Teacher Resource

Sinking Cities

EPISODE 23
22nd August 2023

KEY LEARNING
Students will investigate the causes of subsidence and flooding and the impact it has on people and places around the world.

Focus Questions

Discuss the BTN story as a class and record the main points of the discussion. Students will then respond to the following:

1. About how many cities around the world are sinking?
2. What is the technical term for a city that is sinking?
    a. Subsidence
    b. Subsistence
    c. Subterranean
3. Which is the fastest sinking city in the world?
4. What action is being taken to stop cities from sinking?
5. What questions do you have about the BTN story?

Activity: Note Taking

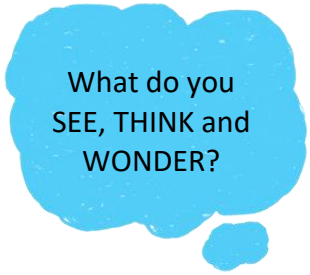
Students will practise their note-taking skills while watching the BTN Sinking Cities story. After watching the story, ask students to reflect on and organise the information into three categories. What information in the story was...?

- Positive
- Negative or
- Interesting

Activity: See, Think and Wonder?

After watching the BTN Sinking Cities story, students will respond to the following questions:

- What did you SEE in this video?
- What did you LEARN from this story?
- What do you WONDER about this story?
- What QUESTIONS do you have about this story?



CURRICULUM

Geography – Year 5
The impact of bushfires or floods on environments and communities, and how people can respond.

HASS – Year 5
The impact of bushfires or floods on environments and communities, and how people can respond.

Science – Year 5 & 6
Scientific knowledge is used to solve problems and inform personal and community decisions.

Science – Year 6
Sudden geological changes and extreme weather events can affect Earth's surface.

Science – Year 7
Scientific knowledge has changed peoples' understanding of the world and is refined as new evidence becomes available.

Geography – Year 7
Causes, impacts and responses to an atmospheric or hydrological hazard.

Activity: Glossary

Students will brainstorm a list of key words that relate to the BTN Sinking Cities story. Here are some words to get them started.

URBANISATION	SUBSIDENCE	RESILIENCE
RISING SEA LEVELS	CLIMATE CHANGE	GLOBAL WARMING

Ask students to write what they think is the meaning of each word (including unfamiliar words). They will swap definitions with a partner and ask them to add to or change the definition. Check these against the dictionary definition.

Further activities for students:

- What is a sinking city? Write a definition using your own words. Use these words in your definition: urban environment, danger, landscape and subsidence.
- How did this story make you feel? Make a list of words that describe how you felt after watching the BTN story.
- Who designs cities? Learn more about the jobs involved with designing a city and the challenges they face. Investigate what the job involves and what you need to study to become one.

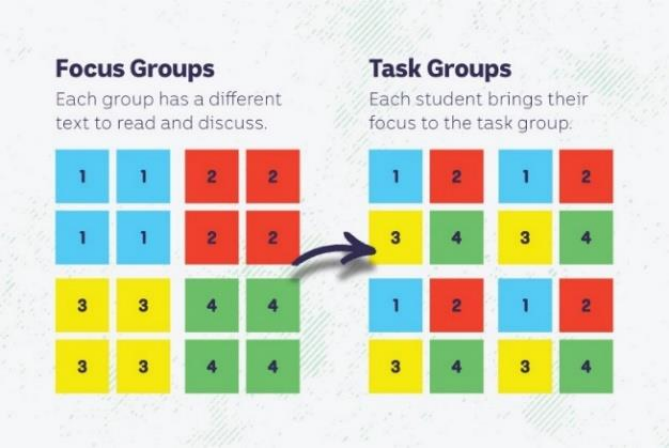
Activity – Jigsaw learning

In this activity students will work cooperatively to understand the concept of sinking cities, their causes, and possible solutions to the problem. Each group will become experts and then share what they have learnt with other students.

1. Form Groups

Divide the class into 4 x Focus Groups. Each Focus Group will be assigned a different city to study. Below is a list of cities affected by subsidence:

- Jakarta
- New York
- Virigina Beach
- Bangkok
- Venice
- Houston
- Rotterdam



Each group will need to decide how they will collect and communicate the information they find during their research.

2. Research

Students can search for news articles and other publications to help with their research. Each Focus Group will respond to one or more of the following questions to become experts:

- Where is the city located? Find on a map. Is it close to the coast or along a river? Explore the geographical features of the city.
- What is the population?
- When was the city built? Investigate its history.
- What is causing the city to sink? List some of the factors.
- What percent of the city sits below sea level? Or how many centimetres has the city sunk?
- Is flooding common? What is causing the flooding?
- How is the issue of subsidence impacting people and the environment?
- How is the city protecting itself against further sinking?
- What are some of the solutions to the problem?

3. Share

Mix the Focus Groups to form Task Groups (Tasks Groups include one student from each of the Focus Groups) to share the information they have collected. Students will share the information they have collected and learn from one another.

4. Reflect

Students will reflect on the activity by responding to one or more of the following questions:

- What did you enjoy about this investigation?
- What did you find surprising?

Activity: Cause and Effect Diagram

In this activity students will work collaboratively to identify and understand the causes of sinking cities using a fishbone cause and effect diagram.

The fishbone diagram resembles the skeleton of a fish, with the "head" representing the problem (sinking cities) and the "bones" representing different categories of causes. The fishbone diagram helps to develop a more in depth understanding of a problem. It is a tool that can be used during brainstorming sessions to sort and record student's ideas into useful categories.

Before starting this activity, facilitate a class discussion using the following questions:

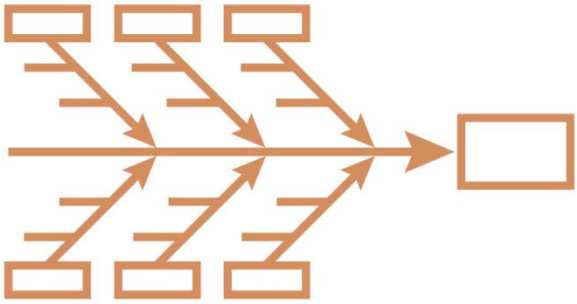
- Have you ever heard of a sinking city? What do you know?
- Have you seen anything in the news about sinking cities? Discuss.
- What do you think might cause a city to sink? (Explain to students that subsidence can have natural or human causes).

What you'll need: Butchers paper (large), sticky notes (to record minor causes), a range of coloured markers.

Problem: As a class decide on a single statement that describes the problem. Write the problem statement in the "head" of the fishbone diagram.

Major causes: In small groups, students will brainstorm the major causes of the problem. They will write these as the main categories, which are represented as "bones" off the main arrow. Major causes relating to sinking cities could include:

- Natural Factors (land subsidence, earthquakes)
- Human activities (urban development, mining, removal of water from underground)
- Climate Change (sea level rise, extreme weather)
- Buildings (the weight of buildings, dams, tunnels)



Minor causes: Students will then identify additional causes related to the issue as minor causes. These can be represented as small "bones" on the diagram. Students will record as many causes as possible relating to the problem.

Activity: Mt Resilience

Students will visit Mt Resilience – an augmented reality experience that allows students to explore a town that's been designed around climate and disaster preparedness.

The app works on both phones and tablets. Get the app here. Go here to find out more about the technical specifications for the app.

Explore the features of Mt Resilience

Working in pairs, students will look around and explore Mt Resilience. Students will play the Mt Resilience experience to see how the community of Waterdown has worked together to mitigate the impact of extreme weather.

Students will then respond to the following:

- What are some of the things that the people of Waterdown can do to protect themselves from floods?
- How can the Government help the people of Waterdown recover from the floods?
- How does the community centre help the people of Waterdown?

Useful Websites

- Why is New York Sinking? – Newsbreak
- Bangkok is sinking and rising sea levels from climate change could threaten the homes of its 11 million people – ABC News
- Sinking City of Venice – Newsbreak
- Venice Floods – BTN
- Mt Resilience – Australian Museum and ABC