

The Sixth Form at George Abbot

'Academic excellence within a vibrant community.'

Subject: Chemistry

Head of Department: Dr Taylor (mtaylor@georgeabbot.surrey.sch.uk)

Pre Sixth Form Tasks

Your ability to research and discover answers for yourself is crucial to your future success. Equally, scientists must develop the ability to communicate complex scientific ideas clearly and concisely. Your challenge is to produce a single page of A4 for each of these tasks. Just one page. It can include text, diagrams, photos or anything else you think will be useful. Be creative, think about communicating the science. You can complete each task however you want; by hand, using a computer or any other way you see fit.

Compound Chemistry (www.compoundchem.com) is an organisation that produces infographics about all sorts of chemical and scientific concepts. Their work is **awesome**. Some examples are found below to **inspire** you.

Task 1: The chemistry of fireworks

What are the component parts of fireworks? What chemical compounds cause fireworks to explode? What chemical compounds are responsible for the colour of fireworks?

Task 2: Why is copper sulfate blue?

Copper compounds like many of the transition metal compounds have got vivid and distinctive colours – but why?

Task 3: Aspirin

What was the history of the discovery of aspirin, how do we manufacture aspirin in a modern chemical process?

Task 4: The hole in the ozone layer

Why did we get a hole in the ozone layer? What chemicals were responsible for it? Why were we producing so many of these chemicals? What is the chemistry behind the ozone destruction?

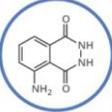
Task 5: ITO and the future of touch screen devices

ITO – indium tin oxide is the main component of touch screen in phones and tablets. The element indium is a rare element and we are rapidly running out of it. Chemists are desperately trying to find a more readily available replacement for it. What advances have chemists made in finding a replacement for it?

Infographic Examples (www.compoundchem.com)



CRIME SCENE CHEMISTRY – LUMINOL



WHAT TRIGGERS LUMINOL'S CHEMILUMINESCENCE?


BLOOD


BLEACH


FAECES


URINE


HORSERADISH

The reaction that triggers luminol's chemiluminescence has to be catalysed. The iron in blood can carry out this role, but luminol can also be oxidised by bleach to achieve the same effect. Enzymes in faeces and horseradish can also help trigger the reaction.



HOW DOES LUMINOL REACT TO PRODUCE LIGHT?

Luminol solutions also contain an oxidising agent, such as hydrogen peroxide, and a base. In the presence of a catalyst, the reaction produces energy, promoting electrons in the product to higher energy levels, before they fall back down and release their excess energy as light.

THE SECRETS OF THE COKE AND MENTOS FOUNTAIN

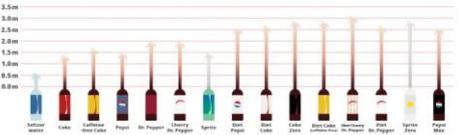
THE COKE AND MENTOS FOUNTAIN

When Mentos are added to a bottle of Coke their surface acts as a nucleation site, allowing carbon dioxide bubbles to form rapidly and causing the fountain effect. It has been suggested that additives such as artificial sweeteners increase the fountain's height by lowering the surface tension. New research has suggested other compounds present may also affect fountain height.

2-LITRE BOTTLE = 15 GRAMS DISSOLVED CO₂ TURNS INTO 8 LITRES OF CO₂ GAS



HOW DOES THE TYPE OF CARBONATED BEVERAGE AFFECT THE FOUNTAIN HEIGHT?



Beverage	Fountain Height (m)
Tap water	0.8
Coke	1.2
Sprite	1.5
Orange Fanta	1.8
Apple & Peach Fanta	2.0
Black & Tan	2.2
Guinness	2.5
Black & White	2.8
Black & Red	3.0
Black & Blue	3.2
Black & Green	3.5
Black & Yellow	3.8
Black & Purple	4.0
Black & Orange	4.2
Black & Pink	4.5
Black & White	4.8
Black & Red	5.0
Black & Blue	5.2
Black & Green	5.5
Black & Yellow	5.8
Black & Purple	6.0
Black & Orange	6.2
Black & Pink	6.5
Black & White	6.8
Black & Red	7.0
Black & Blue	7.2
Black & Green	7.5
Black & Yellow	7.8
Black & Purple	8.0
Black & Orange	8.2
Black & Pink	8.5
Black & White	8.8
Black & Red	9.0
Black & Blue	9.2
Black & Green	9.5
Black & Yellow	9.8
Black & Purple	10.0
Black & Orange	10.2
Black & Pink	10.5
Black & White	10.8
Black & Red	11.0
Black & Blue	11.2
Black & Green	11.5
Black & Yellow	11.8
Black & Purple	12.0
Black & Orange	12.2
Black & Pink	12.5
Black & White	12.8
Black & Red	13.0
Black & Blue	13.2
Black & Green	13.5
Black & Yellow	13.8
Black & Purple	14.0
Black & Orange	14.2
Black & Pink	14.5
Black & White	14.8
Black & Red	15.0
Black & Blue	15.2
Black & Green	15.5
Black & Yellow	15.8
Black & Purple	16.0
Black & Orange	16.2
Black & Pink	16.5
Black & White	16.8
Black & Red	17.0
Black & Blue	17.2
Black & Green	17.5
Black & Yellow	17.8
Black & Purple	18.0
Black & Orange	18.2
Black & Pink	18.5
Black & White	18.8
Black & Red	19.0
Black & Blue	19.2
Black & Green	19.5
Black & Yellow	19.8
Black & Purple	20.0
Black & Orange	20.2
Black & Pink	20.5
Black & White	20.8
Black & Red	21.0
Black & Blue	21.2
Black & Green	21.5
Black & Yellow	21.8
Black & Purple	22.0
Black & Orange	22.2
Black & Pink	22.5
Black & White	22.8
Black & Red	23.0
Black & Blue	23.2
Black & Green	23.5
Black & Yellow	23.8
Black & Purple	24.0
Black & Orange	24.2
Black & Pink	24.5
Black & White	24.8
Black & Red	25.0
Black & Blue	25.2
Black & Green	25.5
Black & Yellow	25.8
Black & Purple	26.0
Black & Orange	26.2
Black & Pink	26.5
Black & White	26.8
Black & Red	27.0
Black & Blue	27.2
Black & Green	27.5
Black & Yellow	27.8
Black & Purple	28.0
Black & Orange	28.2
Black & Pink	28.5
Black & White	28.8
Black & Red	29.0
Black & Blue	29.2
Black & Green	29.5
Black & Yellow	29.8
Black & Purple	30.0
Black & Orange	30.2
Black & Pink	30.5
Black & White	30.8
Black & Red	31.0
Black & Blue	31.2
Black & Green	31.5
Black & Yellow	31.8
Black & Purple	32.0
Black & Orange	32.2
Black & Pink	32.5
Black & White	32.8
Black & Red	33.0
Black & Blue	33.2
Black & Green	33.5
Black & Yellow	33.8
Black & Purple	34.0
Black & Orange	34.2
Black & Pink	34.5
Black & White	34.8
Black & Red	35.0
Black & Blue	35.2
Black & Green	35.5
Black & Yellow	35.8
Black & Purple	36.0
Black & Orange	36.2
Black & Pink	36.5
Black & White	36.8
Black & Red	37.0
Black & Blue	37.2
Black & Green	37.5
Black & Yellow	37.8
Black & Purple	38.0
Black & Orange	38.2
Black & Pink	38.5
Black & White	38.8
Black & Red	39.0
Black & Blue	39.2
Black & Green	39.5
Black & Yellow	39.8
Black & Purple	40.0
Black & Orange	40.2
Black & Pink	40.5
Black & White	40.8
Black & Red	41.0
Black & Blue	41.2
Black & Green	41.5
Black & Yellow	41.8
Black & Purple	42.0
Black & Orange	42.2
Black & Pink	42.5
Black & White	42.8
Black & Red	43.0
Black & Blue	43.2
Black & Green	43.5
Black & Yellow	43.8
Black & Purple	44.0
Black & Orange	44.2
Black & Pink	44.5
Black & White	44.8
Black & Red	45.0
Black & Blue	45.2
Black & Green	45.5
Black & Yellow	45.8
Black & Purple	46.0
Black & Orange	46.2
Black & Pink	46.5
Black & White	46.8
Black & Red	47.0
Black & Blue	47.2
Black & Green	47.5
Black & Yellow	47.8
Black & Purple	48.0
Black & Orange	48.2
Black & Pink	48.5
Black & White	48.8
Black & Red	49.0
Black & Blue	49.2
Black & Green	49.5
Black & Yellow	49.8
Black & Purple	50.0
Black & Orange	50.2
Black & Pink	50.5
Black & White	50.8
Black & Red	51.0
Black & Blue	51.2
Black & Green	51.5
Black & Yellow	51.8
Black & Purple	52.0
Black & Orange	52.2
Black & Pink	52.5
Black & White	52.8
Black & Red	53.0
Black & Blue	53.2
Black & Green	53.5
Black & Yellow	53.8
Black & Purple	54.0
Black & Orange	54.2
Black & Pink	54.5
Black & White	54.8
Black & Red	55.0
Black & Blue	55.2
Black & Green	55.5
Black & Yellow	55.8
Black & Purple	56.0
Black & Orange	56.2
Black & Pink	56.5
Black & White	56.8
Black & Red	57.0
Black & Blue	57.2
Black & Green	57.5
Black & Yellow	57.8
Black & Purple	58.0
Black & Orange	58.2
Black & Pink	58.5
Black & White	58.8
Black & Red	59.0
Black & Blue	59.2
Black & Green	59.5
Black & Yellow	59.8
Black & Purple	60.0
Black & Orange	60.2
Black & Pink	60.5
Black & White	60.8
Black & Red	61.0
Black & Blue	61.2
Black & Green	61.5
Black & Yellow	61.8
Black & Purple	62.0
Black & Orange	62.2
Black & Pink	62.5
Black & White	62.8
Black & Red	63.0
Black & Blue	63.2
Black & Green	63.5
Black & Yellow	63.8
Black & Purple	64.0
Black & Orange	64.2
Black & Pink	64.5
Black & White	64.8
Black & Red	65.0
Black & Blue	65.2
Black & Green	65.5
Black & Yellow	65.8
Black & Purple	66.0
Black & Orange	66.2
Black & Pink	66.5
Black & White	66.8
Black & Red	67.0
Black & Blue	67.2
Black & Green	67.5
Black & Yellow	67.8
Black & Purple	68.0
Black & Orange	68.2
Black & Pink	68.5
Black & White	68.8
Black & Red	69.0
Black & Blue	69.2
Black & Green	69.5
Black & Yellow	69.8
Black & Purple	70.0
Black & Orange	70.2
Black & Pink	70.5
Black & White	70.8
Black & Red	71.0
Black & Blue	71.2
Black & Green	71.5
Black & Yellow	71.8
Black & Purple	72.0
Black & Orange	72.2
Black & Pink	72.5
Black & White	72.8
Black & Red	73.0
Black & Blue	73.2
Black & Green	73.5
Black & Yellow	73.8
Black & Purple	74.0
Black & Orange	74.2
Black & Pink	74.5
Black & White	74.8
Black & Red	75.0
Black & Blue	75.2
Black & Green	75.5
Black & Yellow	75.8
Black & Purple	76.0
Black & Orange	76.2
Black & Pink	76.5
Black & White	76.8
Black & Red	77.0
Black & Blue	77.2
Black & Green	77.5
Black & Yellow	77.8
Black & Purple	78.0
Black & Orange	78.2
Black & Pink	78.5
Black & White	78.8
Black & Red	79.0
Black & Blue	79.2
Black & Green	79.5
Black & Yellow	79.8
Black & Purple	80.0
Black & Orange	80.2
Black & Pink	80.5
Black & White	80.8
Black & Red	81.0
Black & Blue	81.2
Black & Green	81.5
Black & Yellow	81.8
Black & Purple	82.0
Black & Orange	82.2
Black & Pink	82.5
Black & White	82.8
Black & Red	83.0
Black & Blue	83.2
Black & Green	83.5
Black & Yellow	83.8
Black & Purple	84.0
Black & Orange	84.2
Black & Pink	84.5
Black & White	84.8
Black & Red	85.0
Black & Blue	85.2
Black & Green	85.5
Black & Yellow	85.8
Black & Purple	86.0
Black & Orange	86.2
Black & Pink	86.5
Black & White	86.8
Black & Red	87.0
Black & Blue	87.2
Black & Green	87.5
Black & Yellow	87.8
Black & Purple	88.0
Black & Orange	88.2
Black & Pink	88.5
Black & White	88.8
Black & Red	89.0
Black & Blue	89.2
Black & Green	89.5
Black & Yellow	89.8
Black & Purple	90.0
Black & Orange	90.2
Black & Pink	90.5
Black & White	90.8
Black & Red	91.0
Black & Blue	91.2
Black & Green	91.5
Black & Yellow	91.8
Black & Purple	92.0
Black & Orange	92.2
Black & Pink	92.5
Black & White	92.8
Black & Red	93.0
Black & Blue	93.2
Black & Green	93.5
Black & Yellow	93.8
Black & Purple	94.0
Black & Orange	94.2
Black & Pink	94.5
Black & White	94.8
Black & Red	95.0
Black & Blue	95.2
Black & Green	95.5
Black & Yellow	95.8
Black & Purple	96.0
Black & Orange	96.2
Black & Pink	96.5
Black & White	96.8
Black & Red	97.0
Black & Blue	97.2
Black & Green	97.5
Black & Yellow	97.8
Black & Purple	98.0
Black & Orange	98.2
Black & Pink	98.5
Black & White	98.8
Black & Red	99.0
Black & Blue	99.2
Black & Green	99.5
Black & Yellow	99.8
Black & Purple	100.0

All tasks completed	Yes	No
Subject Teacher Signature		

2