# Teaching notes

- This is likely to be a longer project, so it only has one STEM Challenge. Ensure learners take time to reflect, evaluate and learn from each other.
- The photos provided are for inspiration. Learners should create their own design and must not copy the photos.
- A budget has been included – you could differentiate this.
- Resourcing – each group needs a cereal box. You can adapt the other resources depending on what is available. Round tube = kitchen roll tube (avoid using toilet roll tubes). Long box = toothpaste tube box, coffee pods box, etc.
- You could use timers to measure time taken for marbles to travel from start to finish.

# STEM Challenge Project

Vertical marble runs

# Learning Intentions

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

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

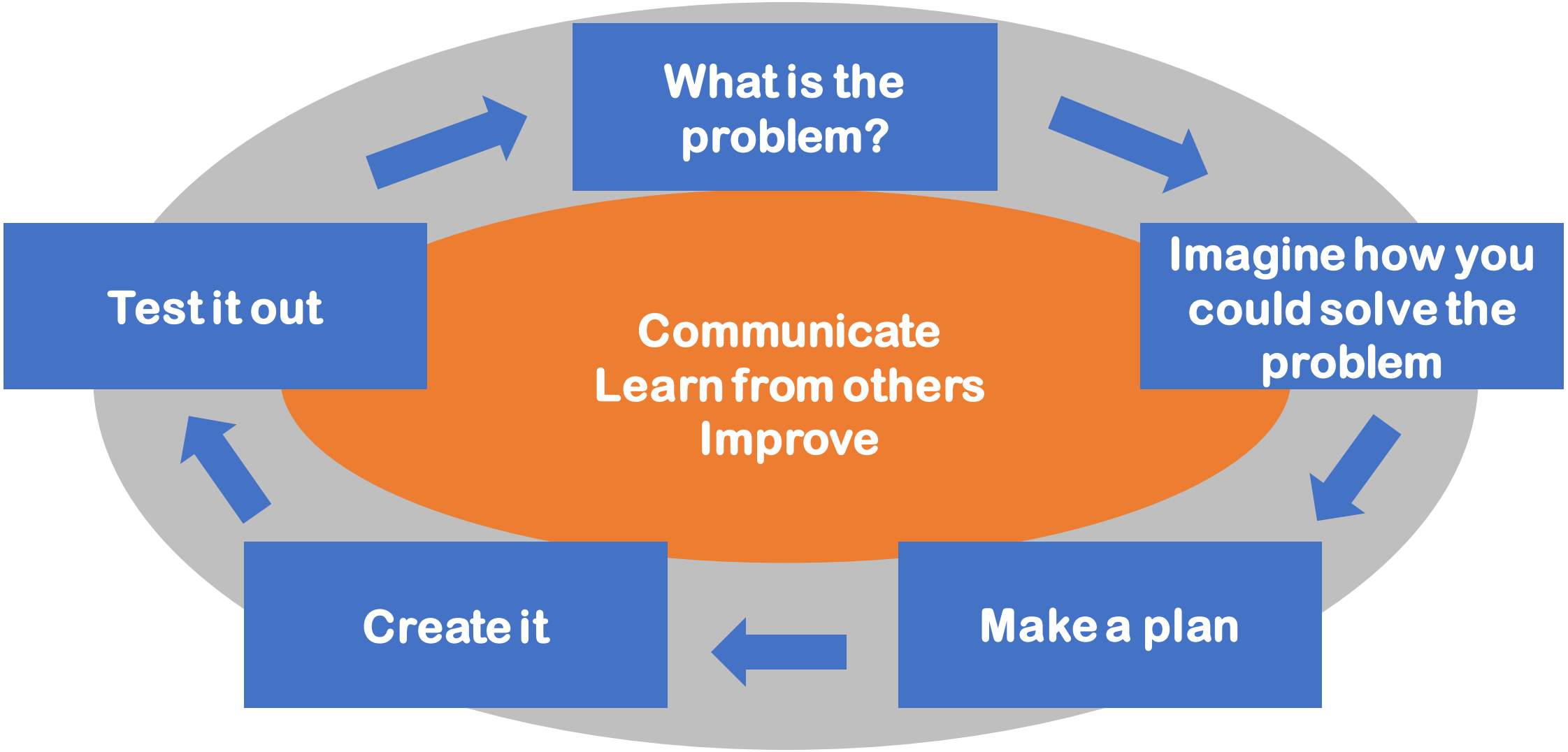
# What are your success criteria for this project?

- 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.

- At the end you will decide if you have been successful.

# The Engineering Design Process



# STEM Challenge

- Design and build a **vertical marble run** with a marble catcher at the bottom
- The marble must take as much time as possible to travel down
- You will be given a choice of materials and a budget of £100
  - **A4 paper £10**
  - **Straw £5 (max 5)**
  - **Piece of scrap card £10 (max 3)**
  - **Round tube £10 (max 1)**
  - **Long box £10 (max 1)**
  - **Lollypop stick £5 (max 5)**
- You will use a **cereal box** as the backing – free
- **Sellotape** is free
- Test your structure using your marble and consider how you could improve it

# What have you learned so far?

- Did anything go wrong with your design?  How did you fix it?
- How did you keep the marble on the ramp?
- How did you make sure the marble run was stable?
- How did you make a marble catcher?  Could this be improved?

# Evaluation

- What is good about your design?

- What could you improve about your design?
  - How could you make the marble run more complicated?
  - What different materials could you use?
  - How would you change your design if you did this challenge again?

- How could you change the STEM challenge next time?

# 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?

# Self-assessment at end of project

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

- Update your previous self-assessment sheet.
  - Tick the boxes to show how you feel about each skill.
  - Circle the skills you feel you have developed during these STEM challenges.