

Energy Sources Activity: Teacher Guide

Activity 1: Individual task - Background information (Page 3)

Proposed Duration: 15 minutes

In this activity, students are to individually share their knowledge about energy sources by answering 4 questions in their workbooks.

Activity 2: Individual reading – Understanding the rise of renewable energy in Australia (page 4 – 5)

Proposed Duration: 15 minutes

In this activity, students are to individually read the provided information on mega renewable energy projects in Australia. Special emphasis should be given to their awareness of a number of current and proposed renewable energy projects in Queensland, as detailed in Figure 3 on page 5, together with its supporting legend in Table 1 (also on page 5).

Activity 3: Competition details: The model sustainable town (Page 6)

Proposed Duration: 10 minutes

In this activity, students are to be in their groups. They are given 15 minutes to read through the competition details.

Teachers are to reinforce to the class that all design decisions and calculations must be written down in their workbooks. In answering questions in the workbook, students are to respond individually.

Activity 4: Group task: Designing your model sustainable town (Page 8 - 17)

Proposed Duration: 3 hours

In this activity, students are to be in their groups. This is the main activity where groups carry out the design of a sustainable town, i.e., a town with no more than 600 people and to be run by a minimum of 50% renewable energy. Their design also has a budget of \$2.5 million.

Proposed Design

The activity starts with groups creating a proposed design where students go through a set of questions on pages 8 and 9, which guide them toward calculating the energy requirements of the town, together with a map (Page 10) where they indicate positions of services indicated in Table 2 on page 11.

Groups then complete Table 2 (Page 11) by filling in the quantity of services they have decided to implement, together with the total consumption of each service. They then add up the total energy consumption (i.e., energy requirements) of their town.

With this total consumption data, students can then determine the solar panel and wind turbine farms required to generate at least 50% (or more) renewable energy (Pages 12 to 14, where pages 13 and 14 are used as a space for working). *Please remind groups that they must show all their workings on pages 13 and 14.*

Final Design

Each group is given an A3 cardboard sheet with the map. They are to use this map to show their final design. Any changes that the group make in the final design should be recorded on Page 15.

Groups then detail their main ideas and math/science ideas on pages 16 and 17.

Activity 5: Individual task: Design Evaluation (Pages 18 and 19)

Proposed Duration: 30 minutes

In this activity, students are to individually assess their group's design by answering questions on pages 18 and 19.

Activity 6: Group task: Our fact sheet (Pages 20 and 21)

Proposed Duration: 1 hour

In this activity, students are to be in their groups. They are to explain their final sustainable design town design to the minister. They should be reminded to go into as much detail as possible.

Activity 7: Group task: Critical evaluation (Pages 22 to 25)

Proposed Duration: 2 hours

In this activity, students are to be in their groups.

- They are to be given the workbooks from a different group
- They are to go through the design and evaluation sections and critically analyse all design decisions and calculations.

Activity 8: Group task: Critical evaluation Presentation

Proposed Time: 1 to 1.5 hours per class

In this activity, students are to be in their groups. Each group is to present their design findings. After each group presentation, the group is to respond to questions from the evaluating group first, followed by questions from the class and teacher. Teacher is to ensure that questions are relevant to design considerations.