

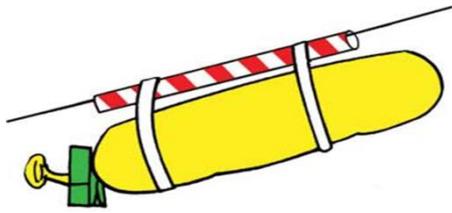
# BALLOON ROCKETS!!!

DESIGN AND BUILD YOUR  
OWN ROCKET!

TEST YOUR DESIGN  
SKILLS!

WILL YOUR DESIGN FLY  
FURTHEST?

WE'LL SEE YOU THERE!



## PRACTICAL NAME: BALLOON ROCKETS

### Equipment

- Balloons
- Sellotape
- Straws
- Paper clips
- Cloth pegs
- Card
- String/Fishing Line
- Scissors

### Method

1. Blow up the balloon and use a peg to secure the end of the balloon.
2. Sellotape the balloon to the straw and sellotape paper clips to the ends of the straw.
3. You might like to give your balloon some funky wings made from cardboard or add colour using marker pens.
4. The teacher will make a tight string line across the classroom.
5. Attach the balloon to the string using the paper clips.
6. Hold the balloon and do a count down (5..4..3..2..1..Blastoff!).
7. Let the balloon go (remove the peg).
8. The winner is the person with the balloon that has flown furthest!

### Scientific explanation

For every action there is an equal and opposite reaction - it's the rule that explains how this rocket works. The blast of air rushing out of the balloon in one direction pushes it in the opposite direction. Isaac Newton discovered this scientific rule hundreds of years ago. Real rockets have enormous tanks for fuel and oxygen that ignite and push the rocket up into the air.

LAVA LAMPS! GROOVY BABY!

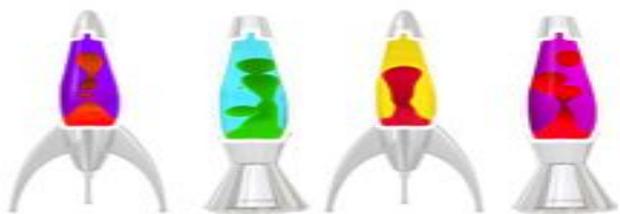
BUILD YOUR OWN LAVA  
LAMP!

WE'LL SEE YOU THERE!

FIRST COME FIRST SERVE

ARE YOU GROOVY?





## PRACTICAL NAME: MAKING SLIME

### Equipment

Clear plastic bottles  
A bottle of vegetable oil  
Alka Seltzer or a fizzy vitamin  
tablet (x15)  
Food colourings  
Pipettes

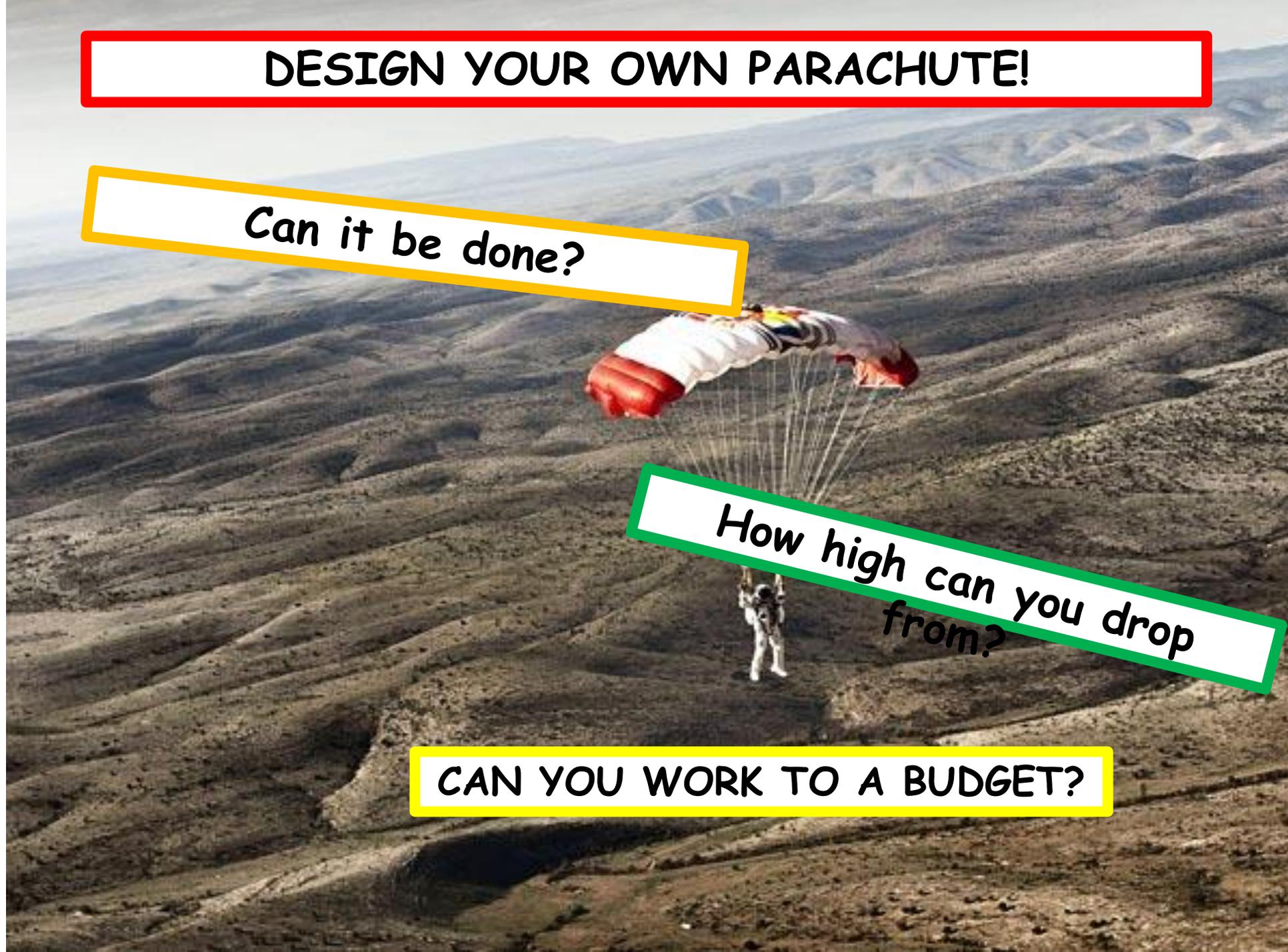
### Method

Fill the bottle or jar a quarter full with water. Top up to the (near) top with the vegetable oil! They should separate into two layers, water at the bottom and oil sitting on top. Add about 6-8 drops of food colouring once they have separated. The colour will mix with the water at the bottom. Pop in half an alka seltzer tablet and watch the bubbles form. Add more alka seltzer bit by bit to keep the bubbles rising and falling. Whatever you do, do NOT shake them up. Let's just say it could be very messy!

### Scientific explanation

Firstly water and oil will not mix - this is because we say that water is a polar molecule - its structure means that it has a positive charge on one end and a negative charge on the other. Water molecules stick together because the positive end of one water molecule is attracted to the negative end of another. Oil molecule structure is different, -it is non-polar, meaning that its charge is more evenly spread out, so the oil is not attracted to water. In fact we call it hydrophobic (water fearing) so it tries to get as far away from water as possible and will not mix. The reason that oil rests on top of the water rather than underneath is because it has a different density to water. As the alka seltzer is added (this is made of citric acid and sodium bicarbonate) it reacts with the water and forms carbon dioxide gas and sodium citrate. It is the carbon dioxide bubbles that carry the coloured water to the top.

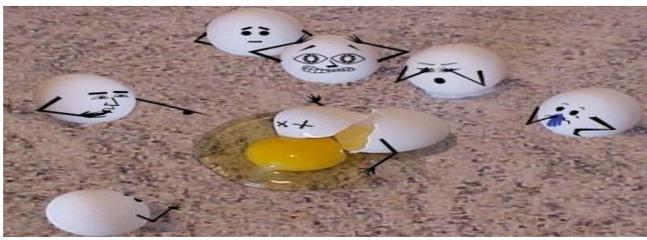
# DESIGN YOUR OWN PARACHUTE!

A person is seen from a high angle, parachuting over a vast, hilly landscape. The terrain is brown and rocky, with rolling hills and valleys. The sky is clear and blue. The parachute is white with red and yellow accents. The person is wearing a white jumpsuit and a helmet. The overall scene is one of a high-altitude, rugged environment.

Can it be done?

How high can you drop  
from?

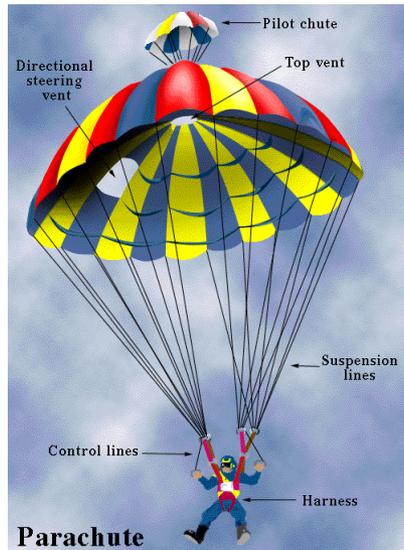
CAN YOU WORK TO A BUDGET?



## PRACTICAL NAME: Parachute challenge

### Equipment

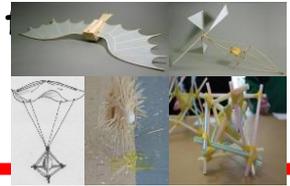
Paper  
Sting  
Tape  
Card  
Bags (different sizes)  
Scissors  
Glue



### Method

Design and build a parachutes to protect an egg dropped from a height.

You must stick to your budget using items you can find at home.



### Scientific explanation / Safety

How will these variables affect your parachute?

Shape?

Suspension/  
strings?

Size?

Material?

#### Engine switch on:

Gravity pulls down  
Thrust increases

#### Take off:

Thrust greater than gravity

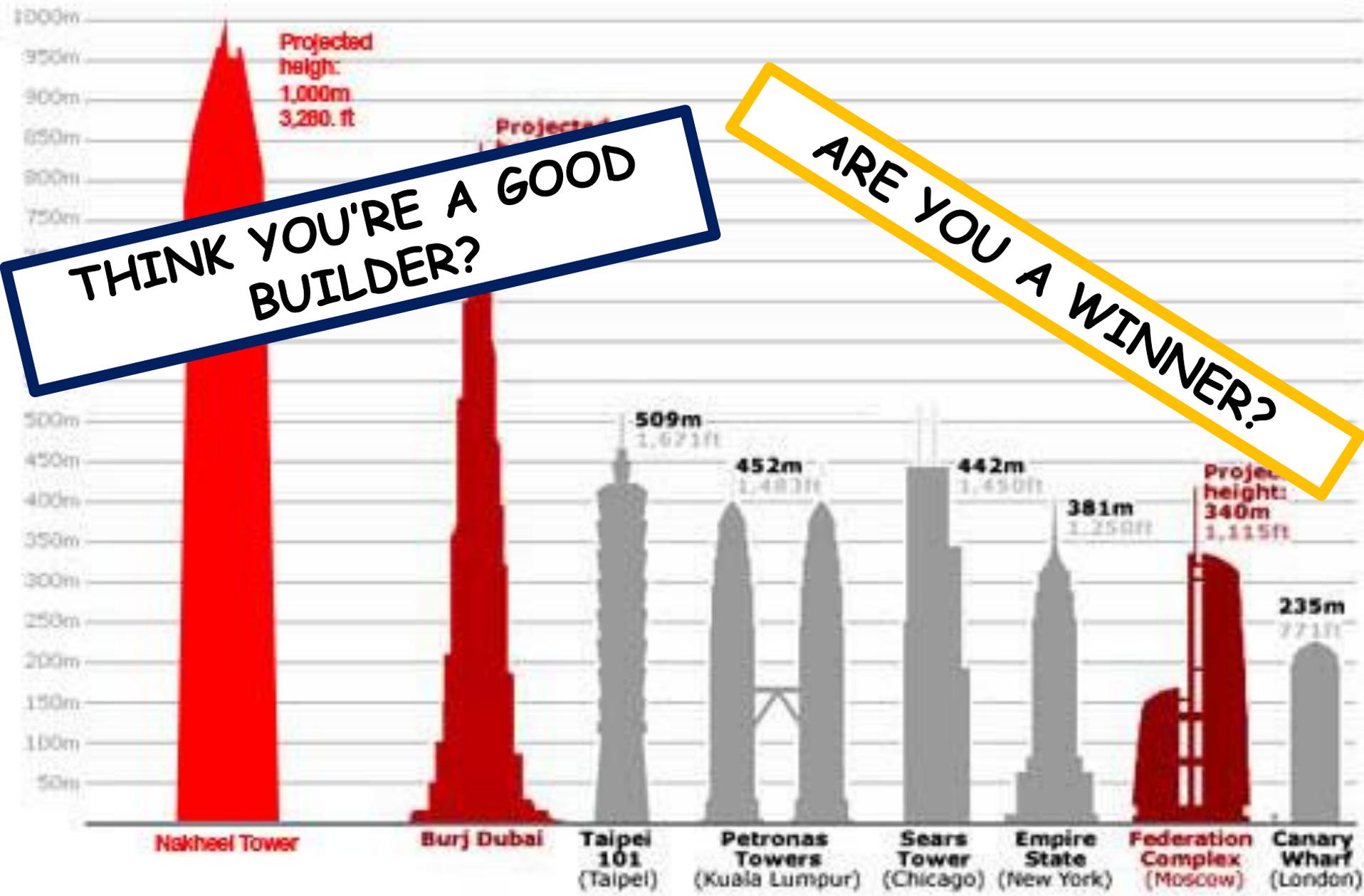
#### Main Flight

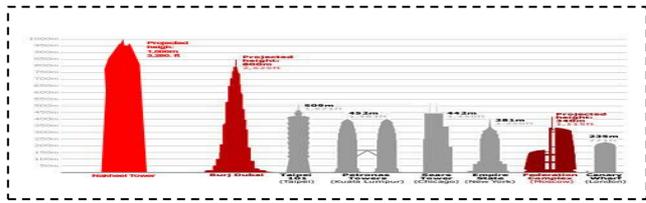
Air resistance increases.

#### Descent

Thrust decreases.  
Gravity (+air resistance)  
are greater than thrust.

# HOW HIGH CAN YOU GO?





## PRACTICAL NAME: TALLEST TOWER

### Equipment

- Sweets (midget jems.)
  - Cocktail sticks.
- Meter ruler (for judging.)

### Method

- Pupils build towers using the sweets provided.
- Ensure that pupils have the same number of sweets and sticks for fairness.

### Scientific explanation

- The strongest shapes include triangles and squares.
- Pupils that incorporate these shapes alongside a wide base (foundation) will build the most successful tower.

# INTERESTED IN VOLCANOES



THEN WHY NOT MAKE  
YOUR OWN LAVA

IT'S QUICK!

IT'S EASY!

WE'LL SEE YOU THERE!

FIRST COME FIRST SERVE



## PRACTICAL NAME: VOLCANOES

### Equipment

- **Baking powder / Bicarbonate of Soda**
- **Red food colouring**
- **Vinegar (preferably white)**
- **Washing up liquid**
- **Water**
- **Empty plastic bottle**

### Method

**Step 1 – Making the cone** - Cut the top off the bottle approximately 2cm below the lid. Turn this up-side-down to represent the magma chamber and place inside the remaining top half of the bottle, cut to size. Secure the upturned top of the bottle with some clay or plasticine to seal the edge.

**Step 2 – Making the volcano sides** - Roll your volcano picture into a cone and put it inside the plastic volcano cone

**Step 3 – Making the activation fluid** - To make your activation fluid, pour the following ingredients into your empty plastic bottle: 150ml (¼ Pint) vinegar, 3 tablespoons of washing up liquid, A few drops of red / orange food colouring

**Step 4 – Loading the volcano** - Carefully spoon the baking powder into the crater making sure that it is no more than half-full (this will use about 2 teaspoons of baking powder)

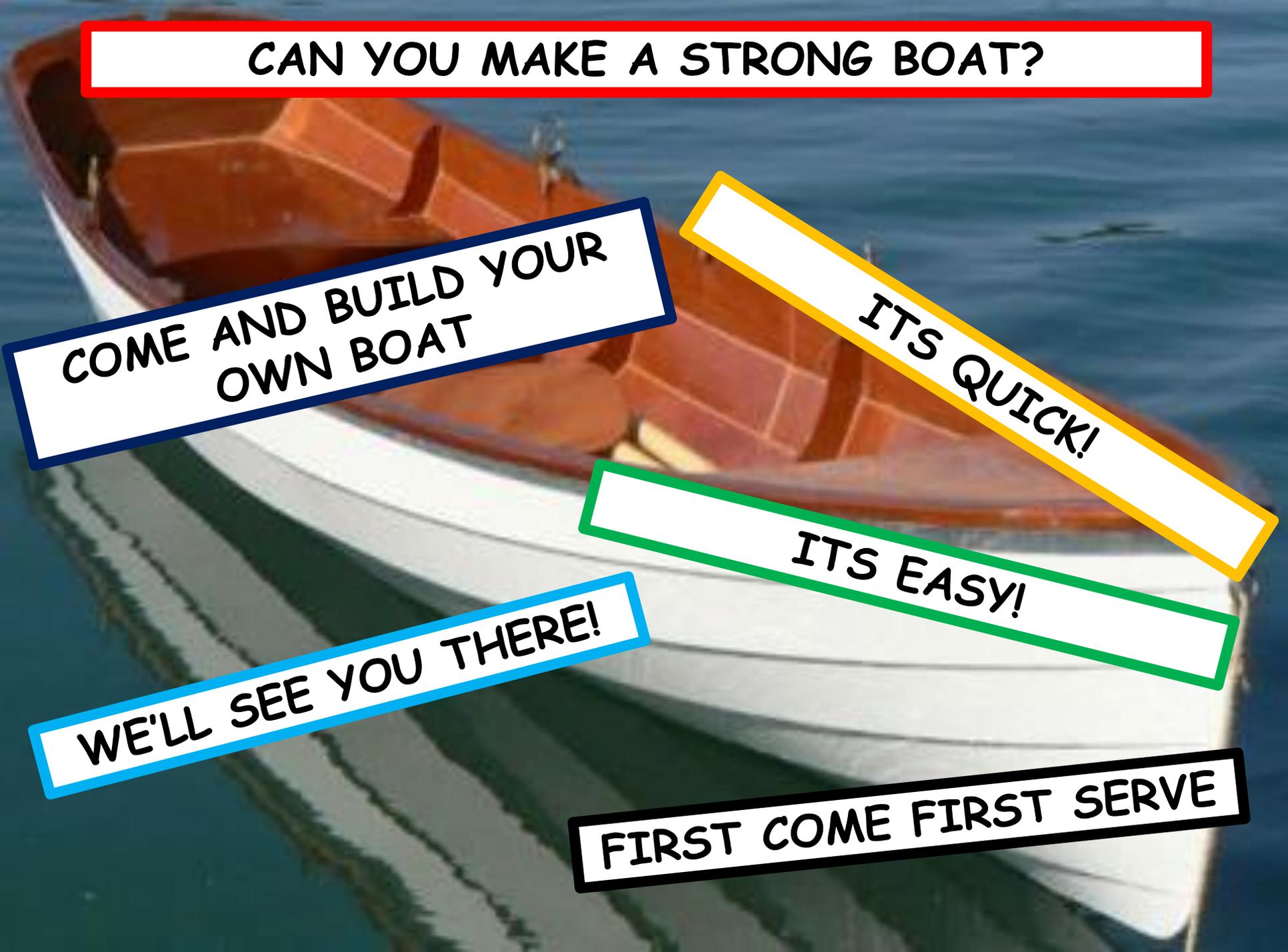
**Step 5 – Erupting the volcano** - Slowly pour some activation fluid into the crater and watch the lava as it flows out of your volcano!

### Scientific explanation

#### **How do volcanoes work?**

The lava that erupts from a volcano is in fact really hot rock. It is rock that has been heated so much that it has become runny. When this runny rock is underground, it is called magma. Volcanoes form where the surface crust of the earth is weak. This means that the magma can creep up through cracks in the weak crust. When it gets to the surface: BOOM! A volcanic eruption happens when the magma forces through the surface (like the way that a fizzy drink will spray everywhere if you shake it up before you open it!). The way that a volcano erupts depends on how runny the magma is and much pressure has built up before the magma breaks through the surface. When a volcano erupts, we call the magma a new name: Lava.

Lava quickly cools down in the open air or sometimes, in water. When it cools down, the lava becomes hard again and turns back into rock.

A wooden boat with a reddish-brown interior is shown from a high angle, floating on blue water. The boat's hull is white. Several text callouts are overlaid on the image, each in a different colored border. The callouts are: 'CAN YOU MAKE A STRONG BOAT?' (red border), 'COME AND BUILD YOUR OWN BOAT' (dark blue border), 'IT'S QUICK!' (yellow border), 'IT'S EASY!' (green border), 'WE'LL SEE YOU THERE!' (light blue border), and 'FIRST COME FIRST SERVE' (black border).

**CAN YOU MAKE A STRONG BOAT?**

**COME AND BUILD YOUR  
OWN BOAT**

**IT'S QUICK!**

**IT'S EASY!**

**WE'LL SEE YOU THERE!**

**FIRST COME FIRST SERVE**



## PRACTICAL NAME: BOAT CHALLENGE

### Equipment

- TIN FOIL
- BOWL
- SCISSORS
- PENNIES OR SMALL MASSES
- WATER

### Method

- Cut a piece of tin foil 5 x 6 inches.
- Design a boat that could hold pennies/masses.
- Place the boat in the bowl of water. Begin adding pennies for the boat's cargo. See how many pennies your boat can carry before it sinks.

### Scientific explanation

There are two primary forces acting on this science experiment. The first force is gravity. Gravity is trying to pull the tin foil and pennies downward. The force of buoyancy is pushing the boat toward the surface.

The gravitational force is determined by the weight of the tin foil and the weight of the pennies in the boat. The force of buoyancy is the weight of the water displaced by the boat. Your boat will continue to float as long as the force of buoyancy is greater than the force of gravity and you do not overload the boat so it will tip over or leak