

# Building Challenge Answers

The answers below are those which pupils can find within the museum. There are other questions in the trail which involve them drawing or giving their own opinion for an answer.

## For upper primary

### Grand Gallery

*What materials can you see?*

Metal, glass, wood, concrete, stone

*How many different floors can you see?*

Three floors

*How do people get to the different floors?*

Lift, stairs, escalator

### Hawthornden Court

*Can you name two ways that this is different to the Grand Gallery?*

- Less curves and more straight lines and shapes
- Not able to see through to different floors in Hawthornden Court
- Grand Gallery is bigger than Hawthornden Court
- Different colours and materials

### Level 3 – Scotland Transformed

*Name the 3 materials it is made of.*

Oak, clay, stone

*How was it heated?*

Fire

*When was it built?*

1720's

*How is it different to the house you live in?*

Less materials, simpler construction, single floor, simpler materials.

### Level 6 – Scotland – A Changing Nation

*Name the building.*

The Scottish Parliament

*Who designed this building?*

Enric Miralles

*Why would it be useful to make a model like this?*

- So the building designer can sell their idea to potential clients.
- A model of a building will give a rough idea of scale (how large or small the building is).
- A model can be a good way of showing how a building will look from different angles.

*When was it completed?*

2004

## For lower secondary

### Grand Gallery

*Name three different materials used in this part of the building.*

Metal, glass, wood, concrete, stone

*This building re-opened in 2011 after a redevelopment. What do think might have changed from when it first opened?*

- Lifts and escalators added
- Brighter colours in the displays
- More visitors facilities added – toilets, cafe, signage

### Hawthornden Court

*Can you name three ways that this design is different to the Grand Gallery?*

- Less curves and more straight lines and shapes
- Not able to see through to different floors in Hawthornden Court
- Grand Gallery is bigger than Hawthornden Court
- Different colours and materials

### Level 3 – Scotland Transformed

*Name three materials it is made of.*

Oak, clay, stone

*How was it heated?*

Fire

*When was it built?*

1720's

*Name four ways this is different to your house?*

Less materials, simpler construction, single floor, simpler materials, etc.

### Level 6 – Scotland – A Changing Nation

*Name the building.*

The Scottish Parliament

*Who designed this building?*

Enric Miralles

*Why would it be useful to make a model like this?*

- So the building designer can sell their idea to potential clients.
- A model of a building will give a rough idea of scale (how large or small the building is).
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*When was it completed?*

2004



# Engineering Challenge Answers

The answers below are those which pupils can find within the museum. There are other questions in the trail which involve them drawing or giving their own opinion for an answer.

## For upper primary

### Level 5 – Energise

*Which engineer invented the first wind turbine?*

James Blyth

*How many bulbs did the first wind turbine power?*

10

*How many homes can a modern wind turbine power?*

1000

### Level 3 – Technology by Design

*Oldest – Hobby Horse 1820*

*Newest – Rover, 1888*

*Name two differences in the way the bicycles are designed*

- Older bike has no pedals, brakes, gears and no air in tyres.
- Newer bike looks more like the bikes we use today.

*What is it called?*

Pneumatic tyre

### Level 1 – Making It

*Name three changes engineers have made to improve cars today.*

Added seatbelts, windows, larger headlights, stronger roof, bigger tyres, etc.

## For lower secondary

### Level 5 – Energise

*What country did the inventor of the first electricity generating wind turbine come from?*

Scotland

*How many bulbs did his turbine power?*

10

*How many homes can a modern wind turbine power?*

1000

*Name two ways of getting power to where it is needed.*

Cables, pipes, batteries, ships, lorries, etc.

*Name one type of engineer involved in this process.*

Electrical engineer

*Describe two challenges in generating enough energy for our everyday lives*

- How can we generate enough energy?
- How can we reduce energy consumption?
- How can we reduce energy consumption?

## For lower secondary

### Level 3 – Technology by Design

*What does this display tell you about how engineers have changed the design of the wheelchair?*

Wheelchairs are designed for different purposes (e.g. sport). Some are powered. Some can be used on own, without assistance. Some are lighter.

*What inspired Alex to design his own wheelchair?*

Alex travelled for 5 years and found many problems with his wheelchair.

*What skills does he have?*

Logical, designer, problem solver, etc

*Circle the job titles*

All job titles are involved

*What is the name of the oldest bicycle on the wall?*

Hobby horse

*What is the name of the newest bicycle on the wall?*

Rover

*Can you identify three differences in the ways these two bicycles have been designed?*

Chain, sprung seat, handlebar height, wheel size, number of spokes on wheels, brakes, etc

*What was wrong with the choice of material for this bicycle?*

Plastic frame too flexible

*What material is it made from?*

Carbon Fibre

*What differences can you see in each bridge design?*

- One is a complex, fixed, steel structure.
- One is a simpler cable, suspension, structure.

*What did engineers of the Forth Bridge (Railway) learn from the Tay Rail Bridge disaster?*

Engineers learned to build a bridge that would never collapse by making it strong, sturdy and able to withstand high wind speeds.

### Level 1 – Explore

*What are they for?*

To detect DNA, to make DNA sequencing easier.

*When were they invented?*

1976



# Life Challenge Answers

The answers below are those which pupils can find within the museum. There are other questions in the trail which involve them drawing or giving their own opinion for an answer.

## For upper primary

### Level 1 – Explore

Dolly was the only live **birth** out of **277** eggs.

*What was it?*

Frog

*Circle the job titles* – all are correct.

### Level 3 – Technology by Design

*How many different grips does it have?*

36 grips.

*Name one other object in this display case which uses technology to assist people living with sight loss.*

iGlasses.

### Level 5 – Enquire

*Why is one bottle smooth and the other one ribbed?*

The ribbed glass was used for dangerous substances. It could be identified by touch.

*How have the designers made this packaging appeal to customers?*

Answers might include, the modern design and colourful labelling.

*Which animal did scientists use to grow a mini kidney?*

Mouse

*How many of his medals can you count?*

Six medals

*Which invention changed the life of Scott MacLeod and allowed him to play rugby for Scotland?*

Asthma inhaler

*Match the body part with the correct object.*

- Optos retina scanner – eyes
- MRI face mask – face
- Krypton 81 generator – lung

## For lower secondary

### Level 1 – Explore

*Why did she become famous?*

Dolly was the first mammal to be cloned from an adult cell.

*Which of these statements are true?*

Not all clones look identical.

### Level 3 – Communicate

*What technology do you need to use with it?*

A smartphone

*Name one activity which people can monitor.*

People can track a range of activities including running, walking and sleeping pattern.

*What is one advantage of this?*

The patient's voice is part of their identity.

### Level 3 – Technology by Design

*How is it different to the other prosthetic arms on display?*

It has a powered shoulder, elbow, wrist and hand.

*Circle the subjects* – all are correct.

*Write down three differences between them.*

Different materials have been used over the years including metal and wood. The leg from the late 20th century has been strengthened with additional material.

### Level 5 – Enquire

*Why is asthma treated with an inhaler?*

There is an immediate effect with using an inhaler. A pill can take a while to have an effect.

*Why is it important to test drugs before they are taken by people?*

To make sure it is safe for the patient.

*Why do doctors use scans?*

To see inside the body

*How has this museum used CT scans?*

To see inside museum objects which cannot be opened, e.g. a mummified body or pocket watch.



# Money Challenge Answers

The answers below are those which pupils can find within the museum. There are other questions in the trail which involve them drawing or giving their own opinion for an answer.

## For upper primary

### Level 1 – Kingdom of the Scots

One of the coins marks Mary Queen of Scots' **marriage** to Lord Darnley.

*What animal is it?*

A tortoise

*What two differences between these coins and our coins today?*

Ours are bigger, thicker, have different designs and are made from different materials.

*Why do you think people put their money in a bank?*

For safekeeping and money can earn interest.

### Level 3 – Scotland Transformed

*Can you find a banknote not in pounds?*

*What is it called instead?*

Guinea, shillings

*How are these notes different to the ones we use today?*

Hand-written, different sizes, not the same amounts.

*What is it? What was it used for?*

Coin scale. Used to weigh coins.

*What was added to these notes to make it more difficult to make copies?*

Colour

### Level 6 – Scotland Changing a Nation

*Pick the correct companies and draw arrows to match them with the objects.*

Direct Line – picture of red phone

Scottish Widows – cloak

## For lower secondary

### Level 1 – Kingdom of the Scots

*In the past, why did people sometimes hide their money?*

There were no banks

*Jewellery was a good way of protecting and storing wealth. Why do you think this was?*

It contained valuable metals such as silver. It was easy to transport. Could trade with what you were wearing.

*What do these coins mark?*

Mary Queen of Scot's marriage to Lord Darnley

### Level 3 – Scotland Transformed

*What was his job title at the Royal Bank of Scotland?*

Cashier

*Write down three ways in which banknotes changed over this period.*

Earlier designs are hand-written. Later banknotes have colour, some are printed and have watermarks.

*What features of the design would have made it difficult to forge these notes?*

Colour, complex designs and watermarks

### Level 6 – Scotland: A Changing Nation

*Write the company names beside the correct objects.*

- Scottish Widows – cloak
- Direct Line – phone



# Tech Challenge Answers

The answers below are those which pupils can find within the museum. There are other questions in the trail which involve them drawing or giving their own opinion for an answer.

## For upper primary

### Level 1 – Explore

*What could Freddy do?*

Freddy could perform a few tasks in a similar way to a child, for example putting scattered pieces into a box.

### Level 1 – Fashion and Style

*What are they?*

Mojito Shoes

Smock and skirt

Jumper by Pringle

*Read the following sentences and tick the ones that you agree with.*

All are correct.

### Level 3 – Communicate

*What are three differences between the oldest and newest phone?*

- Oldest phone is made of wood, not shaped like a phone as we would think of today.
- Newest phone made of metal, plastic and glass and has a large screen.
- Difference too in shape, size and colours

### Level 3 – Technology by Design

*Complete the missing letters to show which body part they relate to.*

**Heart**

**Eyes**

*What technology does his new arm include?*

Answer to follow

## For lower secondary

### Level 1 – Making It

*What are the punched cards for?*

To make the patterns. The holes on each card represent one row of the design.

The code was made up of the digits **0** and **1**.

*What was the machine used for?*

The machine was used in the manufacture of radar wave guides.

## For lower secondary

### Level 1 – Fashion and Style

*What are they?*

- Mojito Shoes
- Smock and skirt
- Jumper by Pringle

*How do you think 3D printing technology might help fashion designers?*

- Clothes can be designed to be longer lasting.
- Clothes can be tailored to the customer which means less wastage.
- 3D printing technology helps designers save on transport and packaging costs.

### Level 3 – Communicate

*What was this machine used for during the Second World War?*

The enigma machine was used to code and decode messages on submarines.

*Why do you think online security is important?*

On-line security is important for protecting personal and business information. Hackers can steal personal information and commit fraud.

### Level 3 – Technology by Design

*Draw arrows to match them with the technology they need to work.*

- Google cardboard – smartphone
- Reveal Dx cardiac monitor – smartphone
- Argus Retinal Prosthesis – computer

### Level 5 – Energise

*What device controls it?*

A smartphone

*What is it?*

A Thermostat

*How would this object help people save energy and money?*

It tracks your energy use

