THE UNIVERSE

I. Do the quiz about the universe.

1. Cosmic Microwave Background radiation is used to explain
   a) Steady State theory
   b) Bing Bang theory
   c) Intelligent Design theory

2. About how long ago do scientists believe the universe began?
   a) 137 million years
   b) 1,370 million years
   c) 13,700 million years

3. What type of star is our sun?
   a) Yellow dwarf
   b) Red giant
   c) White dwarf

4. What is the average lifespan for stars similar to our sun?
   a) 1 billion years
   b) 10 billion years
   c) 100 billion years

5. What does a massive star form when it has fused its available hydrogen and helium?
   a) Red supergiant
   b) Red giant
   c) Green giant

6. What is formed when a massive star begins to collapse and then explodes?
   a) Neutron star
   b) Black hole
   c) Supernova

7. Which piece of evidence supports the Big Bang theory?
   a) The more distant galaxies are moving the slowest
   b) The more distant galaxies are moving the quickest
   c) The more distant galaxies are moving toward us

8. What is the name for the change in the light emitted by a moving object?
   a) Red shift
   b) Blue shift
   c) Ultra violet shift

II. Now read the passage below and check the answers

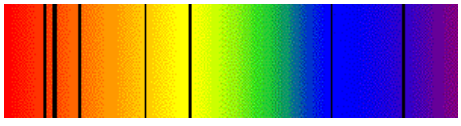
Scientists have gathered a lot of evidence and information about the universe. They have used their observations to develop a theory called the Big Bang. The theory states that about 13,700 million years ago all the matter in the universe was concentrated into a single incredibly tiny point. This began to enlarge rapidly in a hot explosion, and is still expanding today.

The universe contains all the galaxies, thought to number over one billion. The distances involved in galaxies are huge. The distance from one star and another in a galaxy is millions of times more than the distance between the planets in the solar system. Meanwhile, the distance from one galaxy to another is millions of times more than the distance between the stars in a galaxy.

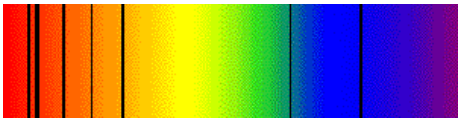
Stars form from massive clouds of dust and gas in space called nebula, an interstellar cloud of dust, hydrogen, helium and other ionized gases. As the gas falls together, it gets hot. A star forms when it is hot enough for nuclear reactions to start. This releases energy, and keeps the star hot. The outward pressure from the expanding hot gases is balanced by the force of the star´s gravity. Gravity pulls smaller amounts of dust and gas together, which form planets in orbit around the star.

Our sun is a type of star called a yellow dwarf. It has been shining for nearly five billion years, and has enough hydrogen fuel to last another five billion years. But the sun and other stars eventually begin to run out of hydrogen. Gravity makes the core of the star smaller and hotter, which results in the outer layers expanding, and so the star becomes a red giant star. What happens next depends on how massive it is. If its mass is relatively small, gravity eventually leads to the star contracting to form a white dwarf. A heavy weight star will still become a red giant, but then it blows apart in a huge explosion called a supernova, or its central part forms a neutron star, or even a black hole, if it is heavy enough.

Our sun contains helium. We know this because there are black lines in the spectrum of the light from the sun where helium has absorbed light. These lines form the absorption spectrum for helium. When we look at the spectrum of a distant star, the absorption spectrum is there, but the pattern of lines has moved towards the red end of the spectrum. This is called red-shift, a change in frequency of the position of the lines. Astronomers have found that the further a star is the more its light is red-shifted. Thus distant galaxies are moving away from us, and the further the galaxy is the faster it is moving away. Since we cannot assume that we have a special place in the universe this is evidence for a generally expanding universe.



Spectrum of the sun



Spectrum of a distant star

III. In paragraphs IV and V underline words or phrases used to talk about cause and effect

IV. Say the sentences below with different cause-effect markers

1. Gravity makes the core of the star smaller and hotter, which results in the outer layers expanding.
2. The outer layers expand, and so the star becomes a red giant dwarf.
3. Gravity leads to the star contracting to form a white dwarf.
4. The further a star is the more its light is red-shifted. Thus distant galaxies are moving away from us.
5. Since we cannot assume that we have a special place in the universe, this is evidence for a generally expanding universe.

V. Use the structure "the more…the more…" to talk about various situations

1. The more you earn, the more you…
2. The longer you sleep, the…
3. The faster the car, …
4. …
5. …

VI. Complete the text below with suitable words (1 word per gap)

1. The Earth _____ around the Sun in an _____.
2. The distance between the Earth and the Sun is _____ for cold or hot weathers.
3. The Earth does not spin _____ but slightly askew.
4. The axis is not _____, it is tilted on its _____.
5. The northern _____ tips into shadow, the nights are long and the days are short.
6. The Sun's rays reach the Earth at different _____.
7. The tilt of the Earth's axis gives us the _____.

Now listen to the recording and check your answers.

VII. **Use cause/effect markers to combine the sentences from exercise VI into one coherent text.** You can expand the text by giving examples or comparing and contrasting.

Source:

www.bbc.co.uk/gcsebitesize
www.youtube.com
www.uefap.com