

P2 Assessed Task

7 Local people find out that a new mobile phone transmitter is planned for their area. This is what some of them say:

Tracy
I think that mobile phones cause cancer, but I don't know how.

Sunil
We should keep the number of phone masts down to the smallest number needed, just in case there is a real problem.

Frank
I don't think we should take any risks with our children's health.

Paul
I saw on television that there are more cases of cancer in places near these transmitters.

Joanna
It's about time we had good mobile phone signal strength in this area.

(a) Which **two** people have identified a possible risk from mobile phone transmitters?

..... and [2]

(b) Which **one** person is referring to a **correlation** between a risk and an outcome?

answer [1]

(c) Which **one** person is referring to a risk being the **cause** of an outcome?

answer [1]

(d) Which **one** person is using the ALARA (as low as reasonably possible) principle?

answer [1]

[Total: 5]

9 This question is about the electromagnetic spectrum.

Look at the statements about the intensity of electromagnetic radiation reaching a surface.

Put a tick (✓) in the box next to every **correct** statement.

If the same number of X-ray photons and infrared photons arrive, the X-ray beam has a greater intensity.

If the surface is further from the source, the intensity is greater.

The amount of heating a surface receives from a beam of radiation depends on its intensity.

The intensity depends on the number of photons arriving at the surface each second.

The total energy reaching the surface depends only on intensity.


[2]

[Total: 2]

10 In recent years, the ozone layer has been getting thinner. This has allowed more ultraviolet radiation from the Sun to reach Britain.


There is concern about the increase in skin cancer in Britain.

Here are two people's comments about this cancer.



Sarah

I don't think there's any link between skin cancer and the hole in the ozone layer. The increase in cancer could be due to other things like pollution.



Michael

I don't think that there's any real risk in Britain. It's not hot enough. I stayed out in the sun a lot when I was little, and I've had no problems.

(a) Put ticks (✓) in the boxes next to the **two** statements that you need to convince Sarah of a causal link between skin cancer and the hole in the ozone layer.

- Pollution is not the only thing that causes cancer.
- Skin cancer can be caused by ionising radiation.
- Skin cancer has increased at the same time as the ozone layer has become thin.
- Ultraviolet radiation is absorbed by ozone.
- Some chemicals can damage the ozone layer.

[2]

(b) Put ticks (✓) in the boxes next to the **two** statements that you need to convince Michael of the real risk of skin cancer in Britain.

- Feeling hot in the Sun doesn't tell you how much ultraviolet radiation there is.
- Global warming has increased the temperature in Britain.
- Carbon dioxide levels are causing global warming.
- More ultraviolet reaches the Earth than it used to.
- Ultraviolet radiation is part of the electromagnetic spectrum.

[2]

[Total: 4]

1 There has been discussion in the media about whether mobile phones are safe or not.

Mobile phones use microwaves to transmit information. Microwaves are part of the family of radiations called the electromagnetic spectrum.

(a) Read this article, then answer the questions which follow

People protest about phone masts. But there are few complaints about phones themselves. Is this because people *choose* to use their phones: they don't often choose to have a mast at the end of the garden radiating energy all the time.

What about phones themselves: harmful or not?

The energy in sunlight striking your head is higher than that from a mobile phone.

Most physicists say, the only effect that phone radiation should have on the body is to warm it slightly. A mobile phone warms the closest part of the brain by only one tenth of a degree celsius. That's less than the natural variation in brain temperature throughout the day.


What is unknown is whether there are other effects at the same time, and whether they could cause long-term problems.

Research around the world

Researchers in Finland reported that low-level phone radiation can cause 'stress' reactions in cells isolated from human blood vessels. This might allow toxic substances to enter the brain. It *might* even cause cancer. But it's a big leap from the test tube to the hospital bed. In 1990, there were 500,000 mobile phone users in Britain: now there are 40 million. Yet there has been no detectable overall rise in brain cancers.

There are more than a billion mobile phones in the world. If the trend continues, half the world's population will have a mobile by the end of this decade.

How will we view mobile phones then? As a technological miracle that has enriched our lives? Or, like cigarettes and BSE, a hazard that we didn't anticipate? Only time - and more research - will tell.



Suggest **two** reasons why people in Britain are more concerned about the construction of the phone masts than they are about the risk of using a mobile phone.

- 1
- 2

[2]

(b) The article discusses the heating effect of radiation from mobile phones.

(i) It is possible to reduce the heating effect your brain receives from your mobile phone.

Suggest how.

.....
.....[1]

(ii) What evidence in the article shows that the heating effects are small?

.....
.....[1]

(c) Researchers in Finland have shown that phone radiation can cause signs of stress to some human cells.

Why does the **Research around the world** section of the article say that, "it's a big leap from the test tube to the hospital bed"?

.....
.....
.....
.....[2]

(d) What data in the article suggests that there is **not** a correlation between mobile phone use and brain cancer?

.....
.....[1]

(e) The author suggests that, "If the trend continues, half the world's population will have a mobile by the end of this decade."

Do you think this forecast is likely to be fulfilled? Justify your answer.

.....
.....
.....[2]

[Total: 9]

Grade	Per Cent
A*	95
A	85
B	75
C	65
D	55
E	45
