MAKER EDUCATION

WITH DR GINNY CHAMBERS, DR KAMRYN YORK AND DR MARK MARNICH

Talking *points*

KNOWLEDGE

1. What is maker education?
2. Where might you find a maker space?

COMPREHENSION

3. Who leads makerspace activities?
4. How is maker education different to traditional teaching methods?

APPLICATION

5. What questions would you ask Ginny, Mark and Kamryn about T.I.M.E for STEM or maker spaces?

ANALYSIS

6. How do maker spaces help teachers?
7. "Educators become learners in maker spaces." What does Mark mean by this? How do you think educators become learners, and why is this a good thing?
8. How is maker education particularly helpful for teaching mathematics?

EVALUATION

9. What makes STEM teaching effective for you? Think back on some of the ways that you have been taught STEM subjects in school. Which lessons stand out, and why? How did these lessons help you to learn and develop skills?
10. The T.I.M.E for STEM project partnered with the Children's Museum of Pittsburgh. Why do you think Mark, Ginny and Kamryn decided to partner with the museum? What benefit do you think this will bring to the project?

CREATIVITY

11. Imagine you have to design a maker space activity to teach younger children about gravity. How would you do this? What materials would you need? What age group would your activity be targeted at?

Activities

Teach younger students!

Can you lead a lesson for students in a younger year group or visit a local elementary/primary school? If so, use these ideas to develop your STEM teaching skills.

If this is not possible, try out the following ideas on your classmates. Give clear instructions, and guide them through their learning. How do they respond? What are the benefits of teaching in this way?

Or have a go yourself, and consider the benefits of learning in this way.

1. Teach mathematics skills by getting your students to draw, design and measure an enclosure for their favourite animal.

They will need to:

- Design an enclosure that is the right height and size for their animal
- Add areas for their animal to eat, sleep and play in
- Figure out the area and perimeter of the enclosure and the areas of each of the specific sections
- For each section, calculate what percentage of the total area it makes up

Optional:

Students build the enclosure using recycled materials.

2. Teach building and problem-solving skills by asking them to build the tallest tower possible. Give each student some sticky tape and a building material such as spaghetti or popsicle sticks. See what they come up with after five minutes! Encourage the students to reflect on their building attempt afterwards, and compare their towers to each other to see which structure worked best.

3. Think of a story you could tell a group of younger students that involves some animals or people needing to cross a bridge. Ask them to bring old pieces of recycling into class, such as egg cartons, toilet rolls, pieces of cardboard and plastic bottles. Get your students to build a bridge to accommodate the figures in the story. Using limited materials is a great way to encourage creativity and problem-solving skills!

Ask the students:

- What shape will their bridge be?
- Will it be high enough for boats to pass underneath it?
- Will it be strong enough for those that need to cross?

Afterwards, roll a small object across each bridge to see which one is strongest. To develop this for older or more advanced children, ask them to make an instructional video for younger students who would not be able to read the information themselves. In the video, get them to tell the story of those crossing a bridge and explain how to make a bridge. This will improve their technology skills and challenge them to demonstrate their understanding by instructing others.

More *resources*

- Tangram exercises are great for teaching students about spatial relationships and geometry. You can buy a kit, make the paper shapes yourself, or use this website: **www.mathigon.org/tangram**
- Read the TeachHub article 'What is Maker Education?' for more information on maker education methods: **www.teachhub.com/teaching-strategies/2020/04/what-is-maker-education**
- Read about Mark, Ginny and Kamryn's work at Point Park University: **www.pointpark.edu/news-education/point-park-university-school-of-education-receives-national-science-foundation-grant-to-support-stem-educator-training**