

Hello Students,

We thought you might like some ideas for science related activities you could do over the summer. We'd love for you to let us know how you get on and prizes will be awarded for the most interesting ones. There are lots of ways you could tell us about what you did – these might include a PowerPoint, a poster, photographs or even a short video. You can email these to [Scienceproject@altrinchamcollege.com](mailto:Scienceproject@altrinchamcollege.com) during the holidays, or bring it in to your new science teachers when we return.

Making a volcano – there are a few different ways to do this (so feel free to research and find out some others if you want to) but here is a good one

<https://www.nhm.ac.uk/discover/how-to-make-a-volcano.html>

Make your own compass – some interesting physics here about how a compass works and why they have been so important for so many years.

<https://www.nhm.ac.uk/take-part/naturenauts/naturenauts-further-adventures/create-a-compass.html>

Bug Hotel- there are lots of different ways to do this and it is worth doing some research to find out which one might best suit your garden and the things you have at home (so feel free to research and find out some others if you want to) but here is a good one. We would love to find out about the wildlife this attracts to your garden.

<https://www.nhm.ac.uk/take-part/naturenauts/naturenauts-further-adventures/build-a-bug-hotel.html>

A butterfly feeder – butterflies need all the help they can get and many are endangered. This is a great way to help them out and attract them into your garden. We would love to see how many you manage attract using this.

<https://www.nhm.ac.uk/discover/how-to-make-simple-butterfly-feeder.html>

A marble run – a little physics project to see if you can keep your marble on the move for at least 60 seconds! Think about the gradient of your slopes and friction between the marble and the material. Send us any pictures/videos of your successful marble runs! See method sheet (Appendix 1)

A cardboard chair – interested in a career in STEM? This is perfect task for future engineers/architects! Send us your pictures of a successful chair – who will dare to give it a test run?! See method sheet (Appendix 2)

Coloured Carnations – a biology task linked to content covered in KS3 and KS4. This is a perfect excuse to go outdoors and collect some flowers – send us your pictures of the final product and if successful maybe you could test to see if this works with any other flowers?! See method sheet (Appendix 3)

# APPENDIX

1.

## MARBLE RUN

### ENGINEERING CHALLENGE 02

Designed by Coco,  
Design engineer at Dyson

#### The brief

Use a cardboard box and cardboard struts to create a marble run. The marble must run for 60 seconds.

#### The method

1. Use tape to attach the cardboard struts to the cardboard box, creating a run for the marble.
2. Place the marble at the top of the run and time how long it takes for it to reach the bottom.
3. Keep improving your design until the marble takes exactly 60 seconds to reach the bottom.

#### Top tip

If you can't find cardboard struts, make your own by folding four inch wide strips of cardboard in half to create a V shape.

#### Materials

Large cardboard box

Cardboard struts

Tape

Marbles

Scissors

(with adult supervision)

#### How does it work?

To help you to control the time your marble takes to run its course you'll need to consider a few factors:

**Potential energy = mass x gravity x height**

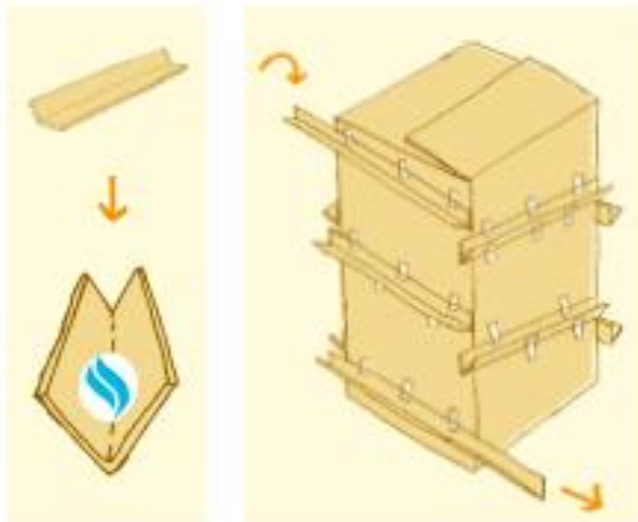
The heavier your marble and higher your slope, the more energy your marble will have.

#### Friction

The rougher or stickier the surface, the slower your marble will travel.

#### Angle of the slope

The less steep the angle of the slope, the longer the marble will take to reach the bottom.



2.

# CARDBOARD CHAIR

## ENGINEERING CHALLENGE 08

Designed by Andy,  
Design engineer at Dyson

### The brief

Construct a chair that you can sit on using only cardboard. No glue, tape or other fixing materials allowed.

### The method

1. Write down or sketch some ideas as to how you will construct the chair.
2. When you are planning, think about using cones, interlocking sheets, spirals, tubes – or even using strips of card like sewing thread.
3. Use the materials to create a chair made from cardboard.
4. If your first design doesn't work, evaluate what went wrong and try again.

### Top tip

Think about structure.

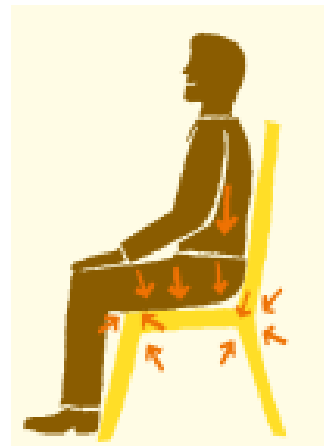
### Materials

Cardboard

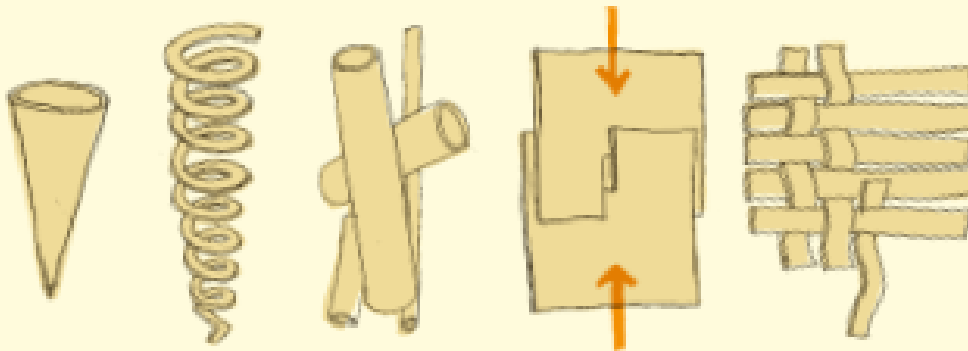
Cutting equipment  
(with adult supervision)

Rulers

Pencils



Examples of different structures:



# COLORED CARNATIONS

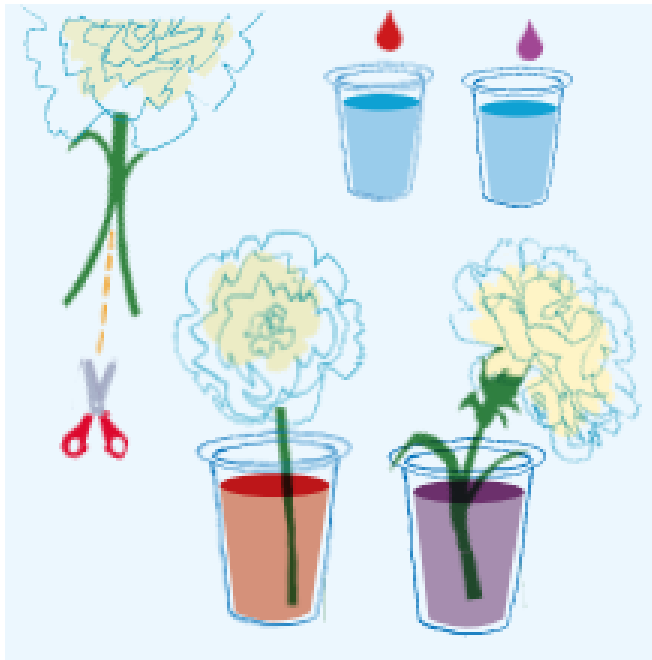
Designed by Adam,  
Science teacher and former  
Design engineer at Dyson

## The brief

Create multi-colored flowers.

## The method

1. Use the scissors to cut the stem of the carnation in half lengthways.
2. Take two cups and fill them with water. Add a different colored food dye to each cup.
3. Put the split stems of the carnation into the cups and leave overnight.
4. The next morning you should find that your flower has changed color.
5. What do you notice about the petals?



## Materials

White carnations

Two colors of food dye

Plastic cups

Water

Scissors

(with adult supervision)



## How does it work?

Plants need a transport system to move food, water and minerals around.

There are two things that combine to move water through plants – transpiration and cohesion.

Water evaporating from the leaves (transpiration) draws water up the stem of the plant to replace what is lost. This works in the same way as sucking on a straw. Water that evaporates from the leaves “pulls” (cohesion) other water behind it up to fill the space left by the evaporating water.