

Scientist Badge
Pack Holiday 1997

Challenge - Jet Propulsion

Equipment: Two short tubes (cardboard) one a little longer than the other, balloon, sticky tape, long string.

Challenge - Send a message along a taut string at least 3 metres without providing the motive force yourself.

Challenge - Self Righting Lifeboat

Equipment: Washing -up liquid bottle, card, plasticine, sticky tape, scissors.

Challenge - Make a self-righting lifeboat. One that will not capsize.

Challenge - Hovercraft

Equipment: Lightweight food tray, balloon, cork with a hole through it, glue, blu-tack, pencil.

Challenge - Construct a hovercraft.

Challenge - Boat Shapes

Equipment: Various boat shapes in balsa wood, piece of guttering, string, weight.

Challenge - Find the fastest shape for a boat

Challenge - Bake a Potato

Equipment: Potato, fork, foil, basket or similar.

Challenge - Bake a potato with the heat of the Sun.

Challenge - Pendulum Skittles

Equipment: Plastic bottles, string, ball.

Challenge - Make a game of pendulum skittles.

Challenge - Electromagnet Cranes

Equipment: Cardboard boxes, pencils, cotton, nail, battery, wires.

Challenge - Construct an electromagnetic crane that can lift metal objects.

Challenge - Span the Gap

Equipment: One sheet thin card; one roll sticky tape; scissors; a 250 g weight.

Challenge - Make a beam with a span as wide as possible which, when supported (but not fixed) at each end, will support a weight at its mid-point.

Challenge - Building Bridges

Equipment: Three drinking glasses of the same size, a crisp new note.

Challenge: Support a drinking glass on a bridge made from a five pound note.

Equipment: Newspaper, paper clips, staples, glue, scissors, objects of varying weights.

Challenge: Use one tabloid newspaper to build a bridge that will span one metre and hold the largest load possible. You have 25 minutes.

Challenge - Engineering Structures

Equipment: A full pack of playing cards.

Challenge: In 20 minutes, build the highest possible tower using all the cards.

Equipment: Two sheets of card, 100 paper clips, 10 drinking straws, 40 pins, one marble.

Challenge: Construct a structure or mechanism that will carry a marble over the greatest horizontal distance before it comes to rest.

Equipment: Six spars, rope.

Challenge: Build a device within an area of 25 cm x 25 cm that will allow your entire patrol to stand at least 60 cm off the floor at the same time

Equipment: Tape, drinking straws, scissors, marble, elastic bands, paper clips.

Challenge: In 20 minutes, build a free-standing tower that will hold a marble one metre above the floor.

Equipment: Drinking straws, pins, elastic bands, tape, paper clips, scissors, plastic cup with drinking straw through the top (just below the rim, punch holes on opposite sides of the cup: slip in a drinking straw).

Challenge: With the fewest drinking straws possible, build a framework that will support a cup full of water at least 5 cm off the ground. You have 25 minutes. You may test your frame as you go, but only on a half cup of water.

Challenge - The Raft

Equipment: A stack of sheets of paper all the same size, a supply of marbles or pennies, and a pan of water for the testing.

Challenge: Build a raft able to hold the largest mass without sinking. You may use as many sheets of paper as you like, but may not cut them to make them smaller. After 10 minutes construction time, you will put your rafts to the test by floating them. You may not test designs in water before the final float test.

Challenge - The Barber

Challenge: Design and make a simple mirror system that will allow you to trim your own hair without going through great contortions.

Challenge - Marble's Adventure

Equipment: A base 30 cm x 1 m, craft sticks, pieces of cardboard, pins, odds and ends, a marble.

Challenge: Design and construct a vertical "adventure playground" for a marble. The aim is to produce a system of interesting devices or events that will delay the marble's descent from one metre without the application of external power. The winning device will be the one that delays the marble's descent the longest and includes the greatest number of devices.

Challenge - Candle Power

Challenge: Use a warming candle to provide power to a mechanical device that will move an object a distance of one metre.

Challenge - Paper Helicopter

Equipment: Sheets of paper, scissors, tape.

Challenge: Make a paper helicopter that will take the longest time to fall to the ground from a height of 3 metres.

Challenge - Drowning Paper

Equipment: A sheet of paper, a drinking glass, a pail of water.

Challenge: Put a piece of paper underwater without getting it wet.

Challenge - Motor Vehicles

Equipment: Craft sticks, twigs, tape, glue, pins, an elastic band.

Challenge: Construct a device that will propel itself along the floor.

Challenge - Alarm Clock

Equipment: A stockpile of candles, elastic bands, tin cans, thread spools, and other odds and ends.

Challenge: From any household items, build a gadget with as many moving parts as possible that will successfully perform as an alarm clock.

Challenge: Invent a device to

- weigh a wild bird without causing it any harm
- enlarge a diagram
- measure the growth of a plant over a period of one week.