

# HAPPY 20<sup>th</sup> Birthday Science Week

Let's light some candles to celebrate...  
four candle investigations

## Burning the candle at Both ends

### Shifting the Centre of Gravity

You will need - a candle, a lighter, a sharp knife, absorbent paper, two cans, two panel pins

### Basic Instructions

1. Use the sharp knife to pare the end of the candle, to expose the wick at both ends
2. Stand the two cans close together on some absorbent paper
3. Push the panel pins firmly into either side of the centre of the candle
4. Carefully balance the candle between the two cans as shown, so it can swing freely
5. Light the candle at both ends and observe what happens.



### Investigate

- ⇒ Try the activity with smaller birthday candles
- ⇒ Or find out what happens if you light one end only
- ⇒ Note the time interval between each 'swing' of the candle
- ⇒ What will happen as the candle get much shorter?

### What is happening?

As the candle wax drips away from under the flame, the mass of the candle is changing. This is affecting the centre of gravity and cause the candle to change position in 'seesaw' type movement.



## EXPLORE more

<https://www.youtube.com/watch?v=31RiUCuy5Dg>  
<https://www.youtube.com/watch?v=cJWfuar5S5s>

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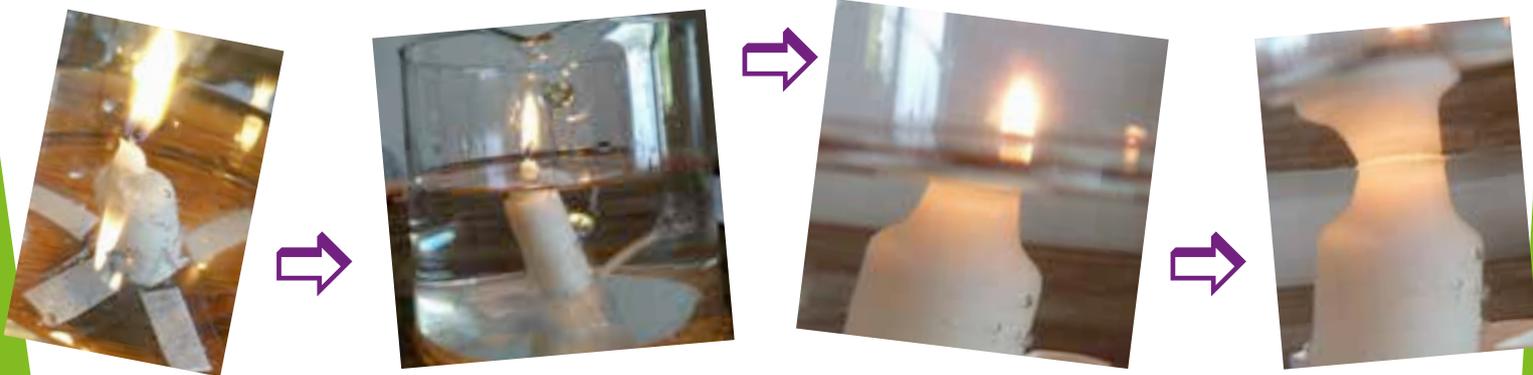
## Can fire Burn under water?

### Investigation 1 - the Candle

You will need - candles, lighter, waterproof tape, scissors, glass container, water, cookie cutter.

#### Basic instructions

1. Use waterproof tape to anchor a short candle to the base of a glass container - this may take patience, and several attempts, to get it to work
2. Fill carefully with water to just below the wick
3. Light the candle and observe what happens.



### What is happening?

The wick is drawing the wax from the candle body which is under the water, and as a tiny protective well forms around it, it can keep some access to oxygen, and so can keep burning for quite some time after it dips below water level.



## Explore more

<http://www.education.com/activity/article/candle-burningunderwater/>

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## Can fire Burn under water?

### Investigation 2 - the Sparkler

You will need - sparklers, lighter, clear sticky tape, large beaker or glass jug, water, goggles, protective clothing and drying cloths.

This can be a messy process - clear the bench before you begin.

There will be some smoke and smell - open a window before you begin.

**You will also need the same PERMISSION and SUPERVISION you would always need when using sparklers.**

### Basic instructions

1. Fill the container two thirds with water
2. Use 4 or 5 sparklers together. NO MORE.
3. Wrap the clear tape tightly around the bunch of sparklers, leaving just enough of the tip of the sparklers uncovered to be able to light the bunch
4. Holding the bunch of sparklers away from you, light the very tip
5. When the "sparkling" has begun, plunge the bunch right down under the water
6. Observe what happens - use your eyes, ears AND (warning!!) your nose.



### What is happening?

There are some oxidising materials in the sparkler, and they allow the burning to continue inside the tape, as long as there are no gaps to allow the water to seep through. The rather unpleasant smell is what is released when the chemicals burn.



## Explore more

<http://science.wonderhowto.com/how-to/underwater-fireworks-light-sparklers-submerged-liquid-354386/>

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## Can air currents turn corners?

You will need - candle, lighter, a bottle or can, a box or "square" container (to make the test fair, try to match up the width of each container)

### Basic instructions

1. Light a candle
2. Place the container you are testing between you and the candle
3. Position yourself facing the container, face level with it, so you cannot see the candle flame
4. Blow a strong puff of air at the container that is blocking you from seeing the candle flame
5. Try this with both containers
6. Note what happens in each instance
7. Repeat several times, and challenge others to try.



### What is happening?

As you puff currents of air towards the circular container, the current flow round the container, join up again and continue onwards to blow out the candle. The square container deflects the currents of air, so they never reach the candle.



## Explore more

<http://www.thenakedscientists.com/HTML/experiments/exp/blowing-out-candles-around-corners/>

<http://indianapublicmedia.org/amomentofscience/a-candle-trick/>

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## Remote Control of water levels

### Raising water level by reducing pressure

You will need - plate, glass container, candle, water, food colouring, lighter

#### Basic instructions

1. Place a short candle standing in a shallow plate
2. Add a small amount of coloured liquid
3. Light the candle
4. Place the glass container over the lighted candle
5. Observe what happens to the flame and what happens to the liquid.



### What is happening?

It's complicated! So much is going on. When a candle burns, many changes happen - it uses oxygen and it releases carbon oxides and other gasses. When you placed the glass cover over the candle, you placed a barrier between the candle and the surrounding air in the room. As the candle burns, it changes the contents of the air inside the glass container, and this in turn changes the pressure and volume of the gasses inside. And so of course the water rises to take up the extra space being made available to it.



EXplore more

<https://www.youtube.com/watch?v=bzNoJOpwRyA>

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## Design Your Future

### Flashy science - design your own future simple LED technology

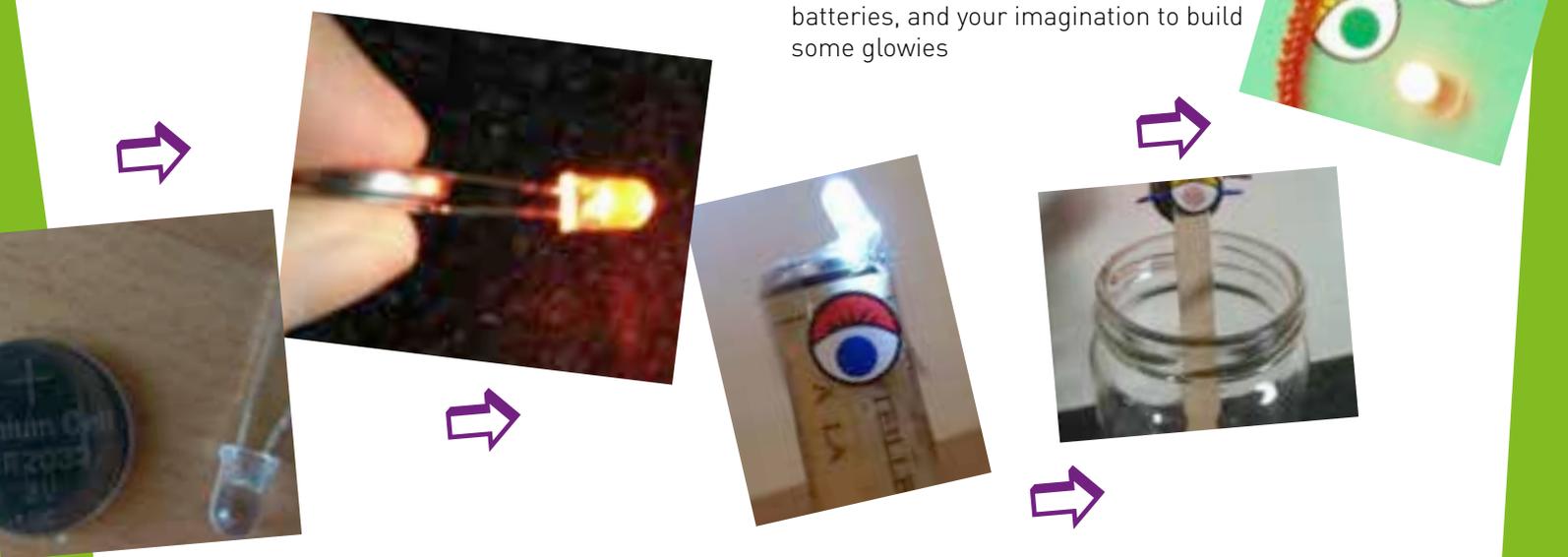
#### Light up your life

Make a simple semi-conductor LED circuit "glowie" to light up your life, to wear as a badge of honour, to decorate your space, or to use as a night light.

You will need - LED\*s, 3V button batteries, stationery supplies, craft supplies, decorative materials, scrap materials, magnets, foil.

### Basic instructions

1. Look closely at the LED. Note that one pin is longer than the other
2. Look closely at the 3V cell. Note that one face is flatter than the other
3. Slide the battery between the pins of the LED, flatter side facing the longer pin.
4. Try the battery both directions, note that the LED only lights when the battery is in the one position. This is important to remember. You have made a 'glowie'. It should stay lighting for up to 4 weeks.
5. Now have some fun - use the LEDs, batteries, and your imagination to build some glowies



## EXPLoRE more

Read about LED technology here:  
<http://www.ipic.ie/impact/outreach/>

## Why not try these ideas?



Attach a glowie inside the lid of a glass jar to make a night light.



Use various coloured LEDs or glass jars, to make the night light more atmospheric or seasonal - think orange for Hallowe'en, red or green for Christmas etc.



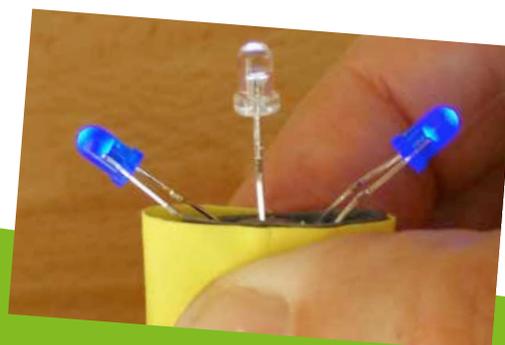
Wrap some reflective foil around the glass jar glowie, turning it into a flash light.



Attach a magnet to a glowie and stick it to the refrigerator door as a night light.



Make a name badge or decoration.



Make a glowie with your team colours. (Can't get an LED in your team's colours - be creative - paint the clear cover of a white LED) to make colours like maroon).

\*LED = light emitting diode. These are relatively inexpensive (less than 10c each depending on source), use little energy, and when connected correctly in a circuit they emit light but not heat.

Sources for LEDs: these can be bought in electronics stores, or online.

Links to online suppliers in Ireland

<http://cpcireland.farnell.com/>

<http://ie.farnell.com/>

<http://www.rapidonline.com/cooney>

<http://irishelectronics.ie/>

Sources for batteries: 3V cells can be sourced from school scientific suppliers, but the most cost effective source is a local bargain store, currently a card of eight sells for approx. €1.50.