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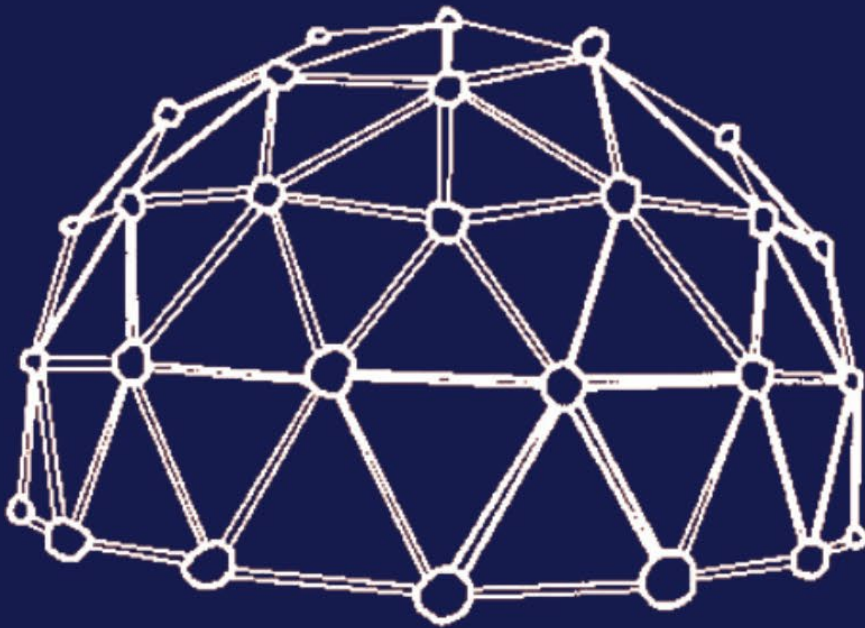


Girlguiding

South West England

THE
JAMES
DYSON
FOUNDATION

Girlguiding South West England and The James Dyson Foundation



40 engineering and science challenges
from the engineers at Dyson



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Introduction

Girlguiding South West England has partnered with The James Dyson Foundation, Dyson's charitable arm, to promote their exciting resource focusing on science and engineering.

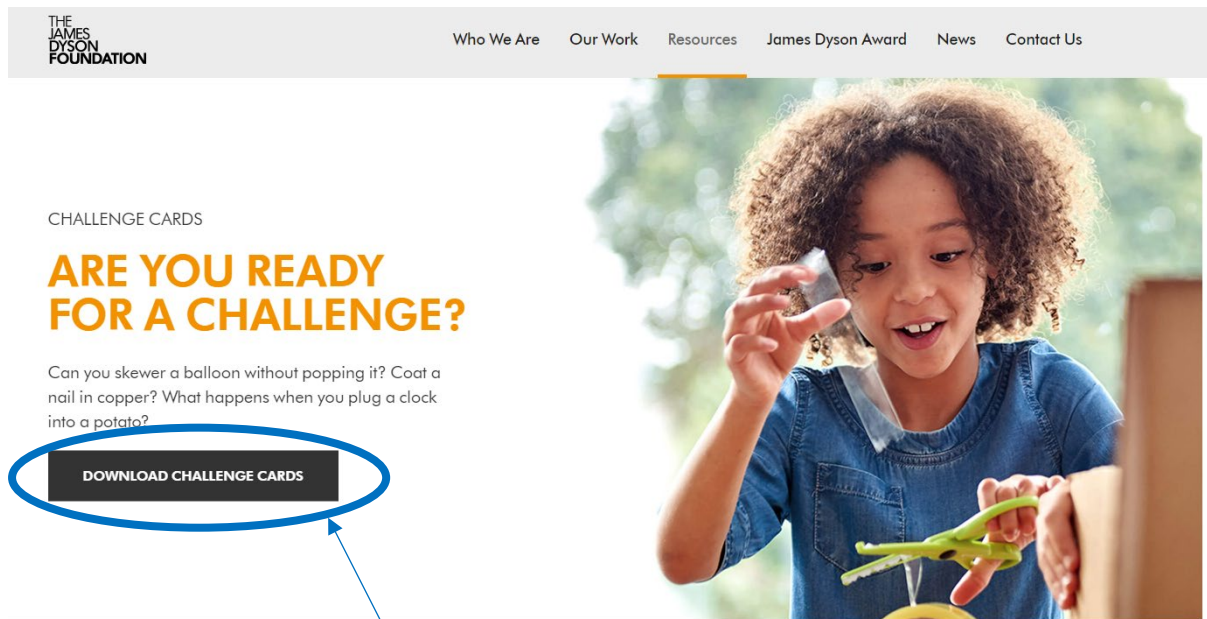
The Challenge Badge

There are a series of challenges designed for children to try at home or in the classroom. We are excited to give Girlguiding members the opportunity to try these challenges themselves in unit meetings, to learn something new and realise all girls can do anything.

The activities, summarised below in the table, can be found and downloaded directly on the James Dyson Foundation website –

jamesdysonfoundation.co.uk/resources/other-engineering-resources-cards or by scanning the QR code.

Scan me to find
the challenges



You can download the challenges from the James Dyson Foundation website – jamesdysonfoundation.co.uk/resources/other-engineering-resources/challenge-cards

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SCIENCE CHALLENGES		01 CHANGING STATES	02 UNDERWATER VOLCANO	03 FLOATING PING-PONG BALLS	04 BALLOON KEBABS
05 LIQUID DENSITIES	06 EXPANDING GASES	07 TORNADO IN A BOTTLE	08 NON-NEWTONIAN FLUID	09 BRIGHT AS A NEW PENNY	10 INERTIAL EGGS
11 $100 + 100 = 192?$	12 MEASURE THE SPEED OF LIGHT	13 WEATHER BALLOON	14 SCARED PEPPER	15 FLOATING PAPERCLIP	16 DANCING RAISINS
17 HOW TO MAKE A LAVA LAMP	18 IVORY SOAP	19 COLOURED CARNATIONS	20 INVISIBLE INK		
ENGINEERING CHALLENGES		01 GEODESIC DOMES	02 MARBLE RUN	03 SPAGHETTI BRIDGES	04 STRONG AS A DRINKING STRAW
05 ELECTRIC MOTOR	06 COTTON REEL TANK	07 CARDBOARD BOAT	08 CARDBOARD CHAIR	09 BOAT POWERED BY A CHEMICAL REACTION	10 CARTESIAN DIVER
11 BALLOON CAR RACE	12 DESIGN AND BUILD A HELICOPTER	13 WATER CLOCK	14 BUILD A COMPASS	15 JELLY AND OIL	16 POTATO POWER
17 A TOUGH NUT TO CRACK	18 HOMEMADE WATER BOMB	19 MAKE A PERISCOPE	20 ATTRACTIVE NAILS		

You can view and download these challenges from the James Dyson Foundation website – jamesdysonfoundation.co.uk/resources/other-engineering-resources/challenge-cards

Some of the challenges can be adapted to the Girlguiding programme, helping members to complete different unit meeting activities (UMAs) and interest badges. It is also worth noting that some of the challenges below can also contribute towards completing our existing Girlguiding South West England region SWEBOTS resource (you can find this on our website under the resources section – girlguidingsouthwest.org.uk/member-information/region-resources/swebots).

Challenges suitable for Rainbows

SCIENCE CHALLENGES	ENGINEERING CHALLENGES
03 Floating Ping-Pong Balls	02 Marble Run
04 Balloon Kebabs	03 Spaghetti Bridges
06 Expanding Gases	06 Cotton Reel Tank
07 Tornado in a bottle	07 Cardboard Boat
08 Non-Newtonian fluid	11 Balloon Car Race
09 Bright as a new penny	12 Design and build a helicopter
10 Inertial Eggs	13 Water Clock
14 Scared Pepper	19 Make a periscope
15 Floating Paper Clip	
16 Dancing Raisins	
17 How to make a lava lamp	
19 Coloured Carnations	
20 Invisible Ink	

Suggested Girlguiding Programme Activities

- Innovate Stage 1 (Go Gobots, Exciting Experiments, Slippery Slopes, Puppet Pals)
- Innovate Stage 2 (Edible architecture, Made to measure)
- Lead Stage 1 (Marble masters)
- Interest Badge (Construction)



Challenges suitable for Brownies

SCIENCE CHALLENGES	ENGINEERING CHALLENGES
02 Underwater Volcano	02 Marble Run
03 Floating Ping-Pong Balls	03 Spaghetti Bridges

04 Balloon Kebabs	04 Strong as a drinking straw
06 Expanding Gases	06 Cotton Reel Tank
07 Tornado in a bottle	07 Cardboard Boat
08 Non-Newtonian fluid	10 Cartesian Diver
09 Bright as a new penny	11 Balloon Car Race
10 Inertial Eggs	12 Design and build a helicopter
13 Weather Balloon	13 Water Clock
14 Scared Pepper	14 Build a compass
15 Floating Paper Clip	15 Jelly and Oil
16 Dancing Raisins	19 Make a periscope
17 How to make a lava lamp	
19 Coloured Carnations	
20 Invisible Ink	

Suggested Girlguiding Programme Activities



- Communicate Stage 3 (Charlie Bravo Alphabet)
- Innovate Stage 2 (Edible architecture, Made to measure)
- Innovate Stage 3 (Speedy explorers, Bounce roll throw, Build it up)
- Interest Badges (Aviation, Space, Inventing)

Challenges suitable for Guides

SCIENCE CHALLENGES	ENGINEERING CHALLENGES
01 Changing States	02 Marble Run
02 Underwater Volcano	03 Spaghetti Bridges
03 Floating Ping-Pong Balls	04 Strong as a Drinking Straw
04 Balloon Kebabs	05 Electric Motor
05 Liquid Densities	06 Cotton Reel Tank
06 Expanding Gases	07 Cardboard Boat
07 Tornado in a Bottle	08 Cardboard Chair
08 Non-Newtonian Fluid	09 Boat Powered by a Chemical Reaction
09 Bright as a New Penny	10 Cartesian Diver
10 Inertial Eggs	11 Balloon Car Race
11 $100 + 100 = 192?$	12 Design and Build a Helicopter
12 Measure the Speed of Light	13 Water Clock
13 Weather Balloon	14 Build a Compass
14 Scared Pepper	15 Jelly and Oil

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15 Floating Paper Clip	16 Potato Power
16 Dancing Raisins	17 A Tough Nut to Crack
17 How to make a Lava Lamp	18 Homemade Water Bomb
19 Coloured Carnations	19 Make a Periscope
20 Invisible Ink	20 Attractive Nails

Suggested Girlguiding Programme Activities

- Communicate Stage 3 (Charlie Bravo Alphabet)
- Innovate Stage 3 (Speedy explorers, Bounce roll throw, Build it up)
- Innovate Stage 4 (Binary beads)
- Innovate Stage 5 (Bridging the gap)
- Interest badge (Fixing)

Guides

Challenges suitable for Rangers

SCIENCE CHALLENGES	ENGINEERING CHALLENGES
01 Changing States	01 Geodesic Domes
02 Underwater Volcano	02 Marble Run
03 Floating Ping-Pong Balls	03 Spaghetti Bridges
05 Liquid Densities	04 Strong as a Drinking Straw
07 Tornado in a Bottle	05 Electric Motor
08 Non-Newtonian Fluid	06 Cotton Reel Tank
09 Bright as a New Penny	07 Cardboard Boat
10 Inertial Eggs	08 Cardboard Chair
11 $100 + 100 = 192?$	09 Boat Powered by a Chemical Reaction
12 Measure the Speed of Light	10 Cartesian Diver
13 Weather Balloon	13 Water Clock
14 Scared Pepper	14 Build a Compass
15 Floating Paper Clip	15 Jelly and Oil
16 Dancing Raisins	16 Potato Power
17 How to make a Lava Lamp	17 A Tough Nut to Crack
19 Coloured Carnations	18 Homemade Water Bomb
20 Invisible Ink	19 Make a Periscope
	20 Attractive Nails

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Suggested Girlguiding Programme Activities

- Innovate Stage 4 (Binary beads)
- Innovate Stage 5 (Bridging the gap)
- Innovate Stage 6 (Sound it out, It fits like a glove)



How to earn your badge

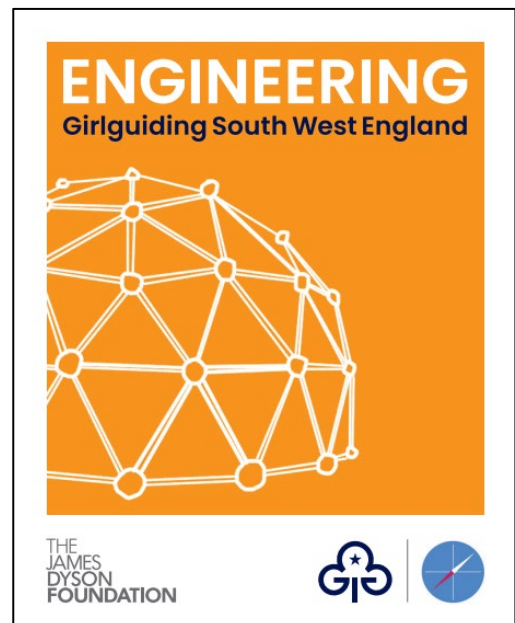
We recommend that each section completes the following number of activities:

Rainbows: 3 activities

Brownies: 5 activities

Guides and Rangers: 6 activities

Once completed, you can order the challenge badge from our region shop. We have a limited number of free badges, where you will only need to pay for the cost of the postage and packaging. Once we have run out of these free badges, they will be available to purchase for £1 (plus p&p). You can find them on the region's online shop at girlguidingsouthwest.co.uk



You can share how you get on with the challenge by tagging us on social media (@girlguidingswe) and using the hashtag #GGSWExJDF

You can also keep up to date with the James Dyson Foundation on social media below:

- Instagram – @jamesdysonfoundation
- Facebook – James Dyson Foundation
- Twitter – @foundationdyson