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0510/11

October/November 2016

1 hour 30 minutes

No Additional Materials are required.

READ THESE INSTRUCTIONS FIRST

DO **NOT** WRITE IN ANY BARCODES.

Dictionaries are **not** allowed.

The number of marks is given in brackets [] at the end of each question or part question.

This document consists of **13** printed pages and **3** blank pages.

Exercise 1

Read the following leaflet about a popular attraction called Deacon Dale, and then answer the following questions.



WELCOME TO DEACON DALE!

Every year, thousands of people come to Deacon Dale, an area of outstanding natural beauty. Visitors have always been able to walk in the hills and admire the beautiful views, but this year, for the first time, they have the opportunity to explore another world below the ground.

Hidden under the hills, a network of caves has been discovered, and this year, five kilometres of tunnels which link these caves have finally been opened to the public. Now this exciting tourist attraction has something for everyone.

Deacon Hole

If you fancy something really different, you'll have to put on your climbing boots and a safety helmet to go down into Deacon Hole, the deepest cave in the network. To reach this cave, you have to face the challenge of crawling on your hands and knees through 800 metres of narrow tunnels. Kim Tomas, a recent visitor, said that this was really exciting: "The highlight of my visit," she said, "was the thrill of reaching the magnificent cave, after crawling in the dark for such a long time!"

Starting out

For young people who want to take up caving but lack confidence, there are easier practice caves to explore. Safety is taken very seriously. Our safety features include fixed ladders, first aid supplies and spare torches.

All the essential caving equipment is provided, including an over suit, boots, helmet, light and belt. Any other items, such as a wetsuit or knee and elbow pads, are available at an additional cost.

Your adventure will begin with a short talk by one of our highly qualified instructors, who will show you how to put on and use the equipment. You will then be ready to start your adventure! When you finally emerge from the caves, exhausted but proud, you will be awarded with a special achievement certificate.

Apart from offering an exciting sporting activity for all, Deacon Dale is ideal for groups. Not only does it encourage teamwork and trust, but it also provides participants with a shared sense of achievement.

Visitor information

If you would like more information about Deacon Dale, please visit our website at www.deacondale.com and for advice about educational bookings, email our groups co-ordinator. Details can be found on the website.

With plenty to do, whatever the weather, Deacon Dale is open all year round. Come and discover the magic!

(a) What has been found underground at Deacon Dale?

.....[1]

(b) What must you do before you can start climbing down to Deacon Hole? Give **two** details.

.....
[1]

(c) Where in Deacon Dale can beginners start caving?

.....[1]

(d) Which equipment will you have to pay extra for when you go caving at Deacon Dale? Give **two** details.

.....
[1]

(e) According to the leaflet, how will you feel after your first caving adventure?

.....[1]

(f) Why is a visit to Deacon Dale popular with groups? Give **two** details.

.....
[2]

[Total: 7]

Exercise 2

Read the following article about the Dana octopus squid, and then answer the following questions.

SQUID THAT LIGHTS UP IN THE DARK

Several species of squid, including the giant squid and the colossal squid, live in the deep waters of the ocean. However, very little is known about them. Scientists have therefore been particularly excited to discover another type of deep-sea squid – one which lights up in the dark.

This enormous squid, known as the Dana octopus squid, has been filmed for the first time in the wild. The film shows the squid, which can grow as big as a human, using bright, flashing lights on its arms to catch other creatures.

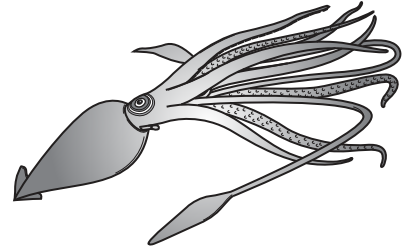
The glow-in-the-dark squid was discovered in 2006 in the dark waters of the North Pacific Ocean off south-eastern Japan by Japanese scientists, during an expedition led by Tsunemi Kubodera of the National Science Museum in Tokyo. They attracted the massive squid by putting food at the end of a long line which they dropped from the research ship down into the ocean, and lowered cameras alongside it. Two years previously, in 2004, the same team had also filmed the first ever images of a live giant squid.

The Dana octopus squid, like most squid, has eight arms with cat-like claws on its suckers. Other large squid use two long tentacles, which are like extra arms, to grab creatures while hunting, but scientists think that the Dana octopus squid blinds its victims using light-producing organs on the ends of two of its arms.

These organs, which are about the size of lemons, are called photophores, and they can be opened and closed like eyes. This deep-sea squid swims in a very dark environment, so their photophores can be used to light up its immediate surroundings. Additionally, the squid uses them to measure the distance between itself and its prey.

The Japanese scientists noticed that the Dana octopus squid also glows when it is not hunting. They believe that the squid uses these light signals as a form of communication. For example, a single flash of light seems to act as a warning signal when the squid is approaching unfamiliar objects. Further investigation revealed that these flashes of light could also be used to attract a mate.

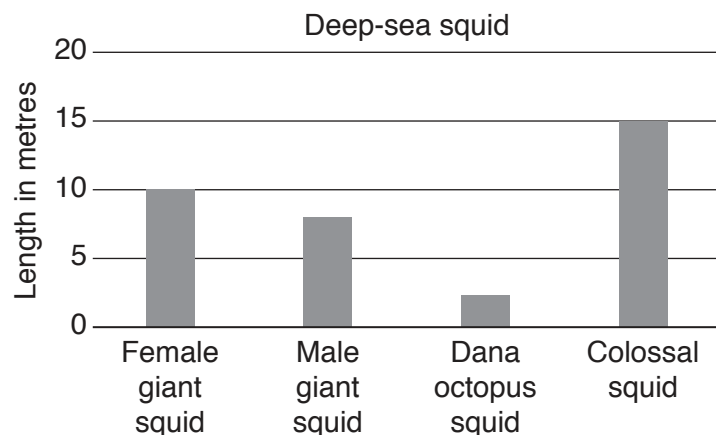
Researchers already had some ideas about how this glowing squid behaves, and the new video footage supports those theories. “It’s nice to have some proof,” says squid researcher Michael Vecchione of the Natural History Institute. “It has mostly been just theory and guesswork up until now.”



The footage also shows that the Dana octopus squid is a very effective hunter. It swims backwards and forwards and it is able to change direction rapidly by bending its body. On the film some were seen reaching speeds of 2.5 metres per second as they attacked the food.

“Some people have said that all deep-water squid are rather slow and heavy because their muscles are not very firm,” says Vecchione, “but this particular type of squid has got very muscular fins for swimming.”

The Dana octopus squid is thought to be one of the world’s largest squid and scientists believe that they live in large numbers in the tropical oceans. However, because they swim in such deep waters, it has not been easy to conduct more detailed research on them. Until the Japanese team caught them on film, no one had ever seen one alive.



- (a) Where exactly was the Dana octopus squid first filmed?
.....[1]
- (b) How did the Japanese scientists film the Dana octopus squid?
.....[1]
- (c) In which year was the giant squid first filmed?
.....[1]
- (d) According to the scientists, what is unusual about the way the Dana octopus squid catches its food?
.....[1]
- (e) What are the Dana octopus squid's light-producing organs comparable to in size?
.....[1]
- (f) Why is the video evidence of the Dana octopus squid important to the researchers?
.....[1]
- (g) Apart from using light-producing organs, what makes the Dana octopus squid such a good hunter? Give **two** details.
.....
.....[2]
- (h) Why is the Dana octopus squid better at swimming than other deep-sea squid?
.....[1]
- (i) Why is the Dana octopus squid so difficult to study?
.....[1]
- (j) According to the chart, which is the second longest squid **and** how long is it?
.....[1]

[Total: 11]

Exercise 3

Rhys Howell is a student at Glyn Derwe High School, Penally Road, Cardiff, CF2 3DR, Wales. Last term, just after his 17th birthday, he went to Blackheath Activity Centre with a large group of 60 students for five days of camping and outdoor activities. He had never slept in a tent before so he was a little nervous about going, and he was worried about whether he would enjoy all the activities. However, by the time they had all settled down in the coach and had started on their journey, he began to look forward to this new experience.

The activity centre was set in the middle of the countryside and Rhys loved waking up each morning to a beautiful view of the surrounding hills. However, he was not so happy about having to queue for breakfast!

The days were very busy with plenty of activities on offer. He had been really excited about trying different watersports, such as canoeing, sailing and swimming. In fact, it was the activities in the hills around the centre that he found most enjoyable – hill walking, rock climbing and, best of all, hiking at night.

On the third day, the students were given the opportunity to visit an attraction which was off-site. Several choices were available. Rhys loves swimming and thought about going to 'Splash World'. He also considered going horse riding, but he decided to try the indoor climbing wall in a nearby town because this was something that he had never done before.

At the campsite there was always something to do. All the students helped to prepare the meals and to wash up afterwards, and they were also expected to keep their tents clean and tidy. Rhys shared a large tent with five other boys. Although they did not know each other very well at the beginning of the holiday, they had become good friends by the end of it. Rhys decided that camping was great fun after all, and a great way to try new activities.

Before the students returned home, the manager of the centre asked them to fill in a feedback form about the holiday.

Imagine you are Rhys. Fill in the form, using the information above.

**Blackheath Activity Centre
Feedback Form**

Section A: Personal details

Full name:

Male/Female (please delete)

Age:

Name of school:

School address:

Section B: Your holiday

How did you travel to Blackheath Activity Centre?

How long did you stay? (please underline):

One or two days

three to five days

six or more days

What was your favourite activity?

Which off-site activity did you choose? (please circle):

Splash World

indoor climbing wall

horse riding

Was there anything that you did not like about your stay at this centre?

.....

Section C

In the space below, write **one** sentence saying how you felt about camping before the holiday, and **one** sentence about your opinion of camping after the holiday.

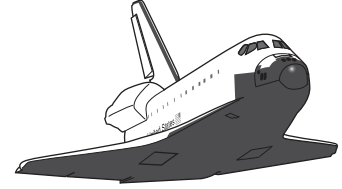
[Total: 14]

Exercise 4

Read the following article about the Mars One project, and then complete the notes on the following page.

LIFE ON MARS

Bas Lansdorp is the co-founder of the Mars One project and is looking for people who want to live on Mars as part of an exciting new project. He believes that with proper preparation a human settlement can exist there, and says that the settlement would provide valuable information for scientists around the world who are studying the possibility of living on another planet.



Undiscovered waters, mountains or faraway lands have always attracted explorers as they search for adventure on Earth, even in the face of extreme danger. It is perhaps not surprising that the Mars One project has already received thousands of applicants, all keen to achieve their dream of setting foot on Mars.

Future explorers take note, however. Mars is a planet very different from Earth. Its atmosphere is very thin, it is extremely cold and the water that remains is frozen or underground. Applicants, then, must be physically fit, adaptable and must work well in a team. There are also plans to televise the project as a reality TV show, from the initial selection of participants to everyday life on Mars.

The first four settlers will be transported to Mars in 2026. Those who are chosen to go will live together in a small community. In order for them to stay alive, energy will be generated from solar panels and water will be extracted from the soil and recycled. The new settlers will attempt to grow their own food, but they will also have an emergency food supply and will receive deliveries when new explorers arrive. After two years, four more people will be sent to join them.

The Mars One project advisers say that, when the number of settlers reaches twenty, the community will be self-sufficient. This means that they will be able to take care of themselves and continue to build the settlement on their own.

So far, no human has ever visited Mars. Critics say that the surface of Mars is extremely hostile, and the planet cannot support human life. Radiation levels are very high, and this could lead to an increased risk of cancer. However, the project team have already thought of this and will advise the settlers to wear protective clothing at all times.

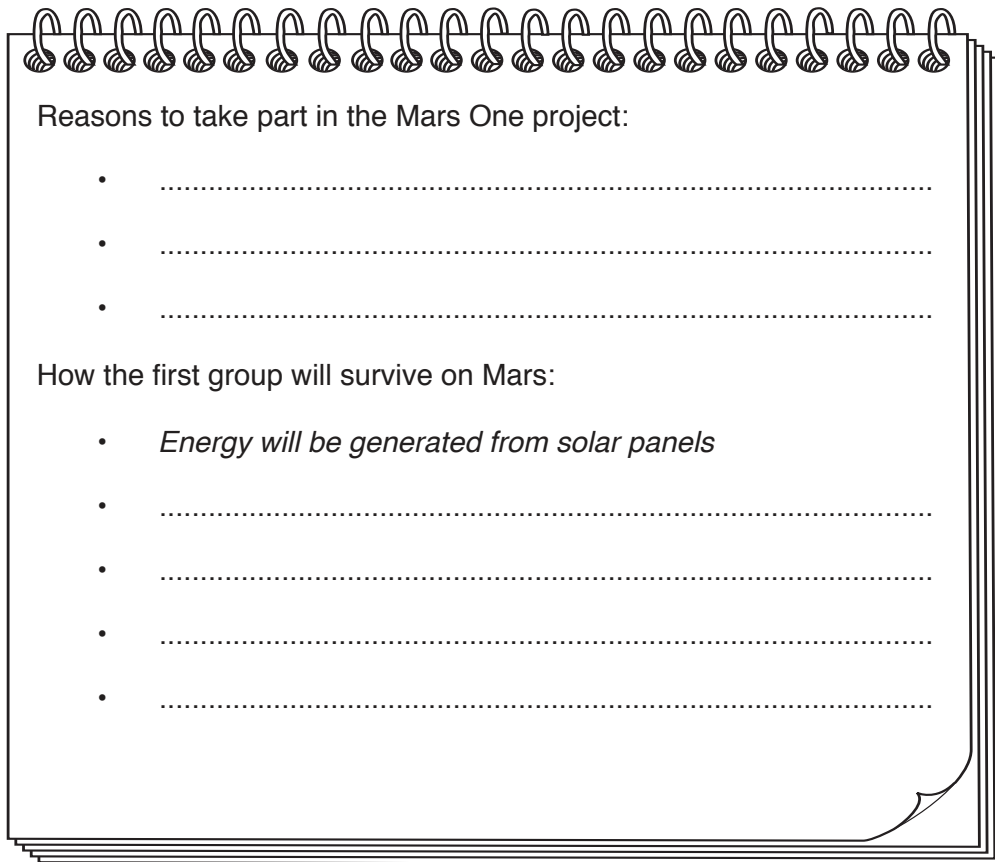
The people who run the Mars One project are confident that it can happen. Tom Acosta, an astronaut who has just returned to Earth after five months in space, has shown interest and has even said that it would be an honour to be one of those selected to go to Mars.

Funding the project may be difficult as it would cost \$5.9 billion to send the first group. However, Bas remains confident that their financial target will be met. "This could be the biggest thing that mankind has ever done," he says. "Humans are naturally curious and so many people want to explore beyond our world; our dream of going to Mars will come true."

Whether or not the Mars One project will achieve its goal, the publicity generated from televising the whole process means that the world will surely be watching.

You are going to give a talk to your school's science club about the Mars One project. Prepare some notes to use as the basis for your talk.

Make short notes under each heading.



Reasons to take part in the Mars One project:

-
-
-

How the first group will survive on Mars:

- *Energy will be generated from solar panels*
-
-
-
-

[Total: 7]

Exercise 5

Imagine that you have given your talk to your school's science club. Now your teacher wants you to follow this up with a summary for homework.

Look at your notes in Exercise 4 above. Using the ideas in your notes, write a summary about the Mars One project.

Your summary should be about 70 words long (and no more than 80 words long). You should use your own words as far as possible.

.....

.....

.....

.....

.....

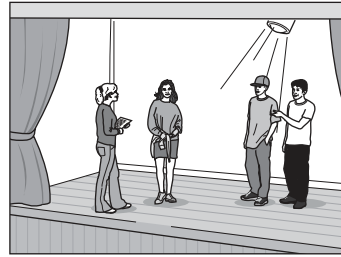
.....

.....

.....

[Total: 5]

Exercise 6



You have recently joined a new club at school.

Write an email to a friend telling them about the club.

In your email, you should:

- explain how you found out about the club
- say what you enjoy about it
- say why you think your friend should join the club too.

The pictures above may give you some ideas, and you should try to use some ideas of your own.

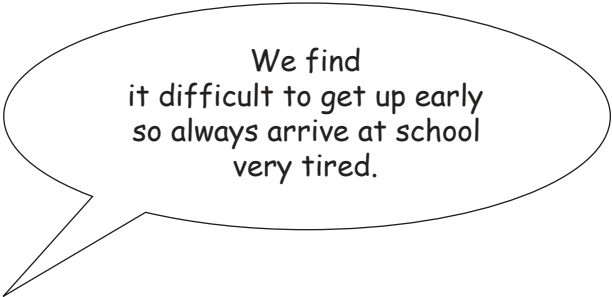
Your email should be between 100 and 150 words long.

You will receive up to 7 marks for the content of your email, and up to 6 marks for the style and accuracy of your language.

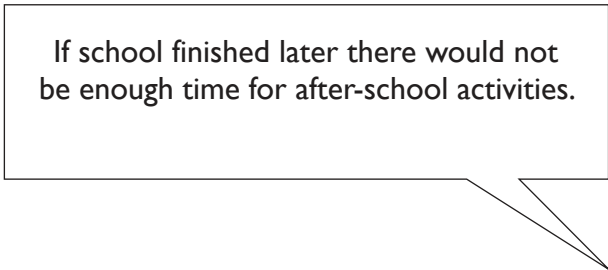
Exercise 7

It has been suggested that the times of the school day should be changed, to start and finish one hour later.

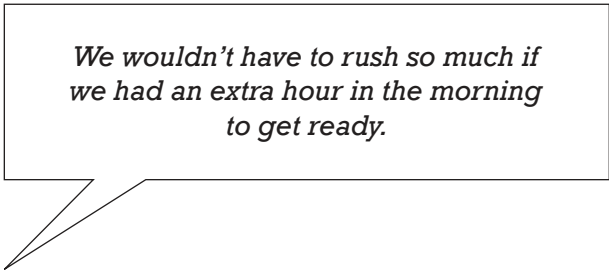
Here are some comments from your friends about this:



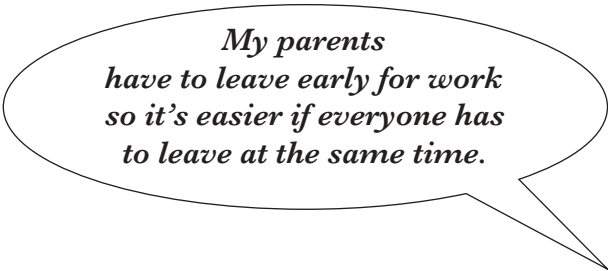
We find
it difficult to get up early
so always arrive at school
very tired.



If school finished later there would not
be enough time for after-school activities.



*We wouldn't have to rush so much if
we had an extra hour in the morning
to get ready.*



*My parents
have to leave early for work
so it's easier if everyone has
to leave at the same time.*

Write an article for the school magazine, giving your views.

The comments above may give you some ideas, and you should try to use some ideas of your own.

Your article should be between 100 and 150 words long.

You will receive up to 7 marks for the content of your article, and up to 6 marks for the style and accuracy of your language.

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