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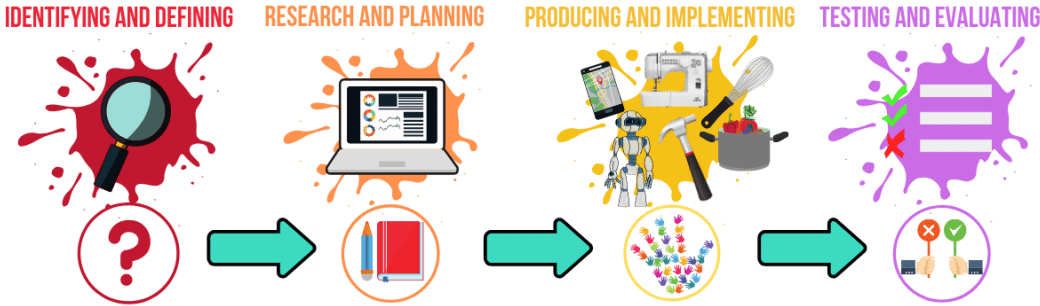
EDST4160 Design of STEM Education

Workshop1: 1st Guided Project

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Macquarie School of Education

D&P skills from S&T K-6 Syllabus

DESIGN AND PRODUCTION PROCESS



A 3 P O S T E R
D I G I T A L D O W N L O A D

D&P is for everyone!



https://www.youtube.com/watch?v=Ho_yKBitO8M&ab_channel=TED

Create a book in Book Creator

- Register as a student
- Use the code provided in the workshop to become part of the class library
- Provide a title for the book using: your first name, your second name, your student number.
- On the book cover, add the title "STEM ePortfolio"
- If you have time, embellish the cover, insert appropriate visuals



Bridge Building Challenge: Identifying and Defining



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What do you know about bridges?

Bridge Building Challenge: Identifying and Defining

What would you like to find
out about bridges?

What would you like to find out about bridges?

- Why are bridges built?
- What types of bridges are there?
- How do they work?
- What materials and structures are used in bridge building?
- How and why have bridges changed over the centuries?

Bridge Building Challenge: Identifying and Defining



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Success criteria:

Bridge spans a gap of 38 cm

Supports the heaviest load

Built within the specified constraints

Constraints:

Bridge weighs no more than 250 g

Built using only the provided resources

Built within the agreed time frame

Resources:

150 g of spaghetti, glue gun, 3 glue sticks, 10 cm masking tape, 6 rubber bands, ruler, drawn plan, couple of sheets of newspaper to protect bench

Bridge Building Challenge: Identifying and Defining

Create a title in Book Creator like the one at the top of this slide.

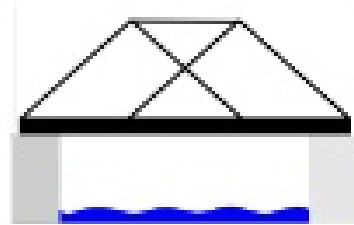
In a few lines below it, describe the bridge building challenge in your own words and what might be relevant to it.

Research and Planning

Types of bridges: Based on Structure



Beam bridge



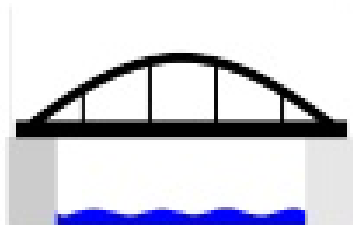
Truss bridge



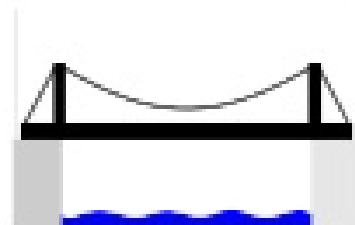
Cantilever Bridges



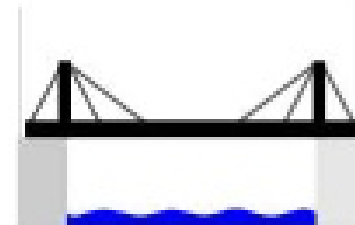
Arch bridge



Tied arch bridge



Suspension bridges



cable-stayed bridge

- <https://www.aboutcivil.org/Types-Of-Bridges.html>

Bridge Building Challenge: Research and Planning



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Do some research on the science of bridges.
For example, take a good look at the document below.

Physics of Bridges:

<https://www.dropbox.com/sh/78do5xuy4a0i8vk/AACpOIMV5KsJ7d20PwqU3BXia/Resources/PhysicsofBridges.pptx?dl=0>

Create a title in Book Creator like the one at the top of this slide.

From your research, write about what you have learned that might be useful in the project.

Bridge Building Challenge: Research and Planning



In what grade might it be safe to use a glue gun with supervision?
What safety issues might there be in using glue guns in primary school?
How could they be addressed?

Bridge Building Challenge: Research and Planning



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Without looking at your partners' plans, use the paper provided to draw *to scale* your *own plan* for what the spaghetti bridge should look like.

You might base your plan on some of the research you've conducted.

Use bold lines for the finished plan so that you can photograph it well.

When everyone in your small group has finished, compare plans.

Choose a plan which seems to be the best or have the best ideas.

Photograph this plan and put it into Book Creator.

Write a few lines about why this idea was chosen.

Support it with your research.

Bridge Building Challenge: Producing and Implementing



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Build a prototype of your bridge using the chosen plan.

Create a title in Book Creator similar to the one at the top of this slide.

Take a few photos to show the bridge being built and add comments about the progress of the work.

Bridge Building Challenge: Testing and Evaluation

Depending on time, one by one, groups may take their bridge to the testing area. They will load up the bridge and record the weight it carries at the point it begins to break.

Record how your model performed.

Compare how the model performed with others that were tested.

Can you explain why one bridge might have been stronger than another one?

How would you improve your bridge if you could build it again?

Record results, observations and ideas for improvement in Book Creator under the title at the top of this slide.

As an example of project-based STEM, what science, mathematics and other KLAs were somehow involved?

Which syllabus outcomes (don't forget skills outcomes!) could be linked to the bridge-building challenge?

Add these to this week's section in Book Creator.