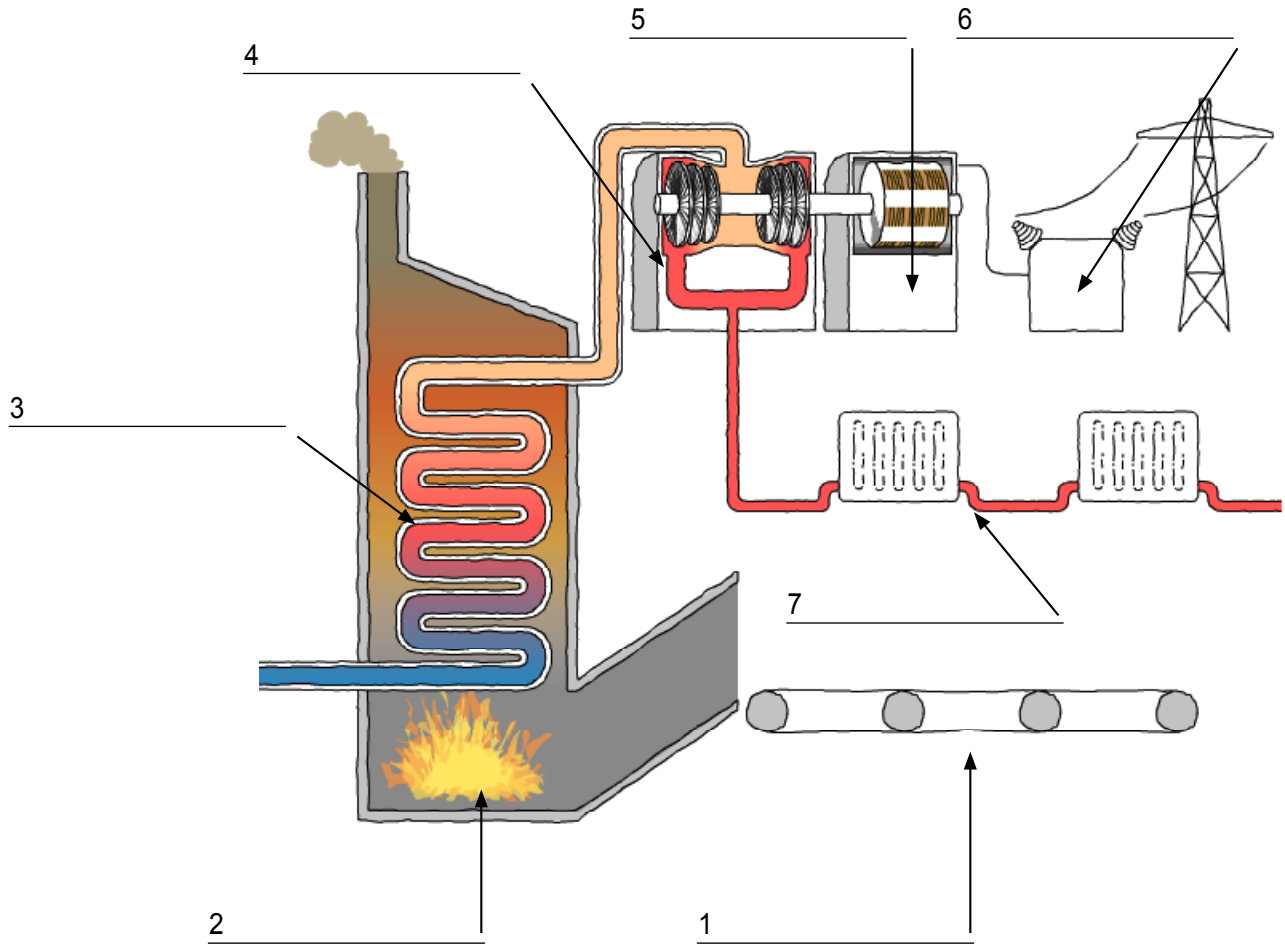


Exercise 1

Look at the diagram of a CHP plant. Write sentences to say what happens at the numbered points on the diagram, using the prompts.



1. _____

biomass, CHP plant

2. _____

burn, very high temperatures

3. _____

heat, water, make, steam

4. _____

steam, spin, turbine

5. _____

turbine, spin, drive, generator, make,
electricity

6. _____

electricity, send, cables, homes

7. _____

steam, run, pipes, use, heating

Exercise 2

Join the words to make sentences showing the correct sequence of events.

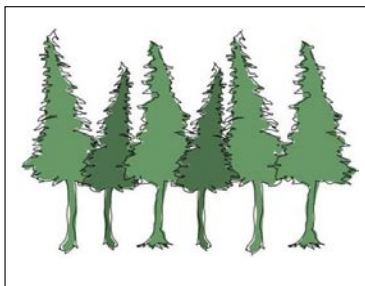
Trees	drive	heating
Biomass	absorb	generators
Water	make	turbines spin
Steam	is burned	the burning biomass
Turbines	is used for	via cables to homes
Generators	is sent	at high temperatures
Electricity	is heated by	electricity
Steam	makes	carbon dioxide

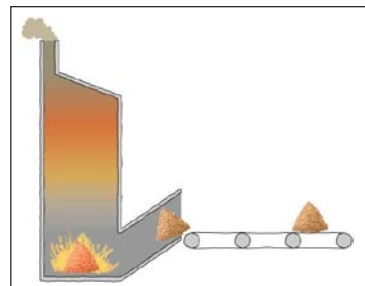
Now write your sentences in the table.

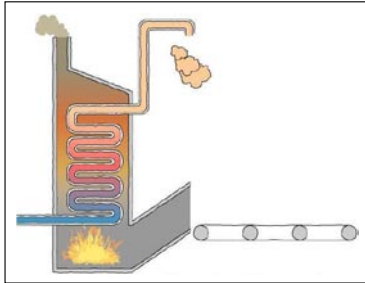
Trees
Biomass
Water
Steam
Turbines
Generators
Electricity
Steam

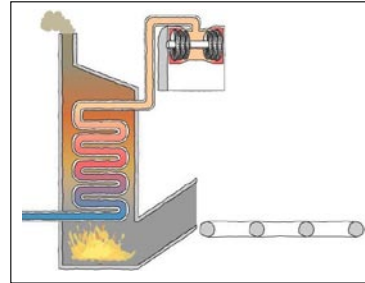
Exercise 3

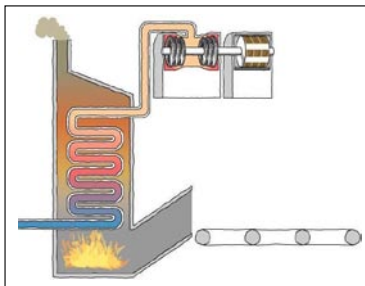
Write the number of each picture (1-8) next to the correct sentence in exercise 2.

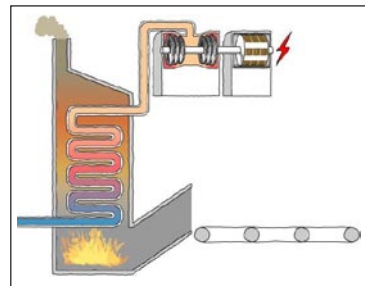


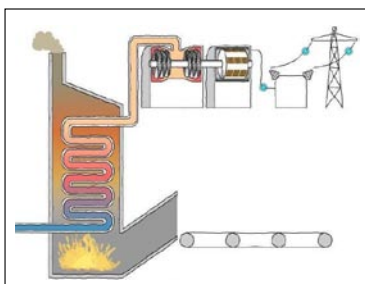


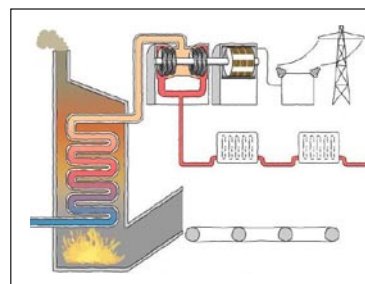












Objectives

Science

Students learn how a combined heat and power plant burns biomass to provide both electricity and heating.

Language

Skills: Speaking, listening, reading and writing

Grammar Present simple tense, present simple passive

Vocabulary: Nouns: *biomass, CHP plant, temperatures, steam, turbine, generator, electricity, cables, pipes, carbon dioxide, power station, energy, climate change*

Verbs: *spin, drive, absorb, harvest, chop up, escape, release*

Activities

Activities	Language skills
Students say what they know about how a CHP plant works	Speaking; vocabulary; present simple tense
They write labels for a diagram showing the process	Writing; vocabulary; present simple tense; present simple passive
They watch the animation and check if their labels are correct	Listening; reading; vocabulary
They produce sentences from a table	Writing; reading; vocabulary; present simple tense; present simple passive
They order a set of pictures showing the sequence of events in how a CHP plant works	Reading; speaking; vocabulary
(Groups only:) They give an oral commentary on the animation	Speaking; vocabulary; present simple tense; present simple passive

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 to say what they know about combined heat and power plants (CHP plants). Introduce some key vocabulary (see above) but do not go into detail at this point. Then ask the students to work in groups and do exercise 1 on the worksheet: they study the diagram, try to work out how a CHP plant works, and write sentences using the prompts. Monitor and help.
- 2 Ask the class to discuss whether they think burning biomass in a CHP plant adds to climate change. Why/why not? Encourage students to tell you their ideas but do not give the correct answer at this point.

- 3 [Slides 2 and 3] Play the animation. Tell students to watch and listen carefully to see if the sentences they wrote in exercise 1 on the worksheet are correct. Ask them also to listen to find out whether burning biomass in a CHP plant adds to climate change. When they have finished watching, ask them for the answer to this question. (Burning biomass in a CHP plant does not add to climate change, as long as we keep growing new trees to replace those turned into biomass.) Then get students to check their answers to exercise 1 on the worksheet in groups. (See answer key.)
- 4 Grammar focus (optional – see below).
- 5 [Slide 4] Tell students not to look at exercise 1 while they do the next exercise. They work in pairs and do exercise 2 on the worksheet: they join the words to make sentences. Monitor and help. Check answers with the class. (See answer key.)
- 6 Students do exercise 3 on the worksheet in pairs: they write the number of each picture next to the correct sentence in exercise 2. Check answers with the class.

With groups (one group studies CHP plants 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 their group and do exercise 1 on the worksheet: they study the diagram, try to work out how a CHP plant works, and write sentences using the prompts.
- 2 The students discuss in their group whether they think burning biomass in a CHP plant adds to climate change. Why/why not?
- 3 [Slides 2 and 3] Students play the animation and watch and listen carefully to see if the sentences they wrote in exercise 1 on the worksheet are correct. They also listen to find out whether burning biomass in a CHP plant adds to climate change. When they have finished watching, they should discuss the answer to this question. (Burning biomass in a CHP plant does not add to climate change, as long as we keep growing new trees to replace those turned into biomass.) Then students check their answers to exercise 1 on the worksheet using the answer key.
- 4 Grammar focus (optional – see below).
- 5 [Slide 4] Tell students not to look at exercise 1 while they do the next exercise. Students work in their group and do exercise 2 on the worksheet: they join the words to make sentences. They can check their answers with the answer key.
- 6 Students do exercise 3 on the worksheet in pairs: they write the number of each diagram next to the correct sentence in exercise 2. They can check their answers with the answer key.
- 7 [Slide 5] Groups get ready to give an oral commentary on the animation. They can rehearse it once or twice if they wish. Play the animation without sound; students give the commentary.

Grammar focus (optional): present simple passive

1. Focus on the suggested answer for sentence 1 in exercise 1: *Biomass is taken to a CHP plant*. Write the sentence on the board or ask students to highlight it on their worksheet. Underline the passive verb form *is taken*. Ask students to identify whether this verb form describes an active process or a passive process. Is the phrase describing what the subject (the biomass) 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 is carrying it out.
3. Write the structure of the present simple passive on the board: *am/is/are + past participle*.
4. Ask students to look at the table for exercise 2 on the worksheet, and to identify some more present simple passive verbs in the middle column (*is burned, is used for, is sent, is heated by*).
5. If you wish, give students further grammar exercises practising the present simple passive to describe processes.

CHP plants**Worksheet answer key****Exercise 1**

Suggested answers:

1. Biomass is taken to a CHP plant.
2. It is burned at very high temperatures.
3. This heats water and makes steam.
4. The steam spins a turbine.
5. As the turbine spins, it drives a generator which makes electricity.
6. Electricity is sent via cables to homes.
7. The steam is run into pipes and used for heating.

Exercise 2

Trees absorb carbon dioxide.
 Biomass is burned at high temperatures.
 Water is heated by the burning biomass.
 Steam makes turbines spin.
 Turbines drive generators.
 Generators make electricity.
 Electricity is sent via cables to homes.
 Steam is used for heating.

Exercise 3

- | | |
|---|--|
| 3. Trees absorb carbon dioxide. | 6. Biomass is burned at high temperatures. |
| 2. Water is heated by the burning biomass. | 4. Steam makes turbines spin. |
| 7. Turbines drive generators. | 1. Generators make electricity. |
| 8. Electricity is sent via cables to homes. | 5. Steam is used for heating. |