



Key Stage 2	
Curriculum Subjects	Science Maths Geography 
Learning Objectives	To design and build an earthquake proof building.
Materials	Marshmallow Bic® Kids Visa® Felt Tips Cocktail sticks Bic® Kids Learner Mechanical Pencil Ruler Planning sheet 

Teacher Prep

Prepare an email from an engineering 'friend', example below.
 Print out A3 planning sheets, example below. Ensure each group has an 'engineers' resource pack on table; A3 planning sheet, Bic® Kids Visa® Case Felt Tips pack, Bic® Kids Learner Mechanical Pencil and a sample of marshmallows and cocktail sticks.

Lesson

Carpet activity:

Carpet activity: Watch this National Geographic video (<http://video.nationalgeographic.com/video/101-videos/earthquake-101>) which gives background to earthquakes and the destruction they can cause. Afterwards share the statement, "It is not the earthquake that kills people, it is the buildings". Ask the children what they think this means, how can we make buildings stronger etc. Use talk partners to share ideas. (10 minutes)

Main activity:

- 1) Carpet activity: Introduce activity that today they will be engineers designing a model of a building. Ask them what they think that means? Share with them diagrams of buildings with cross-bracing, example below. Discuss how this would help. Share email from an engineer friend which has his actual planning sheet from work, example below. Discuss the importance of planning. The model building will have a twist as it will be using toothpicks and marshmallows. Share with the children the 'engineer resource packs' they will be using; A3 planning sheet (example attached below), Bic® Kids Visa® Felt Tips pack, Bic® Learner Mechanical Pencil, rulers and a sample of marshmallows and cocktail sticks. (15 minutes)
- 2) Table activity: In groups of 3 the children will work through the planning sheet, drawing and colouring their designs using Bic® Kids Visa® Case Felt Tips and filling in the other planning criteria with the Bic® Kids Learner Mechanical Pencil for example estimating their structures height, width etc. Use learning stops during the activity for the children to share ideas on how to make their structures strong and flexible. Focus on cross-bracing is important as it helps support the earthquakes sideways forces. (30 minutes)

Plenary:

Gather the children on the carpet for a discussion about their plans, giving them time to reflect on their ideas and share their self-evaluations with the rest of the class.

Learning Outcomes	<ul style="list-style-type: none"> • I understand the impact earthquakes can have and it is the buildings that cause problems in an earthquake. • I think like an engineer and can design an earthquake proof building. • To consider the forces acting in an earthquake. • To use a ruler confidently during the planning stage to correctly measure the size of the structure. • To work in a team.
Follow on Activities	<p>This activity can be extended as much as desired. The next stage would be to build the structure using the marshmallows and cocktail sticks. The earthquake could then be simulated by placing the structure on a piece of card and shaking it. The structures can then be peer assessed and improvements made.</p>

Examples of PowerPoint Presentation Slides

<p>It is not the earthquake that kills people it is the buildings...</p> <p>What do I mean?</p>	<p>Today you are engineers!</p> <ul style="list-style-type: none"> • What are engineers? • What do you think they have to do with earthquakes? • What do you think engineers do? 	<p>You are going to design and build a model of an earthquake-resistant building...</p> <p>Engineer criteria:</p> <ul style="list-style-type: none"> • You must have at least 4 levels/floors • It must hold a toy at the top • When the paper underneath is shaken...it must not drop the toy <p>YOU'LL NEED:</p> <p>What will make your building strong and flexible?</p>	<p>Earthquake proof buildings</p>
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Template for an email:

Dear <insert class name>,

<Insert class teacher name> has been telling me all the exciting things you have been learning about across Science, Maths and Geography at the moment! It sounds like you might be able to help me with my current project.

I am an engineer and am currently working on rebuilding flats in Nepal after the earthquake there last year. We are designing earthquake-resistant buildings to see which ones might be strong and flexible enough to build. I was wondering if you wanted to have a go at making some models?

<Insert class teacher name> has told me your team work and creativity is amazing so I look forward to seeing your ideas.

I have attached a planning sheet that we use to plan our ideas before making the models.

Good luck!

Template for the Planning Sheet:

<p>A labelled drawing of design:</p>	<p>Materials used:</p> <ul style="list-style-type: none"> • • •
	<p>Height estimation (in cm):</p>
	<p>Width estimation (in cm):</p>
<p>Team members and roles during model building:</p> <ul style="list-style-type: none"> • • • 	<p>How many floors will it have?</p> <p>What makes it strong and flexible?</p>