AQA Biology
GCSE Student working scientifically B4.4

Name ..... Class ..... Date .....

Which one should I have?

Specification reference:

- B2.2.4 Coronary heart disease: a non-communicable disease
- WS 1.4

Aims

You will be learning how to make a decision by considering personal, social and economic factors.

Learning outcomes

After completing this worksheet, you should be able to:

- describe an application of technology in science
- evaluate personal, social, and economic implications to make a decision.

Overview

Science has been used to develop many new technologies, including new medical treatments.

All technology has its benefits and drawbacks. These can have personal, social, economic, and environmental implications. When making a decision, these implications have to be taken into consideration.

Personal: How will the technology impact on me and my life?

Social: How will it affect other people?

Economic: How much will it cost?

Environmental: Will it have a negative impact on the environment?

Context

In your science GCSE you will come across many examples of everyday and technological applications of science. You may be asked to evaluate the personal, social, economic, and environmental implications and make decisions based on these.

Examples include different treatments for infertility (Chapter B11, Hormonal coordination), the conflict between using natural resources and the impact on the environment (Chapter B18, Biodiversity and ecosystems), and the many different treatments available for heart disease.

When choosing a treatment, a doctor must carry out careful research and choose what they think is the most suitable treatment for each individual patient. They will have to consider the patient's age, lifestyle, existing health issues, and beliefs. As different treatments cost different amounts, there are also economic factors to think about.

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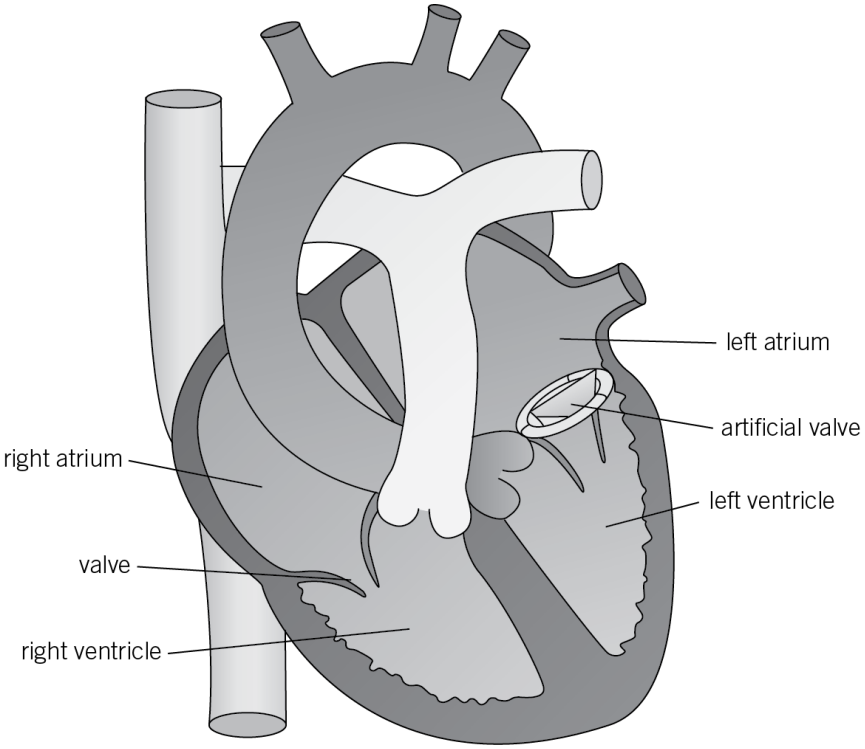
You may be asked to make a decision by evaluating all the options against these considerations.

Task



Heart valves can become damaged. If this happens then the flow of blood through the heart is affected so they may have to be replaced.

Currently, there are two options for a replacement heart valve: a mechanical valve or a biological valve.

A Read through the information.

B Write down a list of advantages and disadvantages of having a mechanical heart valve rather than a biological one. Remember to consider personal, social and economic factors.

Mechanical heart valves

These valves are made of lightweight, strong, and durable materials, such as titanium. They will last 20–30 years before a replacement is needed.

Because of the materials in the valve, it is likely that blood clots will form on it. This could stop it from working. Patients will need to take blood thinning drugs every day for the rest of their lives. Even with the thinning drugs, there is also the risk that a blood clot will form and then move to block a blood vessel, which could cause a stroke or heart attack.

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Biological heart valves

Biological valves are created from animal valves or other animal tissue that is strong and flexible, usually from pigs. They can last 10–20 years. The risk of blood clotting is very small, so patients don't usually require the long-term use of medication.

Mechanical valves are cheaper than biological ones, but this does not take into account the long-term use of drugs.

Question

1 A 76-year-old man needs a replacement heart valve. He lives alone and cares for himself.

Choose the most suitable type of heart valve replacement for him: mechanical or biological. Explain how you made this decision.

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