

Answer ALL Questions

SECTION A: Reading

You should spend about 40 minutes on this section.

Read the following passage carefully and then answer the questions which follow.

In the last Ice Age much of the planet was covered in ice and snow. Prehistoric people, who lived at that time, needed fire to help them survive.

Ice and fire

The air is so cold that, as the men breathe out, their breath freezes and beads of ice collect on their beards. It is dark by the time they reach their home, a group of four huts built of skulls and bones, and covered with skins. The huts are beside a river in Russia, a bleak, windy, treeless landscape. Pushing aside the skins that hang in the doorway of a hut, they
5 smell the thick smoke and feel the warmth of the fire. It scorches the skin of their faces as they squat around it, the melting ice dripping from their wolf-skin clothes. Without fire these people could not possibly survive. The edge of the polar ice sheet is only a few hundred miles to the north, and is inching closer every year.

The Ice Age affected human life everywhere in the world. No place was as numbingly
10 cold as the Russian Plain. Frostbite would have been a constant danger, and one that could kill the healthiest person in a matter of hours. If chilled fingers or toes don't get enough blood for long enough, then the skin dies and turns black.

As the hunters thaw out, gently rubbing their fingertips to restore the blood flow, a child
15 comes in with more bones for the fire. This is their fuel: huge bones that are stripped of flesh and stored underground until needed. The bones are difficult to set alight, so a fire is kept burning night and day, carefully tended to stop it going out.

When they first arrived at this winter camp, travelling here from their summer home, they had to light a new fire. Perhaps they laid down some dried leaves and woody twigs, carefully collected and brought with them. On top of this they probably spread another
20 layer of dry material. To make a spark one of them may have struck a piece of flint against a lump of ironstone.

The flint and ironstone clashed together again and again, until eventually a spark fell on the leaves and twigs and began to burn. A lump of white fat, cut from one of the animals that they had killed may have been added to make the flames burn brighter. After the
25 twigs caught fire the first small bones were laid on top. Larger bones were then added, until the fire was thoroughly aflame.

Fire, like ice, shaped human behaviour. Learning to handle it safely was a very important thing.

As long as people lived in small huts or tents and lit their camp fires outside, the dangers
30 of fire were easily controlled. But once they began to build solid houses fire became dangerous. They made a fireplace out of a ring of stones to control the size of the fire. One way of controlling the height of the flames was to have quite a few small fires instead of one large one. Fire became more dangerous as houses became larger and more



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35 complicated. Whole villages regularly burned to the ground. These houses were made
of wood with a roof made of straw or dry heather. A red hot spark rising in the smoke
could quickly set light to the roof, and because the houses in a village were built so close
together, the fire could leap from roof to roof. The remains of burned out houses tell the
story of such overwhelming fires.

40 There is no doubt that fire was vital to the lives of these people. Fire kept them warm
and kept away frostbite and dangerous animals such as bears. It allowed them to cook
their food, to preserve skins and furs, and to smoke fish caught in the river. But it would
also have had a bad effect on the lungs of these people, living in huts with no ventilation.
A bad cough was probably so common 22,000 years ago that people simply took it for
granted.

**You should refer closely to the passage to support your answers.
You may include brief quotations.**

1. In what country do the people in the passage live?

(Total 1 mark)

Q1

2. Look again at lines 1 to 13.
Give **one** example that shows how cold it is outside, and **one** example that shows how
warm it is inside the hut.

(Total 2 marks)

Q2

3. **In your own words**, describe how the people in the passage make a fire.

(Total 4 marks)

Q3



SECTION B: Reading and Writing

You should spend about 40 minutes on this section.

Remind yourself of the passage *Impact alert – asteroids* from the London Examinations Anthology, and then answer questions 7 and 8.

Impact alert – asteroids

Asteroid facts

- an asteroid is an irregularly shaped lump of rock, measuring between 10m and 10km across.
- if you collected together all known asteroids, they would weigh less than the Moon.
- 5 • being composed of minerals and metals, asteroids are potentially worth a fortune.
- it is estimated that 30,000 asteroid fragments – meteorites – fall on the Earth every year. The vast majority land in deserts or in the seas, which between them make up most of the surface area of the Earth, and so they are not recovered.

What's the probability of Earth being hit by an asteroid in the near future?

- 10 Our being hit by a large asteroid in the future is a certainty. The question is when, and that is what astronomers are trying to find out now.

How much warning time do you think we might have?

We should be able to get 80 or 100 years' notice.

What's the best way to deflect a hazardous asteroid?

- 15 There is no best way because all asteroids are different.

What to expect if one hits

- Looking at the eyewitness reports from the 1908 Tunguska comet-impact, in Siberia, tells us what to expect if an asteroid hits the Earth. Amazingly, no people were killed but over a thousand reindeer were burnt to a cinder. As the shock wave smashed through the forest, it felled trees and stripped them of branches, leaving them looking like telegraph poles. Hunters, further away, were knocked unconscious and thrown to the ground by the blast. Everyone within 1,000 km of the impact saw the great flash in the sky from the explosion. The devastation covers an area approximately the size of Greater London. Should such an impact occur over any city, the human death toll would be measured in millions.
- 20

- 25 Tunguska was caused by an object no bigger than 100m in diameter, and you can expect impacts of that type every century or so. Of course, most will take place over one or other of the vast majority of unpopulated areas.

- In the case of a repeat of the dinosaur-killing impact of 65 million years ago, the proposed scenario is almost unthinkable. When a 10km-sized asteroid hits the ground, it will throw so much dust into the air that the planet will be bathed in a fiery meteor storm. Bill Napier, an astronomer from Armagh Observatory, says: "Global destruction occurs largely through the ejection of hot ash, causing huge numbers of shooting stars that just incinerate everything. Then there would be a massive destruction of the atmosphere."
- 30

- The chemicals released by the impact are likely to destroy the ozone layer and create enormous quantities of acid rain. The dust that does not fall back as meteorites becomes
- 35



suspended in the atmosphere, blocking out the sunlight. Seismic waves from the Tunguska impact were registered around the world. After a 'dinosaur-killer', the entire planet would be wracked with earthquakes. "I think conservatively, you are talking about Richter 9 quakes," says Napier.

40 **Would life survive a big one?**

Throughout Earth's history there have been at least five mass extinctions. The last one was of the dinosaurs. Every time, life survived and built up once again. So although life in some form would continue, predicting what would live and what might die is difficult. Without sunlight for photosynthesis, because of the Earth's dusty shroud, the collapse of food chains on land and in the upper layers of the oceans seems inevitable. Perhaps
45 seeds will survive to start again when the dust settles. Small scavengers such as rats and cockroaches might be able to adapt to the new regime. Life very deep on the ocean floor, around hot water vents, would probably be unaffected.

Worst Case Scenario

50 So, which should we worry about: global catastrophe dinosaur-killer size, or smaller city-smashers? Napier says: "I think the biggest danger is a Tunguska – or super-Tunguska-sized object. Especially if it lands on water, the Atlantic, say. The tsunami caused by this would be disastrous for cities around the Atlantic rim."

Between the 100m class and the 10km class is a size range of objects that also causes
55 concern. They are the asteroids measuring about 1km across. These would not cause global devastation but could have global consequences, with massive damage in every country on Earth. It is estimated that such an impact would cause the death of about a third of the world's population: billions of lives. So although the human race would survive, the biggest question is: could civilisation?

(Source: adapted from an article by Stuart Clark, *Focus*, January 2003)



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Edexcel Limited gratefully acknowledges the following sources used in the preparation of this paper:
Linda Gamlin, *Life in Prehistoric Times*, Reader's Digest Association Limited, 1997
Stuart Clark, 'Impact Alert – Asteroids', *Focus*, January 2003

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