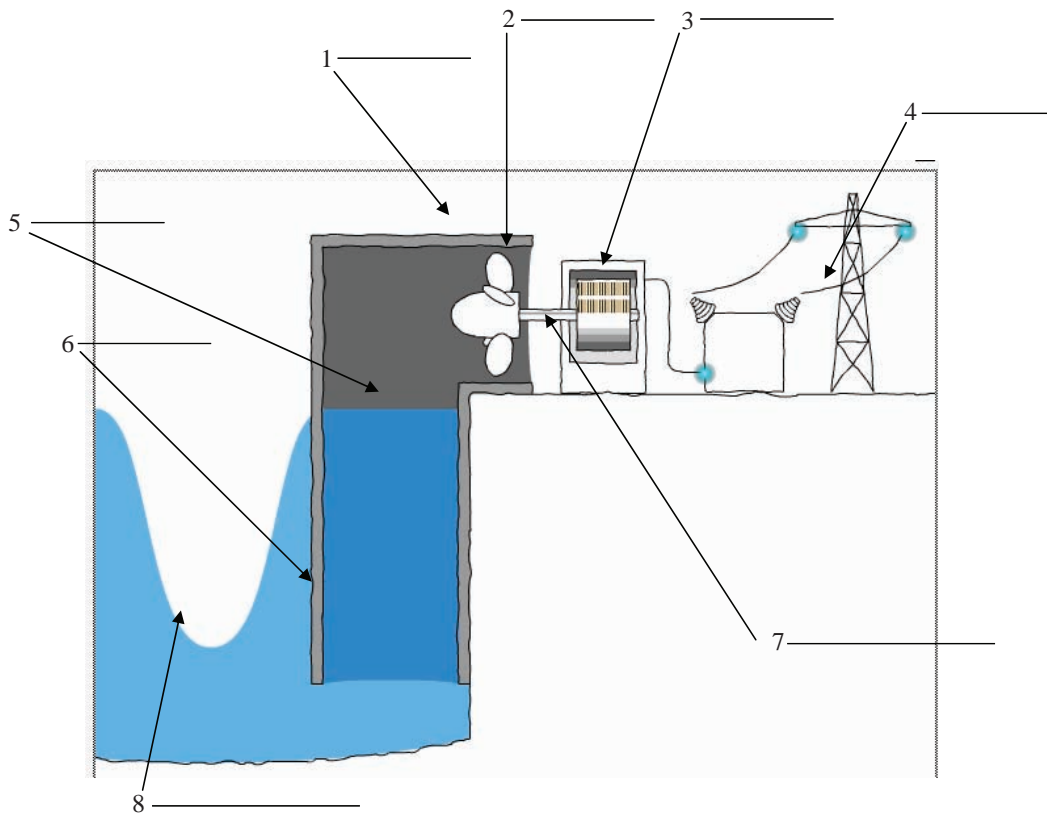


Exercise 1

Write the labels in the correct place on the diagram.



- air
- shaft
- turbine
- chamber
- generator
- pylons and cables
- waves
- pipe

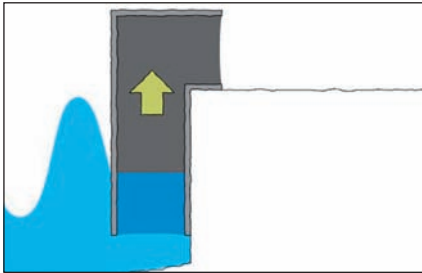
Exercise 2

Match the first part of each sentence with the correct ending.

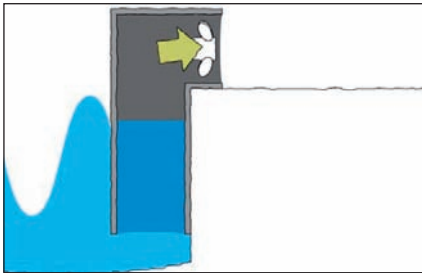
1. Waves powers a generator
2. The pipe converts the energy into electricity
3. The turbine is fitted with a turbine
4. The air is connected to a shaft
5. The turbine is sucked back down the pipe when the waves leave the chamber
6. The shaft is sent via pylons and cables to homes around the country
7. The generator crash into a chamber and drive air into a pipe
8. The electricity rotates as the air is forced past it

Exercise 3

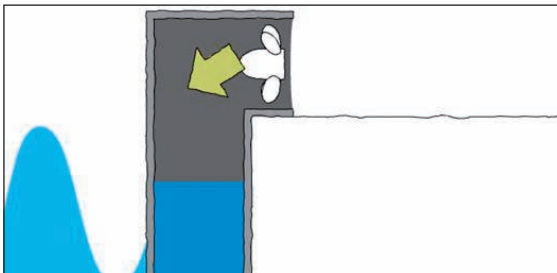
Write sentences about the pictures, using the prompts.



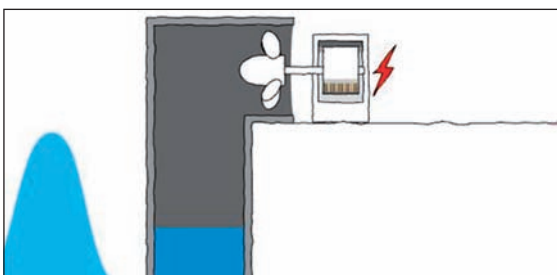
1. As waves crash ...
chamber, seashore, drive, air,
pipe, top, chamber



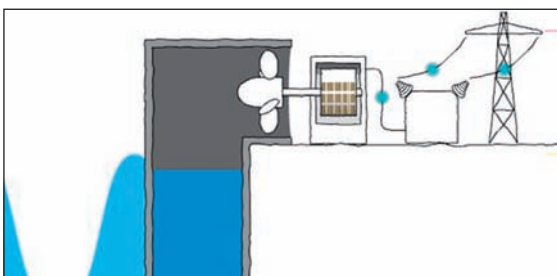
2. The pipe is fitted with a
turbine ...
rotate, air, force, past



3. As the waves leave the
chamber ...
air, suck, pipe, keep, turbine,
move



4. The turbine is connected to a
shaft which ...
power, generator, convert,
energy, electricity



5. Electricity is sent ...
pylon, cable, home, country

Objectives

Science

Students learn how the energy in waves can be used to produce electricity.

Language

Skills: Speaking, listening, reading and writing

Grammar: Present simple tense, present simple passive, relative clauses with *which*

Vocabulary: Nouns: *shaft, turbine, chamber, generator, pylons, cables, waves, pipe, energy, electricity, seashore*

Verbs: *harness, produce, crash, drive, rotate, force, suck, connect, power, convert*

Activities

Activities	Language skills
Students label a diagram showing how wave power produces electricity	Vocabulary
They discuss how they think the process works	Speaking; vocabulary; present simple tense
They watch the animation and check if they were correct	Listening; reading; vocabulary
They do a matching activity to make sentences about the process	Reading; vocabulary
They look at a picture sequence and write captions using prompts	Writing; vocabulary; present simple tense; present simple passive; relative clauses with <i>which</i>
(Groups only:) They give an oral commentary on the animation	Speaking; vocabulary; present simple tense; present simple passive; relative clauses with <i>which</i>

Procedure**With the whole class**

(Typical situation: whole class watching the presentation and animation on an interactive whiteboard or projector.)

1 [Slide 1] Introduce the topic. Ask the class what they know about wave power and how it is used to generate electricity. Introduce some key vocabulary (see above). Then ask the students to work in pairs or groups and do exercise 1 on the worksheet: they label the diagram. Monitor and help.

- 2 Then ask the students to work in groups, talking about the diagram and saying how they think wave power is used to generate electricity. Monitor and help, but do not explain the process at this point.
- 3 [Slides 2 and 3] Play the animation. Tell the students to listen and watch and check the labelling on their diagrams. Ask them if they were right about how wave power is used to generate electricity. Check that they have understood the whole process.
- 4 [Slide 4] Students work in pairs and do exercise 2 on the worksheet: they match the first part of each sentence with the correct ending. Afterwards, check answers with the whole class. (See answer key.)
- 5 Grammar focus 1 and 2 (optional – see below).
- 6 Tell students not to look at exercise 2 while they do the next exercise. Students work in pairs or groups and do exercise 3 on the worksheet: they write sentences about the pictures using the prompts. Monitor and help. When students have finished, ask them to read out their sentences. (Sentences may differ from the suggested answers in the answer key.)

With groups (one group studies wave power and then presents it to the class)

(Typical situation: students arranged in groups around computers eg, in a language lab)

- 1 [Slide 1] Ask the students to work in pairs or in their group and to do exercise 1 on the worksheet: they label the diagram. Monitor and help.
- 2 Then ask the students to work in their group, talking about the diagram and saying how they think wave power is used to generate electricity.
- 3 [Slides 2 and 3] Students play the animation, listening and watching to check the labelling on their diagrams and to see if they were right about how wave power is used to generate electricity.
- 4 [Slide 4] Students do exercise 2 on the worksheet: they match the first part of each sentence with the correct ending. Afterwards, they can check their answers with the answer key.
- 5 Grammar focus 1 and 2 (optional – see below).
- 6 Tell students not to look at exercise 2 while they do the next exercise. Students do exercise 3 on the worksheet: they write sentences about the pictures using the prompts. They can either look at the suggested answers in the answer key or play the animation again to check their answers. (NB Students' sentences may differ from the suggested answers in the answer key.)
- 7 [Slide 5] The group gets ready to give an oral commentary on the animation. They may wish to rehearse once or twice. Play the animation without sound; students give the commentary.

Grammar focus 1 (optional): present simple passive

- 1 Focus on completed sentence 4 from exercise 2: *The air is sucked back down the pipe when the waves leave the chamber.* Write the sentence on the board or ask students to highlight it on their worksheet. Underline the passive verb form *is sucked back*. Ask students to identify whether this verb form describes an active process or a passive process. Is the phrase describing what the subject (the air) does, or what happens to the subject?
- 2 Explain to the students that scientific processes are often expressed using the present simple passive, because the most important thing is the event and not who or what carried it out. Ask students to identify some other examples of the present simple passive in exercise 2 (*is fitted with, is connected to, is sent, is forced*)
- 3 Write the structure of the present simple passive on the board: *am/are/is + past participle.*
- 4 If you wish, give students further grammar exercises practising the present simple passive to describe processes.

Grammar focus 2 (optional): relative clauses with which

- 1 Focus on completed sentences 2 and 3 from exercise 2: *The pipe is fitted with a turbine. The turbine rotates as the air is forced past it.* Write the sentences on the board or ask students to highlight them on their worksheet. Ask students if they can think of a way of joining the sentences together into one. See if anyone can suggest using *which* to replace *the turbine* in the second sentence: *The pipe is fitted with a turbine which rotates as the air is forced past it.*
- 2 Explain to the students that *which* is a relative pronoun that is used to replace the subject or object of the verb and also to join parts of a sentence together.
- 3 Write completed sentences 7 and 8 on the board or ask students to highlight them on their worksheet: *The generator converts the energy into electricity. The electricity is sent via pylons and cables to homes around the country.* See if students can join the sentences together with *which*: *The generator converts the energy into electricity, which is sent via pylons and cables to homes around the country.*
- 4 Explain to students that while the relative pronoun *which* is used for things, *who* and *whom* can also be used for people. These relative pronouns can be replaced (sometimes but not always) by another relative pronoun, *that*.
- 5 If you wish, give students further grammar exercises practising relative clauses.

Wind power**Worksheet answer key****Exercise 1**

1. pipe
2. turbine
3. generator
4. pylons and cables
5. air
6. chamber
7. shaft
8. waves

Exercise 2

1. Waves crash into a chamber and drive air into a pipe.
2. The pipe is fitted with a turbine.
3. The turbine rotates as the air is forced past it.
4. The air is sucked back down the pipe when the waves leave the chamber.
5. The turbine is connected to a shaft.
6. The shaft powers a generator.
7. The generator converts the energy into electricity.
8. The electricity is sent via pylons and cables to homes around the country.

Exercise 3**Suggested answers:**

1. As waves crash into a chamber on the seashore, they drive air into a pipe on the top of the chamber.
2. The pipe is fitted with a turbine which rotates as the air is forced past it.
3. As the waves leave the chamber, air is sucked back down the pipe keeping the turbine moving.
4. The turbine is connected to a shaft, which powers a generator to convert the energy into electricity.
5. Electricity is sent via pylons and cables to homes around the country.