STARGAZERS TO SPACESHIPS



EXPLORE SPACE and BEYOND

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Nelson Literacy Directions

STARGAZERS
to Spaceships

CHAPTER 1 page 4

Stargazers and Seasons
Early humans survived by a process: observing the connection between what they saw in the sky and the seasons on Earth.

CHAPTER 2 page 8

Stargazers Track Time
How can we find a way to know exactly how long it is until the season changes?

CHAPTER 3 page 12

Stargazers See Circles
If we watch our skies and draw what we see, it seems that the Moon, stars and planets move in circles around us. Or do they?

TEXT TYPE Procedure

Pages 5–7



Why do seasons occur?



Is it a long, long, LONG time until summer, or just a long, long time?



Early stargazers watched the skies.

CHAPTER 4 page 16

Stargazing Discoveries
Oops ... looks like we're just another little planet, in another little galaxy, in a big universe.

CHAPTER 5 page 18

Stargazers Imagine Space
A story written to entertain people started them thinking about a great journey.

CHAPTER 6 page 20

Stargazers Travel in Space
At last, we have the technology to help us turn our dreams of space travel into reality.

CHAPTER 7 page 22

Stargazers Keep Watching!
Since our first trips into space, we have learnt much about our planet, our solar system and the stars beyond. Where to next?

INDEX AND GLOSSARY PAGE 24



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humans reach the Moon



The sky is the limit!

1 Stargazers and Seasons

Early Humans Observed

When the first recognisable humans were on Earth between a few million and 200 000 years ago, their lives would have been ruled by the seasons, as were the lives of their ancestors. It made sense to know as much as possible about the animals and plants throughout the year. Early humans also watched the movements of the Sun, Moon and stars. They would have linked their observations to finding ways to survive.



Early humans evolved from creatures like Australopithecus *(above).*



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TEXT TYPE Procedure

Goal

To survive by making connections between what happens in the sky, the seasonal changes on Earth, and the behaviour of animals and plants.

Survival Step 1: Gather Evidence

Find out as much as possible about the behaviour of animals and growing patterns of plants. Watch the movements of the Sun, Moon and stars.

Early humans learnt that those patterns could help them predict when and where they should go to find water, plants and animals. For example, a change in weather may have meant that it was time to go to a river to catch fish.





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Survival Step 2: Make Observations

Look for any patterns between plants, animals, seasonal changes and what happens in the sky. Observe when certain groups of stars or constellations appear. Notice the regular changes the Moon goes through.

Early humans would have observed the way the Sun, planets and stars changed throughout the year. They would have noticed the way the Moon changed each month or so. Then they would have seen how the world around them changed at the same time. Plants grew, flowered, produced seeds and died. Animals had babies, and moved about in search of food and water.



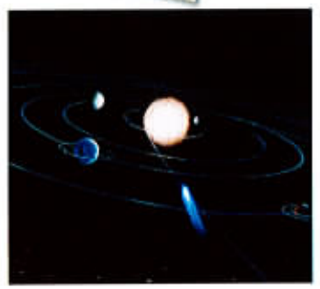
Every year, people observed that plants would flower, fruit and grow seeds at the same times.

Survival Step 3: Test Your Theories

Make theories about why these things happen. Use this information to predict what may happen in the future.

Early humans could have tested their theories by predicting what happened when the Sun, stars or planets were in a certain place in the sky. If early humans were able to find enough food and water, they would have concluded that their theories were correct.

Why Are There Different Seasons?



Earth moves in an ellipse.

We now know that Earth is tilted and travels around the sun in an ellipse (or flattened circle). For part of the year, when some parts of Earth are closer to sun, they are warmer. When others are further away, they are colder. This changing distance from the sun causes the seasons.

Survival Step 4: Remember Your Results

Pass your knowledge on to others so that they can benefit, too.



Early humans would have passed on their knowledge to their children through stories, art, dance and song. They would have remembered the way the world changed with the seasons. They would have used their knowledge to stay safe from dangerous weather, starvation and thirst. From this knowledge, farmers would have known when to plant or harvest their crops; herders would have known when their animals would give birth and make milk; and everyone would have known when to store food to survive.

2 Stargazers Track Time

Observing a Better Time



By about 10 000 years ago, humans had spread across the world. Instead of hunting and gathering food, they began to tame animals. They moved them from one place to another to find fresh pastures. Other humans settled in one place to grow their food.

Although early farmers understood why the seasons changed, they wanted to learn more about time.



An early human settlement was discovered in Skara Brae, in the Orkney Isles, North Scotland.

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Problem: What's the Time?

People wanted to know what time it was each day. They wanted to measure each season and divide the year up into months.

If people could find a way to measure time, they could tell exactly how many hours were left before dark. They would also know how many days or months there were until the next season.



Step 1: Observe the Sun

Early humans observed that the Sun cast a long shadow at dawn and dusk. It cast a short shadow at noon. Early "clocks" used shadows to tell the time.

The Sun rises and sets at different places in each season. People would have noticed where on the horizon the Sun rose and set on summer's longest day. They did the same on winter's shortest day.

What could be made to show where the Sun was in the sky and tell the time?