The Science Teachers Association of Tasmanian 2020 STEM Challenge for students K - 12

The theme for National Science Week 2020 is Deep Blue: innovations for the future of our oceans. This year's Challenge has been designed by the Woodbridge Marine Discovery Centre

The standardised shipping container is an important innovation that has changed the modern world. It facilitates the trade of fresh food and other goods between countries around the world, in turn raising the living standards of many societies.

But, there's a problem. Sometimes the containers can fall off the ship because of accidents, or severe weather, or poor container packing.

See www.youtube.com/watch?v=Q8r8a8_GtG0

The World Shipping Council estimates that over 1500 containers are lost at sea each year. Some containers float to shore where they can be recovered, or crack open spilling their contents into the sea, creating marine debris.

See www.youtube.com/watch?v=aXVE8OpgIzI

Some containers float just below the surface where they can be a danger to other boats. Some containers sink to the bottom of the sea where they become an artificial reef.

See www.youtube/vFxtNsUPRKE

Container loss presents us with a problem to solve or, alternatively, a research opportunity.

This year's challenge is to:

A) Choose a problem that arises from shipping containers and devise a possible solution,

or

B) choose a research opportunity that shipping container loss creates and design how you would investigate it.

The following page provide a step-by-step guide to help you through the STEM inquiry process.

NOTE: This challenge is a 'desktop' exercise. You do not have to build a working model. The challenge is to follow the STEM process and be imaginative, think and reflect!

AND let your imagination and creativity take over.

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Suggested STEM process

What is the problem you could solve, or the research opportunity that you would investigate, if you could?

Find out more.

What have other people done previously?

What are the limitations or constraints?

What is your goal or the mission of your project?

How can you solve the problem or conduct the research?

What would you do?

Tell us about your creative decision-making process.

What are some of the various ideas you considered?

Explain why you selected the approach you took and why other ideas were not chosen.

Plan a model!

This doesn't have to be a real working model, a design on paper is fine. Unless you really want to build, then great! Maybe it could be a computer aided design, or a coded animation.

If you are taking the research path, what equipment would you need? How would you conduct it? What would be your hypothesis?

Describe the engineering details; list the steps that would need to be taken and the materials needed, and how it will work.

Identify any safety issues and how you would lessen risk.

Test your model/research methodology (even if it's not real) and reflect.

Imagine your model/research was real, what tests would you conduct to see if it works?

What are the strengths and weaknesses of your plan?

What modifications/refinements could you do to improve/adjust design?

What are future possibilities?

Record your steps with notes, diagrams, and/or photographs or video.

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Judging Criteria

- ◊ Submits a report
- ◊ Identifies the problem
- ◊ Idea generation and design choice
- ◊ Model/prototype design
- ◊ Model testing process
- ◊ Effectiveness and quality of design
- ◊ Innovation and creativity
- ◊ Acknowledgements

Submit entries electronically to tsts.director@gmail.com by Friay 25 September, at 5 pm.