possible X

Keep the marble moving on the board for as long as possible
(using only the materials provided) ✓



3. Design Brief

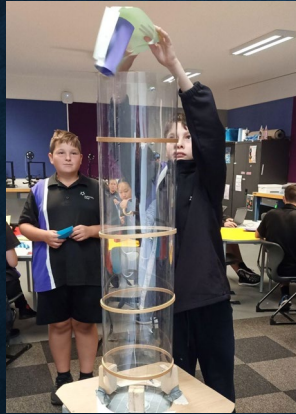
- Work in pairs
- Use supplied materials: paper, ~1 metre of tape, scissors, foil
- In first 10 min fast prototype as many designs as possible
- Test them in the wind tube, then sort them into piles of:
 - Sink
 - Stuck to the side
 - Fly

4. Design Stage



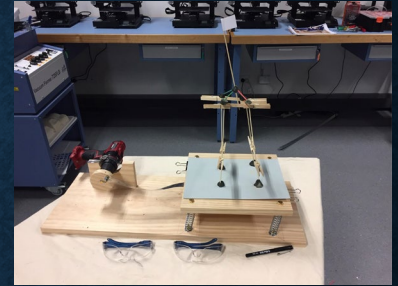
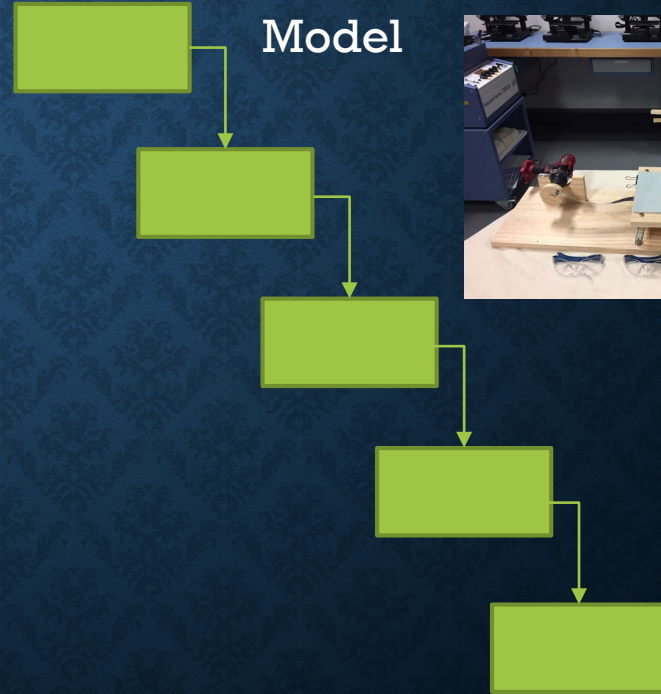
What makes
a good
design?

5. Building and Testing

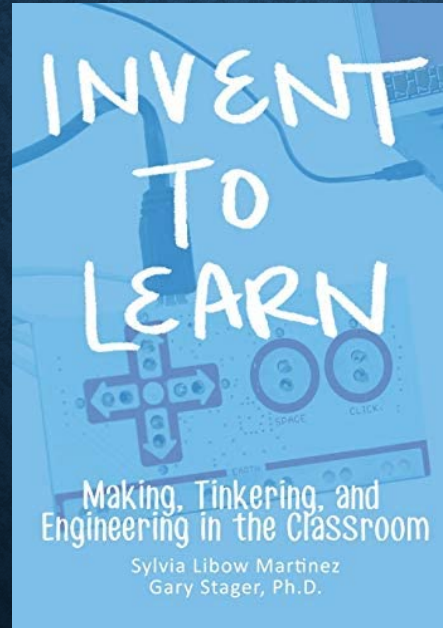


Iterative Model or Rapid Prototyping

Waterfall Model



5. Building and Testing



**Invent to Learn
Making,
Tinkering, and
Engineering in
the Classroom**

**By Sylvia Libow
Martinez & Gary
Stager**

6. Conclusion/Final Discussion

What designs worked best?

Why did these designs work so well?

How could you redesign it to hover for longer?

6. Conclusion/Final Discussion



My favourite STEM Challenges

1. Wind Tube Challenge
2. Earthquake Structure Challenge
3. Wind Resistant Structure Challenge
4. Marble Run
5. Plank Structures
6. Lego Zipline Challenge
7. Remote Learning Challenges





Australian Government
Department of Industry,
Innovation and Science



1. Wind Tube Challenge

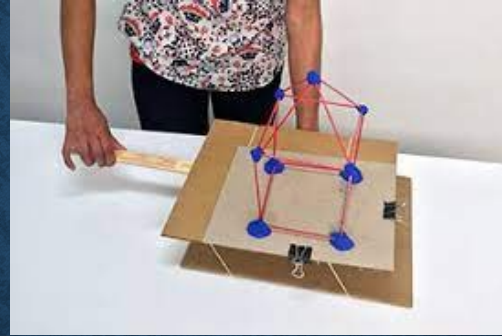
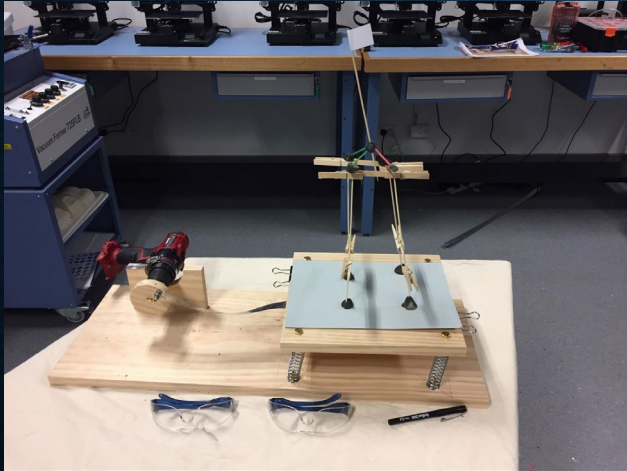


Challenge

Create a craft that can
hover in the windtube for
6 seconds

Students investigate how
the shape of a craft can
influence it's flight. They
create crafts out paper
and foil to see what will
float, fly out and fly off
course and use these
ideas to create a
structure that will hover
in the tube.

2. Earthquake Structure Challenge



Challenge
To build the tallest
Earthquake Structure

Points are scored for:

- Level of earthquake it can resist
- Height of tower
- Aesthetics

3. Wind Resistant Structure Challenge



Challenge

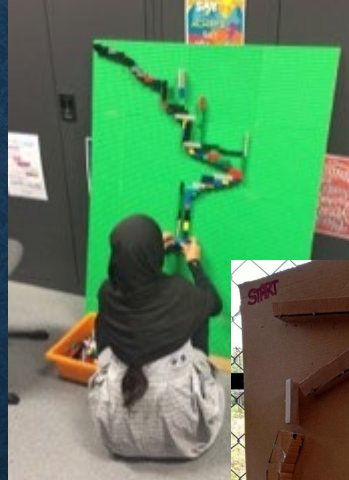
To build a structure that can withstand wind

Students to build a paper structure that can:

- Hold a washer 30cm off the ground
- Stay upright 1m away a fan

Extension: Hold more weight, go higher or closer to the fan

4. Marble Run Challenge



Challenge

To keep a marble moving on the board for as long as possible

A chance for lateral thinking. Students can have the pegboard in whatever position they like. Construct a marble run using materials such as dowel, wood, laundry hose or a lego run etc..

5. Plank Structures

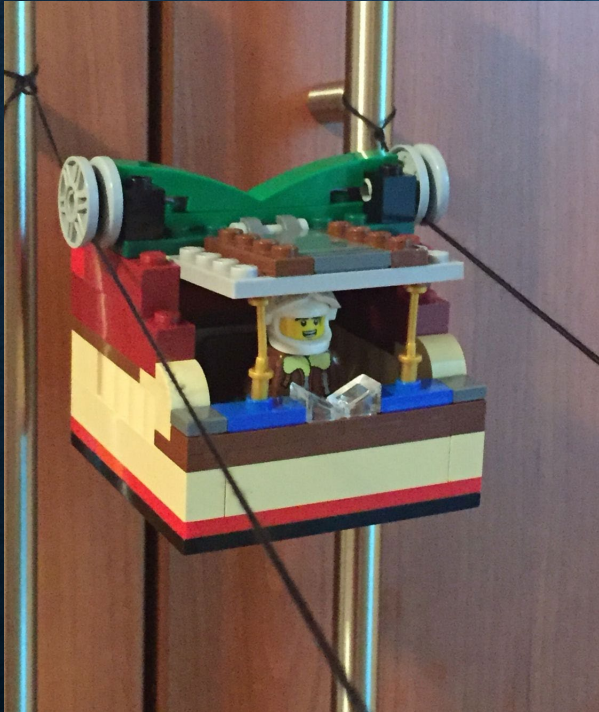


Challenge

What can you build from
1000 planks of wood!

Time to be creative!
Students are shown
examples of what you
can build with planks
and then left to make
what they want. Trust me
they won't get bored or
stop building!

6. Lego Zipline Challenge



Challenge

To create a gondola to house a lego figurine to go down a zipline.

Use lego and lego mindstorm for the gondola and clothesline cord to run down.

Students score points for:

- Safety
- Speed
- Aesthetics

7. Remote Learning Challenges



Construction Materials

Popsticks, planks, toothpicks, skewers, paper cups, pool noodles, balloons



Cheap Construction

Plain & coloured paper, newspaper, cardboard, aluminium foil



Connectors

Masking tape, elastic bands, plasticine, paper & alligator clips



Marbles

I Hope You Enjoyed This Workshop!!

You can contact me at

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