

# 9a The universe

## Vocabulary Celestial bodies



- 1 a) **10.5.2** Listen and say. Then, read the dictionary entries.

**planet** /plæni/ (n) a large round object in space that moves around a star e.g. the Earth

**asteroid** /æstərɔɪd/ (n) a small celestial body that moves around the sun (mainly between the orbits of Mars and Jupiter)

**comet** /kɒmɪt/ (n) a bright object with a long tail that travels around the sun

**galaxy** /gæləksi/ (n) a large group of stars and planets that extends over many billions of light years

**star** /sta:/ (n) a large ball of burning gas in space

**meteor** /mi:tɪə/ (n) a small mass travelling through space

**moon** /mu:n/ (n) any planet's natural satellite

**constellation** /kɒnstə'leɪʃən/ (n) a group of stars that form a pattern and are named after it

- b) Can you name the planets in our solar system?  
 Listen and check.

## Reading

- 2 **10.2.1** What do you know about the origins of the universe? What would you like to know about it? Write down two questions.  
 Listen and read the text. Can you answer your questions?

# How Did It All Begin?

Throughout history, mankind has wondered about the origin of the universe. Has it existed eternally with no beginning or end, or was it created at some point in time? Physicists still can't say for certain how the universe came to exist, or why it exists, but they have several theories ...

### Check these words

eternally, exist, startling discovery, expand, logically, explode, widely accepted, hypothesis, collapse, prior, trillion, endless, countless, expansion, contraction, infinite, motivation

### Study skills

#### Setting a purpose

Before you read a text, think what you already know about the topic. This will help you think what else you would like to learn about it.

- 3 **10.4.2** **10.4.9** Read the article again, then for questions 1-8, choose from theories A-C. The theories may be used more than once. Which theory/theories:

- |   |  |       |
|---|--|-------|
| 1 | say space, time, and matter have existed forever with no beginning or end?       | ..... |
| 2 | do most physicists support?  | ..... |
| 3 | suggests a reason why our universe has the ideal conditions for supporting life? | ..... |
| 4 | says our universe came from an earlier universe?                                 | ..... |
| 5 | say only one universe exists at any one time?                                    | ..... |
| 6 | is supported by evidence we can see?   | ..... |
| 7 | says our universe will eventually disappear?                                     | ..... |
| 8 | says our universe we are living in is unique?                                    | ..... |

### A The Big Bang Theory

Before the 20th century, people believed that the universe had existed forever, and had looked the same way forever. But in 1929, astronomers made a **startling** discovery. Looking through their telescopes they noticed that the galaxies in our universe are actually moving away from each other at enormous speed – our universe is expanding!

If our universe is expanding, then logically at some point in the past the entire universe was contained in a single point in space. The Big Bang Theory states that about 14 billion years ago, our universe exploded out of nowhere from a single point and it has been expanding ever since to form the universe we know today. Our universe, in other words, has not existed forever. It had a definite beginning. Before our universe came into existence there was nothing ... no time, space, matter, energy ... nothing! The Big Bang created time, space and matter.

The Big Bang Theory is currently the most **widely accepted** hypothesis for the origin of the universe. However, it still leaves many questions unanswered. For instance, it doesn't explain *why* the big bang happened in the first place.

### B The Cyclical Universe Theory

The Cyclical Universe Theory addresses the question, "What caused the big bang?" The answer it gives is the collapse and expansion of a prior universe.

According to the Cyclical Universe Theory, our universe began when another universe collapsed violently into a **single point** then exploded out again. Trillions of years from now, our own universe will stop expanding and begin to contract. Eventually, it will also collapse into a single point and explode out again giving rise to a new universe. Our universe is therefore just **the latest** in an endless series. Countless universes have preceded this universe and countless others will follow it. Space and time had no beginning. Cycles of expansion, contraction, collapse, and explosion have been going on forever.

### C The Multiple Universe Theory

According to the Multiple Universe Theory, what we have been calling the universe is actually nothing like we thought! It is just a single bubble in an infinite number of universes. We are actually living in a multiverse consisting of trillions of universes. The multiverse has existed forever, and each universe in it is different.

The main motivation behind the Multiple Universe Theory is to provide an explanation as to why our universe seems to be so perfectly suited towards supporting life. For many people, this fact demands an explanation. They feel it is too much of a coincidence that the conditions in our universe just happen to be right to make life possible.

The Multiple Universe Theory states that there is nothing mysterious about this. There are trillions upon trillions of universes in the multiverse and therefore at least a few of them will have conditions that make life possible. We simply happen to be living in one of these universes.

4 **10.5.2** Fill in: *expanding, exploded, collapse, prior, infinite*.


- 1 Astronomers have discovered that our universe has been ..... since it was formed.
- 2 Many universes may have existed ..... to the one we are living in.
- 3 Our universe might actually be just one of a(n) ..... number of other universes.
- 4 One day our universe may ..... and give rise to a new universe.
- 5 According to the Big Bang Theory, our universe ..... into existence from a single point.

#### Study skills

##### Avoid repetition

Writers use pronouns to avoid repeating the same nouns again and again. Identifying the nouns they refer to will help you understand the text better.

#### Identifying pronoun references

- 5 **10.4.5**  Look at the underlined pronouns in the text. Decide which noun each one refers to.

#### Grammar see p. GR19

- 6 **10.6.1** **10.6.3** Look at the words in bold. Which one is: a *compound noun*? an *-ing adjective*? a *compound adjective*? a *superlative adjective*? Check in the *Grammar Reference* section. Give one more example from each one of these.

#### Speaking & Writing

- 7 a) **10.3.2** Write one question for each theory in the text. Write the answers on a separate piece of paper.

*How did the universe start according to the Big Bang Theory?*

- b) **10.1.2** **10.3.2**  Swap papers and answer your partner's questions. Check with your partner.

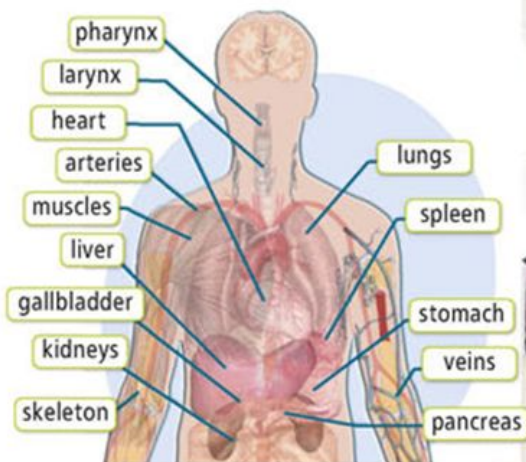
- 8 **10.4.4** **10.5.6** **10.5.7** **ICT** Do some Internet research and find out another theory about the origin of the universe. Write a short text. Present it to the class.

# 9b Human biology

## Vocabulary

### Human anatomy

- 1 Listen and repeat.



## Reading

### Study skills

#### Identifying the author's purpose

Authors write in order to inform, entertain, and persuade. Identifying the author's purpose helps us understand the text better.

- 2 **10.4.3** Read the title then skim the text. What is the text about? What does the author want us to know about the topic?
- 3 **10.4.1** Find the main idea in each paragraph. Compare with your partner.

### Study skills

#### Identifying main ideas

Paragraphs are usually laid out so that each one contains a main idea. Identifying the main idea helps us to understand what the paragraph is about. The main idea is usually found in the first or the last sentence of the paragraph. These sentences are called topic sentences.

## CAN WE PUT AN END TO AGING?



▶ The results of a recent experiment to slow the effects of the aging process in mice amazed scientists in Boston, USA. The scientists increased the amount of an enzyme called telomerase in the cells of the mice. Telomerase is an important enzyme because it repairs DNA. With increased telomerase in their cells, the mice's fertility improved, their fur began to look healthier, even their brains worked better. The scientists were hoping simply to slow the aging process in mice but, much to their surprise, they actually reversed it!

▶ Could we use the same process to stop humans from aging? It's possible, but it wouldn't be without risks. Scientists believe increasing the level of telomerase in human cells would put people at greater risk of cancer. What's more, it's unlikely that simply increasing telomerase would be enough to keep us young because hundreds of enzymes are involved in the aging process.

▶ Although scientists don't yet know exactly how and why we age, they have several theories. One theory is that as time passes, our bodies become less efficient at removing toxins from our cells. One way to try to stop the aging process is to keep cells as clean as possible. Scientists in New York successfully used this technique to restore the livers of old mice. The researchers bred special mice that did not lose their ability to remove damaged proteins from their livers. When

### Check these words

aging process, enzyme, cell, repair, fertility, process, reverse, efficient, toxin, technique, restore, breed, ability, protein, youthful, combat, artificially, development, prevent, serving, compare, wrinkles, fantasy