Teaching notes

- A good pillar has to be strong and stable. The way is it made contributes to this – starting with a rectangle, cutting and sticking needs to be done carefully, making sure that the bottom and top of the pillar are level. Wide (fat) cylinders are more stable than narrow (thin) cylinders – children will soon learn this. A strong pillar needs several layers of paper so a long rectangle is a good starting point. Children will also learn quickly that a stable pillar is not necessarily a tall pillar!
- Children can investigate different 3D shapes for pillars – good for discussing shape.
- Bridge deck – investigate strength of A4 paper when it is flat, as opposed to when the 2 long sides are folded up (about 3-4cm). Again, layering paper so the bridge deck is thicker increases strength.
- You could provide a river/canal made of blue paper etc for each team.
- Safety – watch out for falling weights while testing. Children could test their pillars / bridges on the floor. You could set a maximum amount children can use for testing.

STEM Challenge Project

Perfect pillars

Learning Intentions

- To build up our skills such as **teamwork** and **communication**

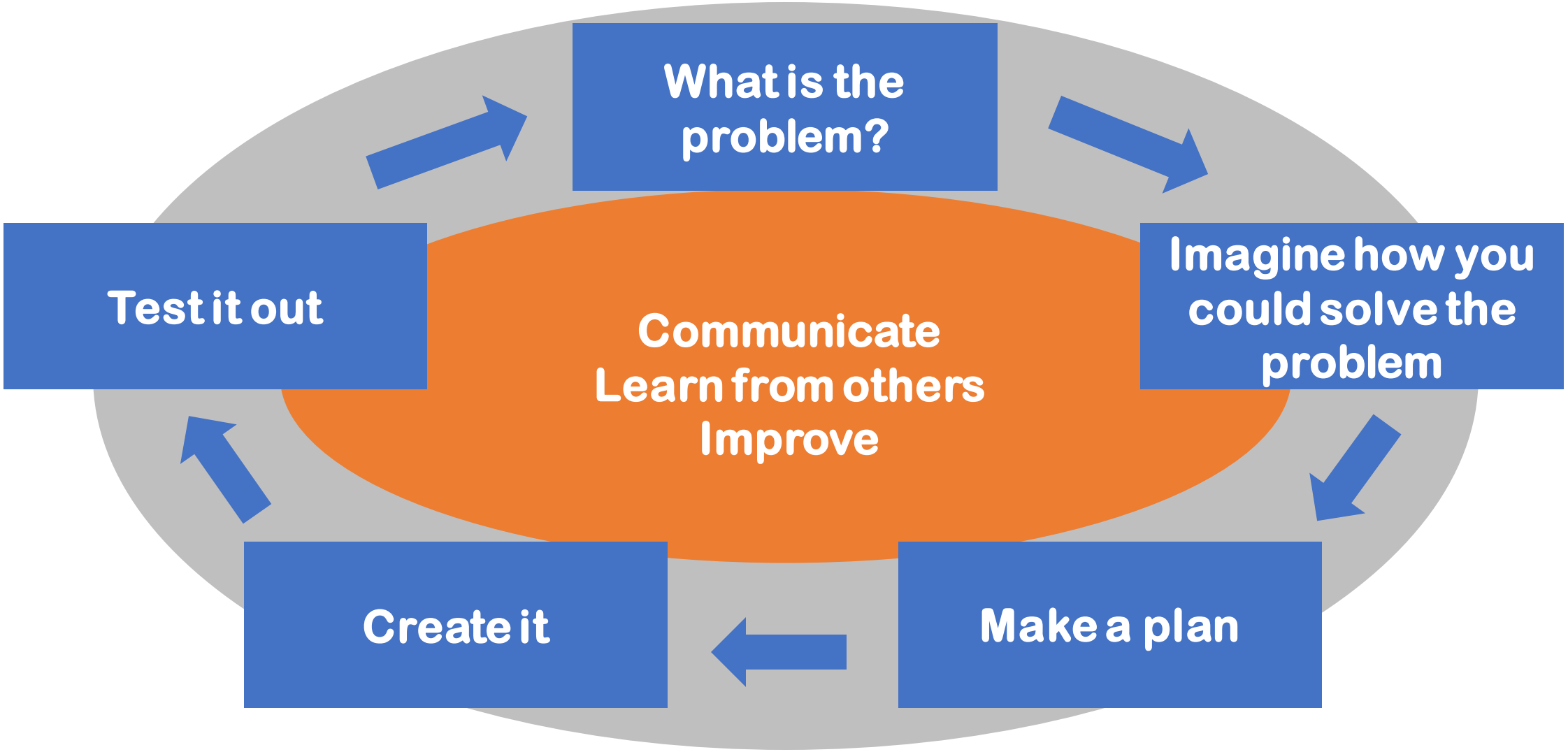
- To use the **engineering design process** to solve a problem

How will you be successful today?

- What does successful **teamwork** look like?

- What can you do to be a good **communicator**?

The Engineering Design Process



STEM Challenge

- Design and build a **pillar** which can hold as much weight as possible

- You will be given:
  - **A4 paper**
  - **Sellotape**

- Test your pillar to see how much weight it can support. Try to improve it

- What makes a perfect pillar?

What can you learn from others?

- **Learning loop** – look at other people's work.
- What good ideas did you see?
- What did you see that hadn't worked, or that you wouldn't use?
- **What makes a perfect pillar?**

STEM Challenge Project

Perfect pillars

Part 2

Learning Intentions

- To discuss what we learned from last week and create a **strong, stable structure**
- To continue building up our skills such as **teamwork** and **communication**
- To use the **engineering design process** to solve a problem

How will you be successful today?

- What does successful **teamwork** look like?

- What can you do to be a good **communicator**?


Together
Everyone
Achieves
More

What did you learn last lesson?

- What shape does your paper need to be before you roll it up?
- How do you need to roll the paper?
- How can you make a strong pillar?
- How can you make a stable pillar?
- **What makes a perfect pillar?**

Pairs of perfect pillars

- Look at the pillars in this rail bridge near Dundee

- Pairs of perfect pillars can make a structure more stable

STEM Challenge

- Design and build a **strong and stable bridge** which can support a toy car. No ramps are needed.

- You will be given a choice of materials:
  - **A4 paper**
  - **Poster paper**
  - **Sellotape**
- Test your bridge and try to improve it
- If your bridge can support a car, try using books to test it. How much weight can your bridge support?

What can you learn from others?

- **Learning loop** – look at other people's work.
- What good ideas did you see?
- What did you see that hadn't worked, or that you wouldn't use?

Evaluation

- Discuss how your team approached the STEM challenge today
  - What had you learned from last week?
  - What did you learn from working with different team members?

- How could you improve your design?

- Can you think of another similar STEM challenge you could set yourself to try at home?

Self-assessment

- How did you get on with
  - Teamwork
  - Communication

Yes – I was successful

Almost – I need some help

Not yet – I need to keep working on this

Instructions

- Write or draw instructions so someone else could build your design
- Number each step
- You could draw labelled pictures to show how to build your design

Queensferry Crossing between Edinburgh and Fife