

Name:

Class:

## Chapter 6: Physical and chemical change

# Science as a Human Endeavour

## Be more shellfish, use bioplastics

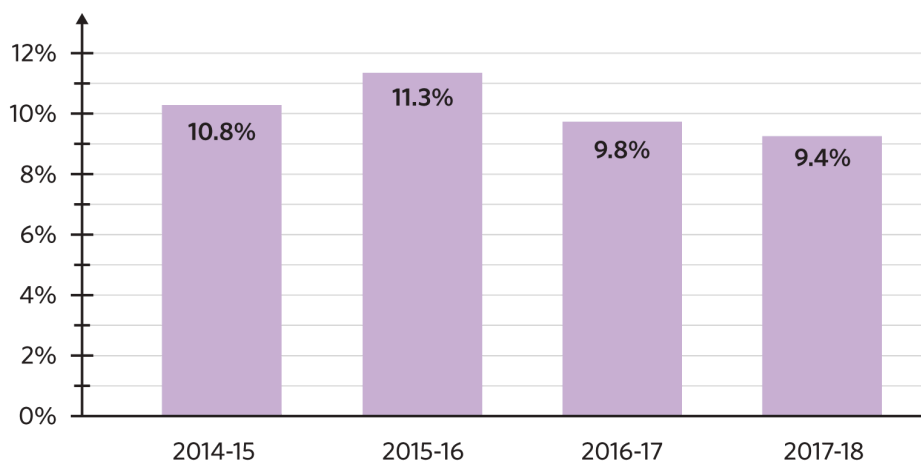
One of the challenges of this decade is to try to overcome the problem of world plastic pollution. Plastics are traditionally made from fossil fuels and take hundreds of years to break down. Despite knowledge of the problem, only 9% of the world's plastic is currently recycled, and in 2019 the amount of global plastic waste reached 353 million tonnes – which is enough waste to go from Earth to the Moon and return 35 times!

In contrast, to regular plastics, some bioplastics can break down in landfills to produce fertiliser.

Scientists sometimes look to the natural world for inspiration when making new products. In 2012, scientists from Harvard University produced a new type of bioplastic using waste prawn (shrimp) shells and silk proteins that they named 'shrilk'. As with all new substances, the atoms in shrilk bond in a unique pattern.

Shrilk is a transparent, flexible plastic that has the strength of aluminium. Shrilk might be able to be used as an alternative material for producing rubbish bags and nappies. This new product could help to solve our plastic waste issue.

**Annual Australian plastics recycling rates 2014-15 to 2017-18**



Source: Department of Environment and Energy (2019). 2017-2018 Plastics Recycling Survey National Report

## Literacy and numeracy questions

### Question 1

Developments in technology can occur when scientists share their ideas with others. This can be useful in helping to solve the plastic waste problem because

- A. plastics never break down.
- B. other scientists always know the answers.
- C. scientists can build upon their ideas and the ideas of other people.
- D. once a problem has been solved, there is no longer anything left to do.

### Question 2

Shrilk is the combination of the words

- A. metal and silk.
- B. plastic and silk.
- C. shrimp and silk.
- D. garbage bags and silk.

### Question 3

Paragraph three contains the phrase '... produced a new type ...' Which word could be used to replace the word 'produced'?

- A. synthesised
- B. decomposed
- C. disintegrated
- D. extinguished

### Question 4

The global use of plastic has doubled during the last 20 years. If this trend continues, how much plastic waste would be expected by 2040?

- A. 32 million tonnes
- B. 70 million tonnes
- C. 353 million tonnes
- D. 706 million tonnes

### Question 5

Why does the author include the graph of Australian annual plastic recycling rates?

- A. to show that local plastic recycling is increasing every two years
- B. to show that prawn waste can be used to make a biodegradable plastic
- C. to show that some plastics are exported to be recycled into prawn waste
- D. to show that only a small proportion of plastic has been recycled in Australia in recent years

### Question 6

Why does the author include the last sentence?

- A. to show that shrilk is transparent
- B. to suggest the reader should not recycle plastic
- C. to summarise how biodegradable plastics can be made
- D. to persuade the reader to consider the benefits of biodegradable plastics

## Answers

### Question 1

C. Scientists collaborate to share ideas to explain what did and didn't work.

### Question 2

C. Shrilk is a word made by combining the words shrimp and silk.

### Question 3

A. Synthesised has the same meaning as produced (to make something).

### Question 4

D. Paragraph 1 states that global waste is 353 million tonnes. Doubling that gives a total of 706 million tonnes of waste.

### Question 5

D. The author includes the graph to show that only a small proportion of plastic has been recycled in Australia in recent years.

### Question 6

A. The author includes the last sentence to persuade the reader to consider the benefit of bioplastics.