

CHALLENGE CARDS

Three Chinese New Year themed engineering and science challenges from the engineers at Dyson.



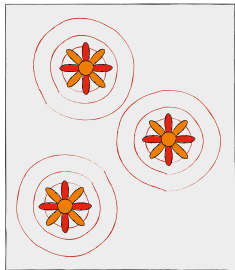
Please note that the activities contained in here are intended for children ages seven and above. Adult supervision is recommended for all projects.

About the challenges in this pack

Blooming Flower

Science challenge

Also known as the Spring Festival, the Chinese New Year occurs in the Spring season when flowers start blooming, representing growth and life. In this challenge, we'll learn to make our own flowers that bloom.



Fireworks

Science challenge

In Chinese mythology, Nian is a creature that terrorises villages during the Chinese New Year. As Nian is afraid of bright lights, loud sounds, and the colour red, firecrackers were used to ward off the creature. Today, fireworks are often used to keep up with this tradition and we'll learn to make our own version in a glass.



Water Wheel

Engineering challenge

Chinese New Year is associated with wealth and good fortune. In Chinese beliefs, water represents wealth. Hence, decorations such as a water wheel can represent wealth and good fortune.

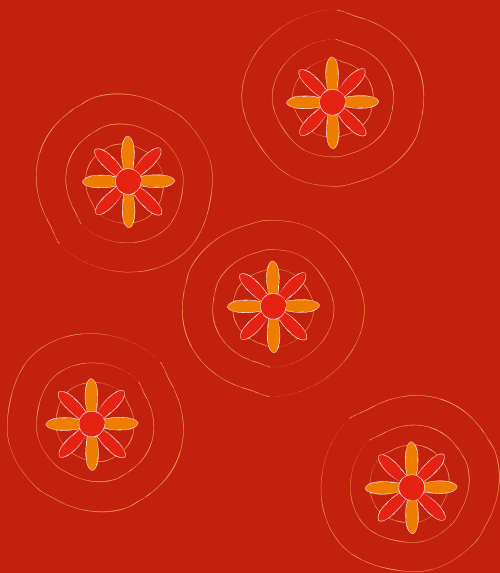


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SCIENCE
CHALLENGE

BLOOMING FLOWER

How to make paper flowers that 'bloom'



Instructions for Blooming Flower

1. Draw flowers on a piece of paper and cut them out.
2. Fold the petals of each paper flower towards the center. Make sure that the bottom petals don't overlap the ones above it.
3. Fill a bowl with approximately 1cm depth of water.
4. Place the paper flowers on the surface of the water with the folded petals facing upwards.
5. Watch the paper flowers bloom.

Materials

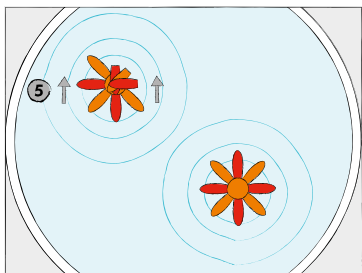
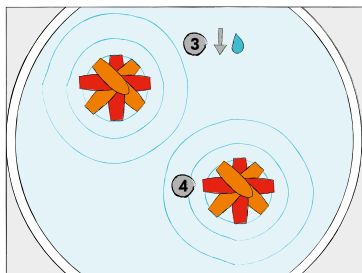
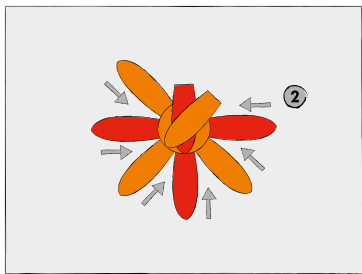
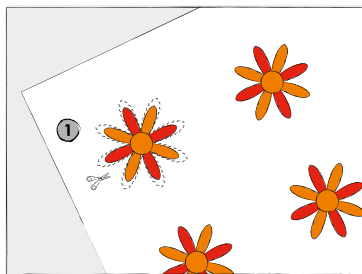
Pen

Paper

Scissors

Bowl

Water



How does it work?

While the paper flowers are floating on the surface of the water, water is absorbed and drawn into the fibres of the paper through a process called capillary action. The water absorbed causes the paper to swell and unfold any creases, leading to the appearance of a blooming flower.

SCIENCE
CHALLENGE

FIREWORKS

How to create 'fireworks' in a glass



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Instructions for Fireworks

1. Pour three tablespoons of oil into the sauce dish.
2. Add drops of food colouring to the oil in the sauce dish. Use different food colouring for best effect.
3. Use a fork to thoroughly mix the oil and food colouring together. Make sure to break apart all the food colouring droplets.
4. Fill 3/4 of the glass with water.
5. Pour the oil and food colouring mixture into the glass.
6. Watch the 'fireworks'.

Materials

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Cooking oil

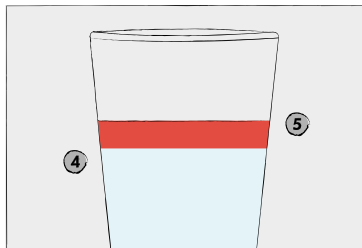
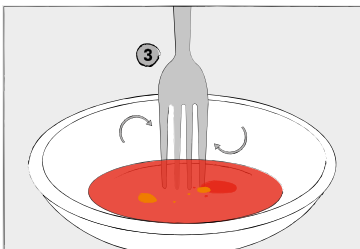
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Water

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Food colouring

.....
Sauce dish

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Fork

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Glass



How does it work?

As oil and food colouring are unmixable, the food colouring forms small globules instead of dissolving when added to the oil. The same relationship exists between oil and water, when the oil mixture is added into the water, the oil and water becomes unmixable. The oil mixture floats to the top of the glass due to its lower density. As the denser food colouring sinks to the bottom of the oil mixture, it dissolves into the water forming the shape of fireworks.

ENGINEERING
CHALLENGE

WATER WHEEL

How to create a wheel that spins
using the flow of water



Instructions for Water Wheel

1. Cut a hole slightly smaller than the diameter of a straw towards the base of the first bottle. Then, cut a section of a straw and insert it into the hole.
2. Cut the second bottle into half. Cut the top section of the second bottle to make four blades in similar sizes.
3. Cut a hole in the center of a bottle cap. Insert a chopstick through the hole in the bottle cap and glue it in place.
4. Glue the blades onto the bottle cap and make sure they are spaced equally apart.

Materials

Two plastic bottles

One plastic straw

One wooden chopstick

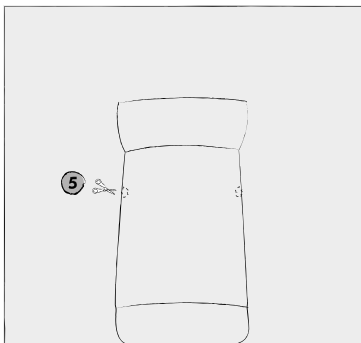
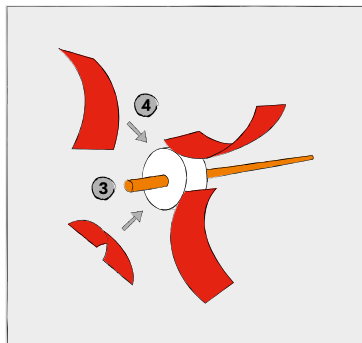
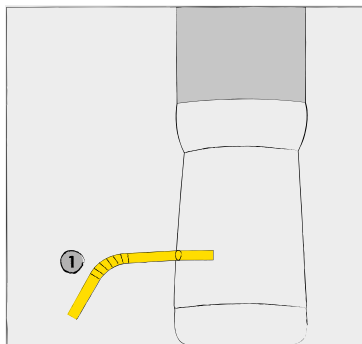
Scissors

Hot glue

Rubber bands

Water

Bowl

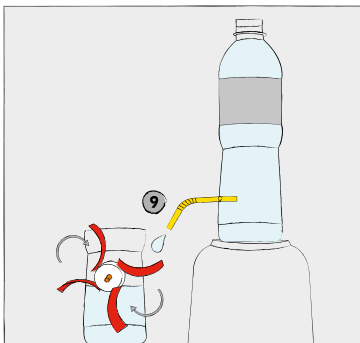
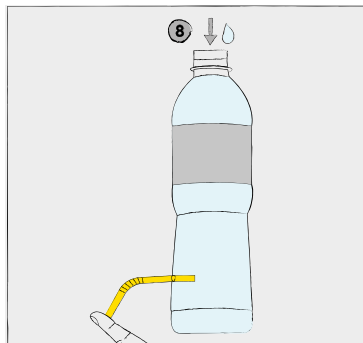
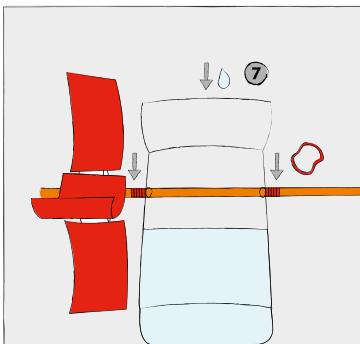
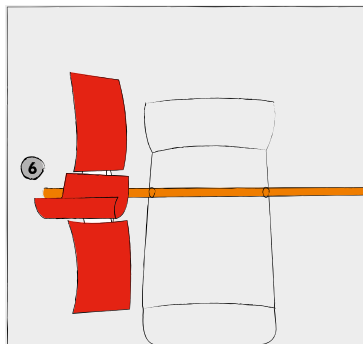


- Cut two holes about the diameter of the chopstick on opposite sides of the second bottle.
- Insert the longer end of the chopstick through the holes in the second bottle.
- Fill half of the second bottle with water. Use a rubber band as a stopper on both ends of the chopstick to prevent it from shifting.
- With a finger on the mouth of the straw, fill the first bottle with water.
- Place the first bottle on top of a bowl. Align the mouth of the straw to the blades, release your finger and watch the water wheel spin.

How does it work?

As the water falls onto the blades of the wheel, momentum gained by the water during its fall is transferred to the wheel.

This momentum is converted into a rotation about the center of the wheel, moving the next blade towards the stream of water, causing the cycle to repeat.



We want to inspire the next generation of engineers and scientists and we want to do this by hands-on learning and experimentation.

James Dyson
Chief Engineer

The James Dyson Foundation encourages young people to think creatively and invent. Through free educational resources and workshops, we introduce the exciting reality of a career in engineering.

These challenges were designed by Dyson engineers to encourage inquisitive young minds to get excited about engineering.

If you enjoyed them, download a set of 40 cards from our website www.jamesdysonfoundation.com.