

Teaching notes

- Good activity for individuals / pairs – larger groups will struggle to work on the structure together
- First and Second level challenges

- Focus – strong and stable structures
- Use of materials – label design sheet with C / P (card/paper) to show how you are going to use each material – how are you going to build – roll / cut / fold etc?
- Ensure team is divided up into making some of the parts each
- Learn from each other by comparing structures – strong poles with well attached struts lead to a more stable structure.

- Net – You could add a net e.g. from a nectarine/plum punnet
- M in STEM Maths links – shapes, angles, measure, nets for 3D objects – 2 Maths activities provided at the end

STEM Challenge Project



Football goal



Learning Intentions

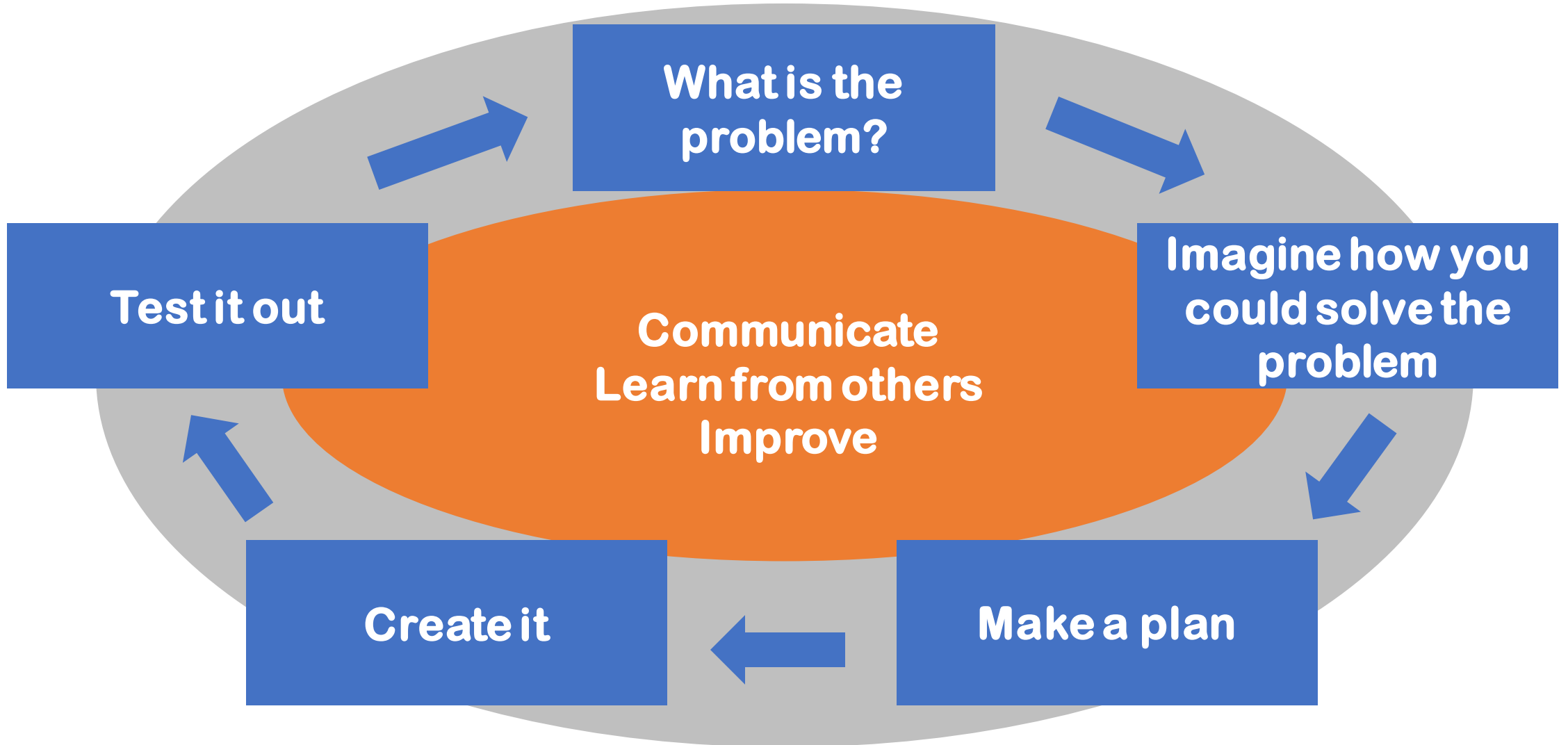
- To build up our **skills**:
 - Teamwork
 - Communication
 - Creativity
 - Critical Thinking
 - Resilience

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

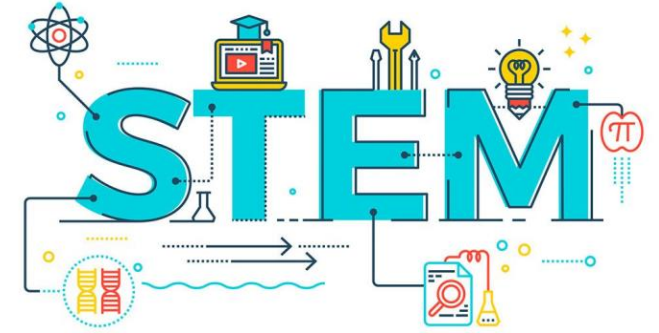
What are your success criteria for this project?

- I would like to get better at
 - teamwork
 - communication
 - creativity
 - critical thinking
 - resilience
- How can you get better at this? Write down some strategies for yourself.
- As you progress through the project, you will decide if you have been successful at developing this skill.

The Engineering Design Process



Previous learning

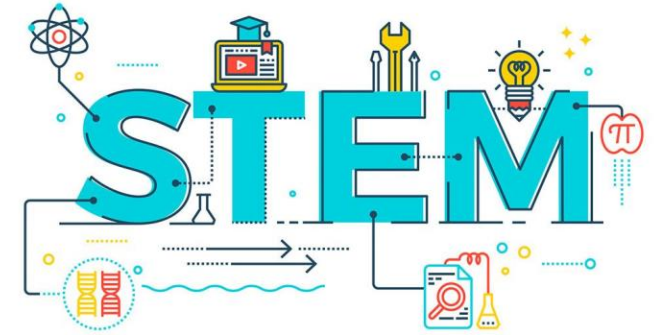


- What have you **learned already** about how to make a structure **strong** and **stable**?
- What can you do with **paper** to make it stronger?

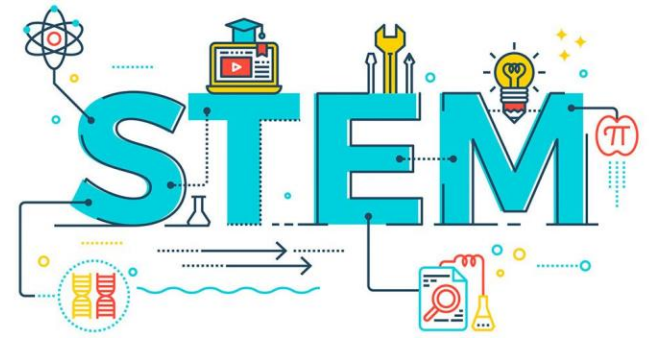
Which shapes can you see?



Football goal



- How can you make sure that the goal is **strong** and **stable**?
- What **could go wrong** when building and testing the model? How could you **solve** these problems?

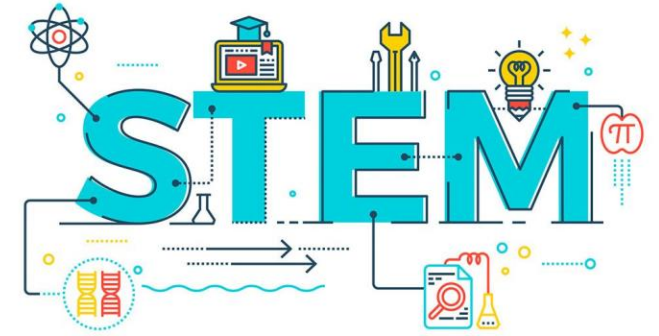


Design and build First level

- **Design** a football goal and ball that you can fit on your table
- You don't need to make the net
- You must stick your goal to a **base**

- **Build a model**, then **test** and **improve** it
- Materials:
 - **A4 Card x 1**
 - **Paper x 3**
 - **Sellotape**

Design and build Second level



- **Design** a football goal and ball that you can fit on your table
- You don't need to make the net
- The goal must be **at least 15cm high** and **at least 20cm wide**
- You are not allowed to stick your structure down to anything

- **Build a model**, then **test** and **improve** it
- Materials:
 - **Paper x 4 – all paper in your structure must be rolled up**
 - **Sellotape**

Evaluation



- On a pink post-it, write down what you are **Tickled Pink** about – what is good about your design?
- On a green post-it, write down what is **Green For Growth** – what needs to be improved about your design?
- Or you could use pink and green highlighters to draw straight on to your design!





What can you learn from others?

- **Learning loop** – look at other people’s work.
- How did other groups tackle the STEM challenge?
- Which ideas did you see that were successful?
- What did you see that hadn’t worked, or that you wouldn’t use?
- **Feed back to your group**



Evaluation

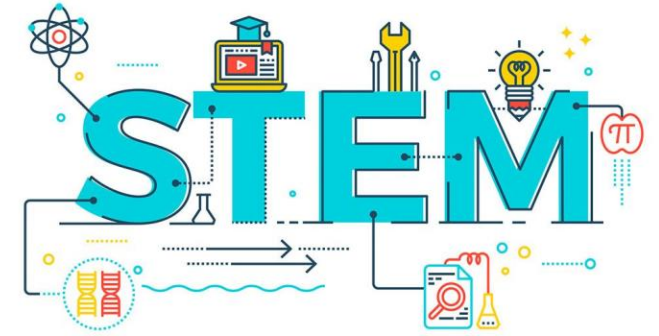
- Discuss how your team approached the STEM challenges in this project
 - What did you learn?
 - Which skills did you develop?
- How could you improve your designs?
- Can you think of another similar STEM challenge you could set yourself to try at home?

Self-assessment at end of project

- We have been developing our skills by doing STEM challenges:
 - Collaboration
 - Communication
 - Critical thinking
 - Creativity
 - Resilience

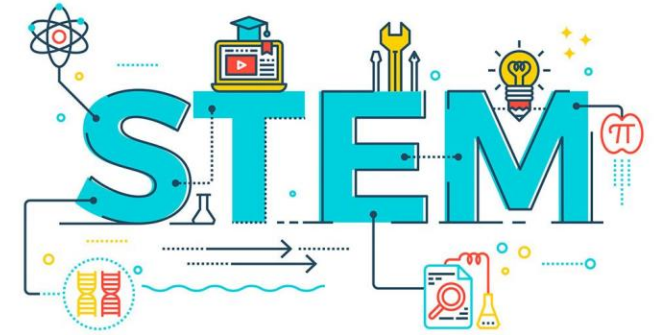
- Have you followed your strategies?
- Have you been successful in developing your chosen skill?
- Have you developed other skills during this project?

M in STEM activity First level



- By creating this goal, you have made a **3D object**.
- How many **corners** does it have?
- How many **straight edges** does it have?
- What **shapes** can you see?
- How many **right angles** does it have?

M in STEM activity Second level



- By creating this goal, you have made a **3D object**.
- Taking careful measurements, and using your Maths skills, can you draw a **net** on paper for the 3D object you have built?
- Could someone else cut out and fold the net for your 3D object?
Does it look like your goal?