THE STRIVING

MUSLIM ACADEMY

Islamic and Academic Education

STAGE 5 · DESIGN AND TECHNOLOGY · DESIGN AND MAKE

Design and make

Decisions to learn, things to make, and the questions to ask of the thing afterwards.

WHAT IS INSIDE

- Research, then write a specification
- Drawings that carry information
- Choosing a material on purpose
- Making a structure stiffer
- The three systems, and what each is for
- Working accurately
- Electrical systems: a series circuit
- Building the longest span in the world
- Task 1: Specification
- Task 2: Annotated sketch and exploded diagram
- Task 3: Prototype, then test against the specification
- Analyse a product that somebody designed well
- Look at what you made

The Striving Muslim Academy

No answers at the back. The work is the answer.

Written for a parent teaching at home. No training assumed, and nothing else to buy.

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The three systems, and what each is for

Read this, then use it on the task pages.



THE THREE SYSTEMS, AND WHAT EACH IS FOR

At this stage a product is allowed to do something, which means it contains a system. There are three kinds and most products use more than one.

Mechanical systems change a movement. Levers and linkages change its direction and size, cams turn a round movement into an up and down one, and gears and pulleys trade speed for turning force.

Electrical systems move energy round a loop. A series circuit is one loop with everything in it, a switch is a gap you can close on purpose, and bulbs, buzzers and motors are the outputs that turn the electricity into light, sound or movement.

Computing lets the product decide. Apply what you know about programming to monitor an input and control an output: the product measures something, a program decides what counts, and an output acts. Choose the system by what the product has to do, not by which one you enjoyed last time.

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Building the longest span in the world

Read this, then use it on the task pages.



BUILDING THE LONGEST SPAN IN THE WORLD

The Forth Bridge, in Scotland, had the world's longest spans when it opened in 1890. A span is the distance between two supports, and each main span here is 521 metres.

You can see where that number comes from. Two arms reach out 207 metres from the towers, and a shorter piece 107 metres long is hung between their tips. Add them up: 207 and 107 and 207.

It is a cantilever bridge. A cantilever is held at one end only, like a shelf bracket, and two cantilevers reaching towards each other can cross a gap with nothing standing in the middle of it.

UNESCO calls it one of the greatest cantilever trussed bridges, and it still carries passengers and freight today. A truss is a frame of triangles, which is the same idea you used with a diagonal across a square.

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Task 3: Prototype, then test against the specification

TASK 3

Prototype, then test against the specification



Build it, then go through your five criteria and write the result of each test. Then ask two other people to use it and write down what they said, including what you did not want to hear.

SAMPLE PAGES

You have read a few pages. The pack is longer.

What you are holding is a short sample, taken from different parts of the pack so that you can see how a week is planned and what a child is actually asked to do, before you decide.

The complete pack, and the rest of the academic materials, are on our website: schemes of work for a parent teaching at home, and practice packs for the skills children get stuck on.

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Members of the homeschool community do not buy these. If you have joined the community, the pack for the term you are working on is given to you at no cost.

Our Islamic Education classes are free. These packs are part of what pays the teachers who teach them.