

Designing Investigation 1

Q:1 Read this article.

Save energy and save money

Recent research shows that money can be saved in most houses by reducing energy losses. Scientists investigated energy costs in houses. They compared houses where the occupants had similar lifestyles. Some of the houses had large amounts of thermal insulation.

The scientists compared these houses to similar houses with only small amounts of thermal insulation. They found that some households could save more than £500 per year by improving insulation.

Match words, A, B, C and D, with the numbers 1– 4 in the sentences.

- A conclusion
- B control variable
- C dependent variable
- D independent variable

In this investigation, the amount of insulation was the ... 1 ...

Lifestyle was the ... 2 ...

Energy cost in a house was the ... 3 ...

The amount of money that could be saved by insulation was the ... 4 ...

(4 marks)

QUESTION TWO

Read this extract from a magazine article.

New device improves wind turbines

A recent study found that wind turbines fitted with a new device, which makes them more responsive to small changes in wind direction, give a better output.

Scientists investigated the output of some wind turbines. They compared wind turbines of similar design, in similar locations. Half of the turbines were fitted with 'wind finders' which respond to small changes in wind direction. They found that 'wind finders' can improve the useful output of wind turbines by up to 10 %.

Match words, A, B, C and D, with the numbers 1– 4 in the sentences.

- A conclusion
- B control
- C environment
- D evidence

The wind turbines without 'wind finders' were the scientists' ... 1 ...

The useful output from the wind turbines was the scientists' ... 2 ...

What the scientists found out helped them to reach their ... 3 ...

Improving wind turbines is important for the ... 4 ...

Q:3 Read this extract from a magazine article.

X-rays and health

Students studied the health records of hospital patients who had been X-rayed in the previous three years. The patients were compared to a similar group who had not been X-rayed in the same period of time.

The students found that there was no significant difference in the health of the two groups.

Match words, A, B, C and D, with the numbers 1– 4 in the sentences.

- A conclusion
- B confidentiality
- C control
- D evidence

The group who had not been X-rayed is the ... 1 ...

The data in the health records is the ... 2 ...

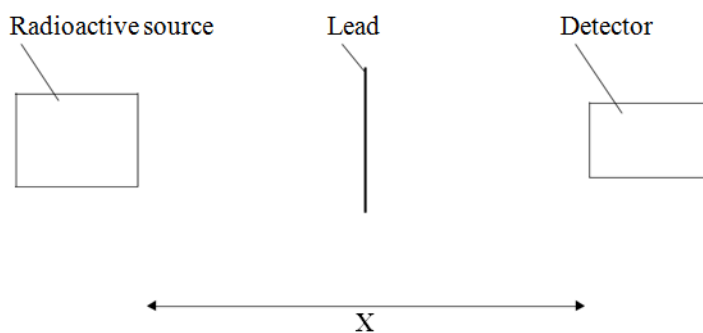
What the students found out helps them to reach their ... 3 ...

The ethical issue in such a study is the issue of ... 4 .

Q:4 A student investigated how much gamma radiation was absorbed by lead.

She used different thicknesses of lead.

She plotted a graph of her results

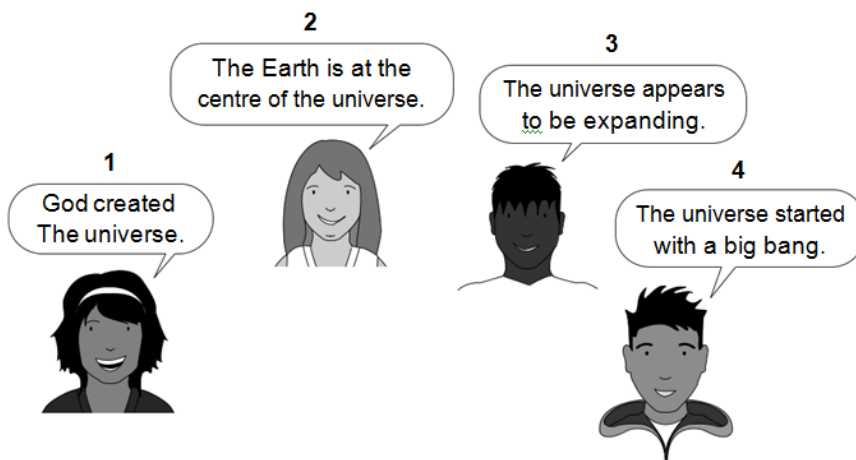


Match words, A, B, C and D, with the numbers 1– 4 in the table.

- A conclusion
- B control variable
- C prediction
- D independent variable

1	She thought that the amount of radiation absorbed would decrease with thickness.
2	She kept the distance X the same.
3	She changed the thickness of the lead.
4	From her graph, she decided that the amount of radiation absorbed increased with thickness.

Q:5 Some students are talking about the universe.

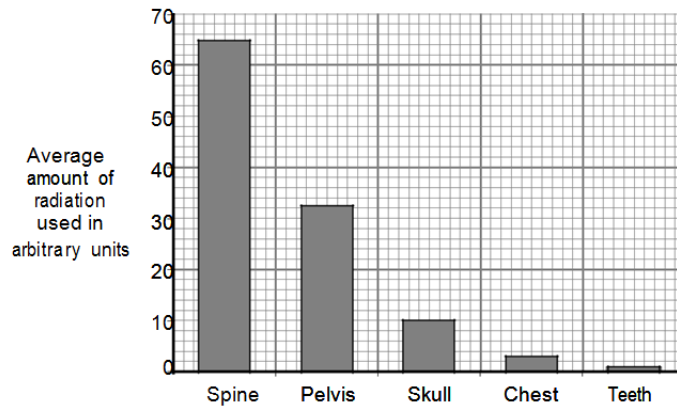


Match descriptions, A, B, C and D, with the students' statements 1– 4.

- A a belief that science cannot disprove
- B a conclusion based on observations of red-shift
- C a theory supported by scientific evidence but not direct observations
- D a theory that science has disproved

Q:6 A survey was carried out on patients having X-rays taken at a hospital.

The graph shows the average amount of radiation used when X-rays were taken of different parts of the body.



Match words, A, B, C and D, with the numbers 1– 4 in the sentences.

- A categoric
- B continuous
- C dependent
- D reliable

The data is not shown as a line graph because only one variable is . . . 1

The amount of radiation used is the . . . 2 . . . variable.

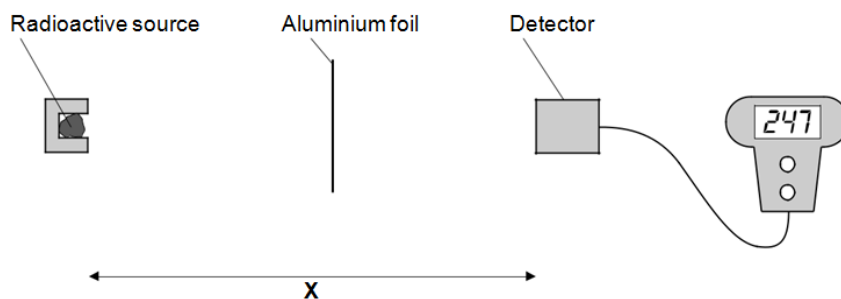
The part of the body of which an X-ray is taken is a . . . 3 . . . variable.

Surveying more patients would make the data more . . . 4

Q:7 A student investigated how much beta radiation was absorbed by aluminium foil.

He used several different thicknesses of aluminium foil.

He plotted a graph of his results.



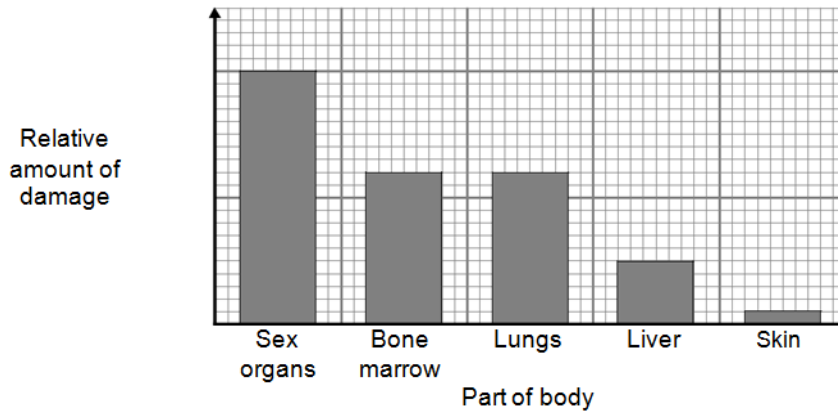
Match words, A, B, C and D, with the statements 1– 4 in the table.

- A conclusion
- B control variable
- C independent variable
- D prediction

1	He thought that the amount of radiation absorbed would decrease with increasing thickness.
2	From his graph, he decided that the amount of radiation absorbed increased with increasing thickness.
3	He changed the thickness of the aluminium foil.
4	He kept the distance X the same.

Q:8 In 1920, scientists investigated the effect of radiation on different parts of the body. They found that radiation affects some parts of the body more than it affects other parts of the body.

The bar chart compares the relative amounts of damage to different parts of the body when they were exposed to the same radiation dose.



Match words, A, B, C and D, with the numbers 1– 4 in the sentences.

- A categoric
- B control
- C dependent
- D reliable

The radiation dose the body is exposed to is a . . . 1 . . . variable.

The data is shown as a bar chart because one of the variables is . . . 2

The relative amount of damage is a . . . 3 . . . variable.

If this investigation was repeated, giving similar results, this would show that the original data was . . . 4