

LESSON 4

Note: Have students read the Student Book, pp.26-29. (This can take place as a pre-lesson activity, done outside of curriculum time, a day or two ahead of the lesson.)

Warm-Up

- 1 Ask: *Have you heard about the term global warming? What do you understand by this term? Is global warming something positive or negative?*

Discuss briefly with students to see how much they are aware of global warming.

10.3 Air Quality and Climate (pp.26-27)

How does global warming lead to climate change? (pp.26-27)

- 2 Teach students about global warming.
 - Explain how the Earth is overheating. State that activities such as burning of fossil fuels and large-scale deforestation are causing the build-up of carbon dioxide in the atmosphere.

Ask: *What specific examples of human activities can you think of that involve the burning of fossil fuels, which contribute to the carbon dioxide build-up?*

Answer: Examples may include the use of vehicles for transportation, production of goods in manufacturing and production of electricity in power stations.

- Define the term *global warming* for students.
- Explain the greenhouse effect. Refer students to Figure 10.1 on p.26.

AR (p.26)

21st Century Skills: *ICT literacy*

Show the AR clip on greenhouse effect by projecting on a screen or get students to watch the AR on their own mobile devices.

- 3 Go through the consequences of global warming in Figure 10.2 on p.27.
 - Ask: *Have you read about these consequences happening around the world in newspapers or heard about them from news broadcast? Which places in the world are or will likely be experiencing extreme climate change?*

Answer: Students may cite examples from the current news. Places that will likely to be affected badly by climate change include Mumbai in India and Gansu in China.

Mumbai is a coastal city and may experience frequent flooding. Gansu, already one of the driest region in China, may experience extreme drought.

- *Enrichment (Think) (p.27)*

21st Century Skills: *critical thinking, communication*

Ask: *What other direct or indirect consequences of global warming can you think of?*

Get students to discuss in groups and share their answers with the class.

Support less able students by giving simple examples to help them understand the difference between direct and indirect consequences.

Answer: Other consequences may include shortage of food, increased health issues, decreased land area and increased death.

- 4 Explain to students the purpose of the Kyoto Protocol.

Support less able students by showing them information in charts, graphs and infographics, e.g. annual carbon dioxide emissions by country, signatory countries on the world map, etc.

Challenge more able students to find out more about the more recent Paris Agreement and how it is different from the Kyoto Protocol.

- *Enrichment (Activity) (p.27)*

Have a class debate on whether the Kyoto Protocol is a success or failure. Give students a week or two to do their research and prepare for this debate. Tell students to be ready for the class debate on the Kyoto Protocol to be conducted during another class period.

Wrap-Up

- 5 Summarise the main learning points of the lesson and Section 10.3. Write on the board using a concept map or graphic organiser. You may want to use the relevant part of *Let's Map It* on p. 30.
- 6 *Let's Practise (p.27)*

AO1: *Knowledge with understanding*

 - Discuss the answers to the questions in the class or get students to do the questions as homework.

- 7 Get students to reflect on their learning for Section 10.3 on their own using the Theory Workbook. Get them to do Exercise 10D as homework.

Go to the Theory Workbook

Exercise 10D, pp.40-41

All answers to questions in the Theory Workbook are available at resource.marshallcavendish.com/teacher. Students can check the answers to *Let's Practise* at resource.marshallcavendish.com/student.

LESSON 5

Note: This lesson can be brought forward to give students enough time to prepare for the debate.

Warm-Up

- 1 Have students recall about the Kyoto Protocol.

Ask: *When and in which country was the Kyoto Protocol made? How many countries signed the treaty during that time? What is the purpose of the treaty?*

Answers: Students should be able to recall the answers from previous lesson. The Kyoto Protocol was made in December 1997 in Japan. 166 countries signed the treaty. The purpose of the treaty is to reduce emissions of carbon dioxide and other gases that cause global warming.

Class Debate

- 2 *Enrichment (Activity) (p.27)*

21st Century Skills: *critical thinking, communication, collaboration*

AO2: *Handling information*

- Conduct a class debate with the motion: *The Kyoto Protocol is not a failure.* The students should have made their preparations earlier.

Wrap-Up

- 3 Summarise the main points of the debate.

LESSON 6

Go to the Practical Workbook

Practical 10.1 Greenhouse Effect, pp.40-41

21st Century Skills: *collaboration, communication*

AO3: *Experimental Skills and investigations*

Objective: To show how the greenhouse effect works on Earth using models

Teacher's notes and answers to questions in the Practical Workbook are available at resource.marshallcavendish.com/teacher.

Warm-Up

- 1 Have students recall about the greenhouse effect.

Ask: *What is the greenhouse effect? What are the main greenhouse gases?*

Answers: Students should be able to recall the answers from previous lesson. The greenhouse effect is a warming effect produced when some heat from solar radiation is trapped in the Earth's atmosphere by greenhouse gases. Carbon dioxide and methane are the main greenhouse gases.

Doing the Practical

- 2 Brief students about the practical. Tell them to work in groups of three.
- 3 Have students do the experiment and complete the tasks given in the Practical Workbook.

Support less confident students by providing specific guidance as they perform the experiment.

Challenge the more able students to think about any improvements that can be made to the experiment and share with the class at the end of the practical lesson.

Wrap-Up

- 4 Ask: *Have the models used in the experiment successfully showed the greenhouse effect that occurs on Earth?*
Get students to explain their answer briefly.