

Ambassador Guide

Activity Title: Station Creation

Resources needed:

Screen and projector for Presentation
Enough Table space for crafts, accommodating the class size

Suggested Student Team Size:

4 – 6 (aim for 4 groups per class/group)

Materials needed Per Group:

150 toothpicks
380 grams of Jelly Babies (2 small packages)
5 sheets of white A4 paper

****Optional materials****

A box of Chocolates or Candy is suggested as prizes.

Related subjects:

Architecture, Civil/Architectural Engineering

Documents included:

Ambassador Lesson Guide,
Power Point Presentation
Student Worksheet
Evaluation Form

Total Estimated Time: 1 hour 30 minutes

Activity	Time (min)	Slides
1. Introduce Crossrail and Engineering	10	1-7
2. STEM Background	5	7-12
3. Project Explanation	5	13-16
4. Project Brainstorming/ Planning	10	16
5. Building	40	16
6. Testing /Presenting	15	17-18
7. Feedback and Discussion	5	19-20
Total:	90	20

This Ambassador Guide is designed specifically for the **Station Creation** activity. It includes information for the activity, and tips on how it could be best implemented. Please use this guide with the Ambassador Presentation to effectively conduct the programme.

Before the Classroom

- Get in contact with Young Crossrail (youngcrossrail@crossrail.co.uk) to ensure that you have the kits/materials needed to present the lesson
- Review and customize the PowerPoint to your liking

In the Classroom

- Make sure you have the sets of materials readily divided into the appropriate number of student groups.

Activity Instructions

Instructions

1. Divide students into 4 teams (cap the team size at 6 students)
2. Give each group their designated materials
3. Thoroughly explain the requirements of the activity.
4. Let the students plan and build their stations.
5. Let students present their “stations”.
6. Collect materials at the end of a discussion and team presentation period
7. Hand out evaluation forms

Requirements and Restrictions

There are minimal restrictions to this activity. The primary restrictions are:

- 50 minute time limit (10 mins brainstorm in teams, 40 mins build)
- Minimum station floor dimensions: 1 sheet of A4 paper
- Maximum station floor dimensions: 3 sheets of A4 paper, touching lengthwise
- Station must have minimum two levels (Ground plus at least one upper level)
- Limited amount of materials
- The structure must be freestanding and capable of supporting 0.5k g on its 1st “floor”

Organization

Keep track of time during the activity. An estimated running time is as follows

Phase	Time (mins.)
Team Formation & Task Explanation	5
Team Construction	50
Presentation/Testing	15

Testing for this activity involves checking the dimensions of the station to make sure that it is within the maximum and minimum dimensions. Also, the structure must be able to support 0.5 g (5x100g weights) on its 1st “floor”. Presentation involves a 2-3 minute “elevator pitch” of why the team chose its particular station design.

After the Lesson

Ensure that all the materials have been returned by completing the check list in each kit.

Activity Tips

Q: What if students are struggling to understand the task or relevant information?

A: Explain to them that they need to sketch a design for their station, and then use the given materials to build the station they design. Each student should have an assigned task to focus on, dividing labour, just as it would be done in real life.

Q: What if a student’s design doesn’t work?

A: Just as in real life, designs may not work. Explain to them that they have to go back and rethink or redesign the station or elements of it before continuing construction. This redesign process may end up as a discussion topic during the group discussion.

Q: What if students are struggling to design a structure that will stand on its own or function?

A: Remind the students that, just like materials, sometimes structures need reinforcement. Building cross-braces or using certain geometries like triangles can help to give their structures more strength, just as materials are added to steel and concrete to increase their strength.

Presentation and Discussion Tips

Q: How do I deal with disruptive behaviour in the classroom?

A: One effective way of preventing this is to set ground rules for students when the presentation begins, such as no talking when the ambassador is talking, no talking over others, etc. Making sure that the class as a whole agrees to follow such rules allows you to enforce the rules when they are broken.

Remember that you are not the only responsible adult in the classroom and that there are full time teachers who will help oversee the students. Ask the student for a reason behind the misbehaviour and if there is anything that you can do to help. Offer different seating arrangements, or show them that they are disrespecting the other students.

Q: There are students who dominate the discussion or activity work, while others are too shy to speak out and hardly participate. How do I promote equal participation?

A: Repeatedly emphasize that the most important element of engineering is planning and teamwork. Encourage students to work as a team and come to decisions for the activity after discussion amongst themselves. Allow students to produce responses to questions as a small group, so that students who are too shy to speak out in class are still able to contribute within the team. If a single student is repeatedly answering questions, you can always engage others by saying something like, “I think we haven’t heard from this side of the class yet?”

Q: There are students who show disinterest in the presentation and the subject material. How should I handle this kind of students?

A: The first step is to get them involved. Use small prize elements such as chocolates to reward correct answers and participation in questions. This will initially make students focus more on what is being presented, but eventually allow them to find an element that interests them.

Second, remember to address how the subject matter and the engineering challenge is relevant to their day to day lives. Connect real-world examples and applications to the engineering principles instead of presenting them as just another subject.

Third, when providing your professional background, remember to bring up exciting experiences relating to your work, and how math and sciences are a tool you use in work, rather than just a subject you learnt.

Q: How do I make sure that students will have a positive, educative experience with the programme?

A: When the activity progresses, ask students to justify their actions and decisions. Utilize the reflection prompting questions that are provided with the Ambassador Presentation and Activity Sheets.

After you explain information, ask simple questions that allow students to review what they have learnt. This way, the key concepts are fresh in their minds as they begin the activity.

Remind students that the activity could easily be replicated or adapted to crafts at home. Encourage students to try different activities at home using materials they have seen being used.

Additionally, if a student makes a good point in a classroom discussion, be sure you give them ownership of that contribution, with prize or recognition. Students will gain confidence and actively participate.

Q: What are some different ways I can structure the discussion?

A: There are two main ways you could structure the discussion

One way, called "Snowball" for various opinions and details to collect and be accessible to everyone in the class. Begin by engaging the students with discussion questions in their respective groups. Then, after a certain amount of time, join two or three groups to share their discussions. Finally, bring the discussion to the entire class, allowing individual students to speak out about their group's approach to the activity, design of the product, etc. and see how each group had different ideas.

Another way to make sure individual students are participating is called the "Marketplace Format." Allow students to discuss their approach to the challenge provided in the activity in their activity groups. Then, ask the students to form groups consisting of one member from each activity group, and ask them to share what they did to members from different activity groups. This allows individual students to explain the groups design, and promotes each student's participation in discussing and sharing ideas.