

Lesson Plan: Energy generation challenge

Year 8: Science

Materials List

This activity is designed to be carried out in pairs.

Who	Resource Type
Materials - each pair of students will need:	<ul style="list-style-type: none"> • Laptop/computer with internet access • Ruler • Calculator • Pencil • Eraser • Scrap paper • Energy Generation Challenge excel spreadsheet • Student folio (one per student) • Cleangreenton student plans PDF

Lesson plan part 1

Method

1. **Discuss** renewable energy and non-renewable energy.
2. **Show** students video on renewable energy: Renewable energy 101 from National Geographic.
3. Explore the themes of the video. **Class discussion:**
 - Why are we moving away from fossil fuels as sources of energy?
 - What are the sources of renewable energy?
4. **Divide** students into groups of four and hand out the student folios – one per student.
5. Students can read the energy challenge they will work towards and begin Part 1.
6. Each person in the group chooses one type of renewable energy source to research (of the four listed in the student folios). Reliable websites are listed at the end of this lesson.

After the research, students share their summaries with the rest in their group, including some of the advantages and disadvantages of each energy source.

NOTE: A wave energy generator is being commissioned offshore (March 2021) on King Island in Tasmania and will be connecting into Hydro Tasmania's grid on the island. See the animation that explains the process: <https://www.youtube.com/watch?v=EPFGQy4Bnjc&t=84s>

6. As a class, **discuss** the advantages and disadvantages of each energy source. Students fill in the chart in their folios.
7. **Display** the digital maps of Tasmania's potential energy resources or provide student groups with a hard copy of the map.
8. As a team, students decide which energy resources would be best and worst for each of the cities/towns highlighted on the maps.

Class discussion:

- Are there cities/towns on the map that could potentially use more than one renewable energy resource? Why or why not?
9. Tell students that their task for the next lesson will be to design a renewable energy plan for a city.

Class discussion:

- Thinking about the advantages and disadvantages of the renewable energy sources we explored, do you think using just one of these energy sources to power a community or town is enough? Why or why not?

Lesson plan part 2

Method

1. Divide students into pairs working with computers and their folios. Ensure students can access the Excel spreadsheet calculator.
2. Practice manipulating the spreadsheet as a class using the projector to show what happens when you add different values into it.
3. Give students time to work on Part 2 of the folio activity with their partners and use the map labelled Cleangreenton student plan to draw in where their energy generators will be situated.
4. At the end of the class, students can present their plans and maps and/or they can do a 'gallery walk' around the room to view the other groups' plans.

Reflection

As a class group **discuss**:

- What did you notice about the renewable energy plans of the other groups? Why do you think they made the choices they did?
- Do you think it is better to choose just one renewable resource to power a community, or more than one? Why?
- What is an important step we did not do in this project but would be essential if planning energy generation for a town? What are the social impacts? It's important to have input from the community. Scheduling forums, workshops and information sessions are key to create awareness and gain support from community members.
- How do engineering and technology impact society? How does society influence engineering and technology? (eg. Engineering and technology can impact people's quality of life by affecting the environment they live in. Society can control how quickly technology can advance or what kind of technology can be used.)
- How do engineering and technology impact the natural environment? How does the environment influence engineering and technology? (eg. Engineering/technology can cause damage to the environment if it creates pollution or disturbances but it can help the environment too depending on what kind of technology it is. Environmental conditions can constrain what kinds of technology can be used in a particular area.)

Success Criteria

Learners:

- Explain why renewable energy is important for energy generation.
- Describe why using more than one source of renewable energy in powering a community is important.
- Describe what elements need to be considered when building an energy generation plan for a town.

Resources

YouTube Video: Renewable energy 101: National Geographic (5 mins running time):

<https://www.youtube.com/watch?v=1kUEOBZtTRc>

<https://www.britannica.com/>

<https://arena.gov.au/what-is-renewable-energy/>

<https://www.forteachersforstudents.com.au/site/themed-curriculum/renewable-energy-in-australia/facts/>

Resources cont.

Reliable sites for information on wave energy

<https://www.ecogeneration.com.au/australias-wave-energy-inventors-look-for-a-break/>

<https://www.alternative-energy-tutorials.com/wave-energy/wave-energy.html>

<https://www.youtube.com/watch?v=EPFGQy4Bnjc&t=84s>

Extensions

Take a look at the Global atlas for renewable energy as an extension:

<https://irena.masdar.ac.ae/gallery/#gallery>

References

This lesson was adapted from the California Academy of Sciences: Optimal and sustainable: Renewable energy revamp lesson.