Australian Curriculum

YEAR 6

AGES 11–12

RIC PUBLICATIONS

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SCIENCE: A STEM APPROACH

AC

Biological sciences

Chemical sciences

Earth and space sciences

Physical sciences

SCIENCE TECHNOLOGY ENGINEERING MATHEMATICS

SAMPLE - NOT FOR SALE

RIC-6176 7.0/1261

Teacher notes

Science inquiry focus:

What are tsunamis and how do they form? Does the magnitude of an earthquake affect the size of a resulting tsunami?

Science Inquiry Skills:

- Questioning and predicting **QP**
- Planning and conducting **PC**
- Processing and analysing data and information **PA**
- Evaluating **E**
- Communicating **C**

Science as a Human Endeavour:

- Students plan and conduct an experiment to test how the amount of force produced by the movement of tectonic plates can cause tsunamis, and use this data to develop explanations of the relationship between earthquakes and tsunamis.

Technology/Engineering/Mathematics links:

- using an iPad® application such as Microsoft® PowerPoint to present information
- using materials and equipment safely when conducting an experiment
- using an iPad® to film each test in their experiment
- uploading a digital presentation to a class blog or sending it via email to the teacher

Assessment focus:

- Use students' digital presentations to assess their science inquiry skills, including their ability to formulate an investigation question, plan and conduct a fair experiment, record accurate and reliable data, use their recorded data and information to develop explanations, and reflect on their experiment to suggest improvements.

SAMPLE - NOT FOR SALE

Background information

- A tsunami is a series of large sea waves caused by an earthquake or volcanic eruption in the ocean crust.
- At the point where the event happens, the waves have a small wave height and a long wave length. As they move closer to the shore, they increase in height and decrease in length, resulting in the gigantic waves that destroy coastal cities. Go to <https://tinyurl.com/ya2rsbcd> to see a diagram.
- When tsunamis hit coastal cities, the initial wave acts as a brick wall, destroying infrastructure and personal belongings. This wall of water can also be responsible for the death of living things in its path. The waves following flood the city and move everything, including boats, several kilometres inland. The movement of these heavy items causes further destruction.
- During the experiment, students should discover that earthquakes with higher magnitudes (more force), create larger tsunami waves.

Resources

- Online image at <https://tinyurl.com/y8v5ncrt>
- Online video–*Introduction to earthquakes* at <https://tinyurl.com/y8rrpvru>
- An iPad® for each student with a presentation application such as Microsoft® PowerPoint
- For each group: a copy of the tsunami simulation experiment card on page 85; a long, shallow plastic container; a thin, plastic chopping board with a handle; a piece of rope (approximately twice the depth of the plastic container); access to sand and water
- Online video–*How earthquakes trigger tsunamis* at <https://tinyurl.com/qzgpf4l>

Lesson plan

Introduction:

1. Display the online image at <https://tinyurl.com/y8v5ncrt> to see some of the effects caused by the earthquake and tsunami that hit Japan in 2011. Using a think-pair-share, students predict which natural disaster they think occured to cause the damage shown in the image. Encourage students to think about what might have caused the boat to be positioned on top of the building. **QP**

Development:

2. As a class, revise the devastation that earthquakes cause by watching the online video *Introduction to earthquakes* at <https://tinyurl.com/y8rrpvru>. *Note: Students watched the opening 2:08 of the video in Lesson 3, but will need to watch the remainder of the video to see the connection between earthquakes and tsunamis.*
3. Using an iPad® application such as Microsoft® PowerPoint, students individually create a presentation to show how the magnitude of an earthquake affects the size of the resulting tsunami. *Note: This presentation will be added to throughout the les*son. Students create a heading for their presentation using an investigation question such as, 'Does an earthquake with a higher magnitude, form a taller tsunami?' and then record their prediction on the second slide. **QP**
4. Divide the class into groups of three and give each group a copy of the tsunami simulation experiment card on page 85. In their groups, students plan an experiment to test how the magnitude of an earthquake affects the size of the tsunami. Individually, students insert a photograph of the experiment card and describe how they will ensure a fair test is conducted, on the third slide of their presentation. **PC**
5. In their groups, students decide which group members will be responsible for each role and conduct their experiment according to their plan, filming each test and recording the heights of the waves. When they think they have collected enough data to make a reliable analysis, students review their videos of each test and discuss the results. They then email the videos to each group member. **PC** **PA**
6. Individually, students create a new slide for each test conducted, inserting the video of each test into the appropriate slide and adding written text to explain each result. Students then add another slide entitled 'Conclusion' to answer their investigation question, using evidence from their group's experiment. **PC** **C**

   Differentiation
   - Less capable students can use an audio recorder to record information or can create less slides in their presentation.
   - More capable students may be encouraged to research major earthquakes that have caused tsunamis, and the magnitude of each.

Reflection:

7. As a class, watch the online video *How earthquakes trigger tsunamis* at <https://tinyurl.com/qzgpf4l>. Students reflect on the effectiveness of their test to determine if it accurately answered their investigation question. Using their presentation, students record audio or write text to explain how they could improve their experiment and suggest other experiments they could do to test the effects of a tsunami. Students then upload their presentation to a class blog or email it to the teacher. **E** **C**

SAMPLE - NOT FOR SALE

978-1-925431-99-5

Earthquakes and tsunamis

Tsunami simulation experiment

Materials

- 1 long, shallow plastic container
- 1 thin, plastic chopping board (with a handle)
- Rope
- Sand
- Water

Preparation

Hint: Tie a piece of rope to the handle of the chopping board. Tape the other side of the chopping board securely into the corner of the plastic container.

Student 1
Stand at the edge of the plastic container and pull the rope towards you using different amounts of force.

Student 2
Using a video camera, introduce the test being conducted by stating the independent and dependent variables, then record each test.

Student 3
Using a marker, record the height of the waves in each test.

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