

# English/Science written tasks



## Experiment 1: Fizzical reaction

**Aim:** To use a model of a volcano, to see what happens when two particular chemicals come together.

### Background information:

The 'volcano' erupts in this activity because the baking soda (sodium bicarbonate) and vinegar (acetic acid) react and produce a gas called carbon dioxide. In the activity, the bubbles of carbon dioxide are released, making the 'lava' residue flow.

**Cultural note:** The cultural connection with this activity can be linked to the active volcano of Mt. Etna in Sicily; students could view images of this volcano in action on the internet.

### What you need:

- white vinegar
- baking soda
- sand, enough to cover a bottle to form a volcano
- red food colouring (2-3 drops)
- two small plastic bottles (600 ml size or smaller)
- baking dish or tray
- a funnel

### What to do:

1. Put the vinegar into one of the plastic bottles and add the red food colouring to the bottle.
2. Use a funnel to fill the other small plastic bottle with baking soda.
3. Put the bottle with the baking soda in it into the middle of a large dish or tray. Pile sand around it to make it look like a volcano.
4. You are now ready to create your own volcano. Carefully pour the red vinegar mixture into the top of the volcano (into small bottle with baking powder) and observe what happens when the vinegar mixture comes in contact with the baking soda.
5. Circle the answers that best describes the reaction:

Bubbling

Fizzing

Exploding

Expanding

No reaction

### Questions:

1. The chemical reaction of vinegar and baking soda produces a common gas that is found in fizzy drinks. What is the name of this gas?

These same bubbles found in the fizzy drink in a can or bottle also make you burp loudly!

### Extension activity:

1. Try changing the amount of vinegar and bicarbonate soda to see if the reaction continues to work.

## Experiment 1B: Fizzical reaction



**Aim:** To show that the carbon dioxide gas is being produced when baking soda and vinegar react together. The gas will be enough to inflate a balloon.

### Background information:

To blow up a balloon we can use our breath which contains carbon dioxide. This same common gas can also be produced using vinegar and baking soda. In this chemical reaction the gas produced (carbon dioxide) expands the balloon and the balloon swells up.

### What you need:

- a balloon
- a plastic bottle (500 litre)
- white vinegar – 250 ml
- baking soda
- a funnel
- a paper cup
- water – 250ml
- a measuring jar

### What to do:

1. Using a measuring jar mix vinegar and water together and then pour into the bottle.
2. Use a funnel to fill the balloon with baking soda.
3. Stretch the end of the balloon tightly over the top of the bottle, carefully making sure that the mixtures don't touch and the balloon dangles low now predict what will happen when the soda hits the vinegar:  
What happens in the bottle?  
What happens to the balloon?
4. Now lift the balloon up so that the powder falls into the bottle.
5. Record your results.

### Questions:

1. Why did the balloon expand?
2. What is the name of the common gas that has been produced?

## Experiment 2: Cabbage indicator



**Aim:** To make an indicator and use it to test liquids to see if they are acid, base or neutral.

### **Background Information:**

Liquids and solids used in our homes can be tested to find out if they are acids or bases. We can do this using a liquid indicator that turns red in acids and blue or green in bases. Red cabbages can be used to make one of these indicators. However, if the liquid or solid is neutral (neither acid nor base) then there will be no colour change.

### **Safety Hints**

Be careful with sharp knives and boiling water. Note: You can add alcohol or methylated spirits to preserve the indicator using a 1:5 ratio of alcohol to water. It can also be frozen.

### **What you need:**

- red cabbage
- knife and chopping board
- boiling water
- two jugs
- strainer
- cups for testing (use clear plastic disposable ones)
- Things for testing from the kitchen (or bathroom), some suggestions are: lemon juice, vinegar, apple juice, sugar, flour, soft drink, milk, baking soda, yogurt, water, apple juice, soap, detergent.



## What to do:

1. Cut up about one – two cups of cabbage and place it in a jug.
2. Add 1-2 cups of boiling water and allow to stand for about 5 minutes.
3. Strain the liquid from the cabbage into the other jug, using the strainer.
4. List the products to be tested in the table below.
5. Guess whether the product is an acid or base before testing it.
6. Put a little of the products to be tested into each of the cups.
7. Add some of the cabbage water to each and look for the colour change.
8. Record whether they are an acid or base as determined by the indicator.

Product to be tested	My guess (acid, base or neutral)	Record results

## Questions:

1. Now that you have tested a variety of substances discuss characteristics of acids, bases and neutrals.

## Experiment 3: Bubble mix



**Aim:** To make your own bubble mix.

### Background information:

Water molecules have strong cohesive forces and tend to cling together. Because of this it is impossible to stretch water across a frame to form bubbles. However, when you add detergent to water, the detergent weakens the force between the water molecules and this allows it to stretch across a bubble frame, and to make bubbles. The soapy film of a bubble is very elastic and can expand without breaking. This elasticity is due to a reduction of the surface tension. The spherical shape of bubbles is due to a balance between the air inside the bubble pushing out and the film's tendency to reduce its surface area pushing in. For a given volume, a sphere is the shape with the least surface area.

### Safety Hints

Bubble mix may sting eyes

### What you need:

- one part dish-washing detergent
- five parts water
- 1/2 part glycerine (or glycerol available from pharmacies)
- large container
- things to make bubbles with (wands, kitchen utensils like a potato masher, spatula, garlic crusher, whisk)

### What to do:

1. Mix all ingredients together in a bowl.
2. Try to make different shaped bubbles using a variety of kitchen utensils. Remember don't throw away your bubble mix - it actually gets better with age, so put it somewhere safe (with a label) and come back to it another time.

### Questions:

1. From the things that you used which formed the best bubbles?
2. Describe your best bubble. What did you find that all bubbles had in common, after experimenting with different objects/utensils?

## Experiment 3B: Milk and Bubble mix



**Aim:** To investigate what happens when milk and bubble mix come in contact with each other.

### Background information:

From the previous experiment it was discovered that soap reduces surface tension. When soap touches the milk, the surface tension at that point is reduced, but it is as strong as ever in the rest of the bowl. That's why the milk (and the colours) spreads towards the side of the dish.

### What you need:

- a dish of milk at room temperature
- bubble mix from the previous activity
- a toothpick
- two different coloured food dyes

### What to do:

1. Dot drops of food dyes in the dish of milk at room temperature.
2. Dunk a toothpick into some bubble mixture. Predict what will happen when you touch the centre of the milk:
3. Your prediction:
4. Now dunk the toothpick into the milk.
5. What happens to the food dye?
6. Dip the toothpick again in the bubble mixture and touch a blob of colour this time and see what happens?

### Questions:

1. Explain how the changing surface tension of the milk causes the coloured food dye to spread

Check the website: [www.abc.net.au/science/experimentals/stories/s1360031.htm](http://www.abc.net.au/science/experimentals/stories/s1360031.htm) find Psychedelic Milkshake for the explanation.

## Experiment 4: Dancing currants



**Aim:** To investigate what happens when currants or sultanas are added to soda water.

### Background information:

The surface of the sultanas is naturally hydrophobic/water repelling, or 'water hating'. The sultanas 'want' to get away from water. Gas bubbles from the soda water surrounds them so that their surface is less exposed to the water. When enough gas bubbles are attached they float to the surface. At the surface, the bubbles burst and the sultanas fall down. The cycle is repeated and the sultanas continue dancing around. If you add detergent to the mixture, it alters the surface reaction of the sultanas. They no longer repel the water and the bubbles no longer stick to their surface.

### What you need:

- soda water
- currants
- glass jar
- spoon
- water
- bubble mix from previous experiment

### What to do:

1. Almost fill the jar with soda water.
2. Add a handful of sultanas. At first the sultanas will sink to the bottom of the jar, however after a moment, each will rise to the surface but they will not stay there! The sultanas will continue to sink to the bottom and rise again for hours.
3. After a while, you can try adding a small amount of detergent and watch what happens. (the currants will sink to the bottom)

### Questions:

1. Observe what happens to the sultanas for a couple of minutes and record your observations.
2. Why did the sultanas rise to the surface?
3. Why did they fall to the bottom again?

### Extension activity:

1. Try this experiment with different objects instead of sultanas use other small dried fruits, peanuts, cooked rice or even a piece of cooked pasta and add food dye for colour effects. Record your results and discuss which 'danced' around and which didn't.