



**Teacher's Resource sheet  
Episode 2**



**Curriculum Strand - Materials  
Strand Unit – Materials and Change**

**Aims and Objectives:**

To explore chemical reactions in the world around us, find out what the class already know, and put this to the test using experiments with different household chemicals.

**Class plan**

Suggestions:

- ✓ Ask warm up questions with the class
- ✓ Watch the video
- ✓ Fill out the first two questions of the investigator's sheet (see resources below)
- ✓ Do experiments in class
- ✓ Complete the investigator's sheet

**Resources contained in this print out:**

- ✓ Curriculum questions explaining
- ✓ Some warm up question suggestions
- ✓ The Science Investigators Chemical Reactions episode can be accessed here:  
<https://scienceinvestigators.wordpress.com/about/episodes-and-resource-sheets/>
- ✓ Experiments to do in class (resources and instructions are included)
- ✓ An investigator's sheet for pupils to discuss and fill out for each experiment

## Curriculum Question Suggestions with answers (also addressed in the episode):

### Explaining:

- **Chemical reactions**
- **Fast or slow reactions**
- **Why do we care about chemicals?**

### **CHEMICAL REACTIONS**

What is a chemical reaction?

#### **Answer:**

A chemical reaction is a chemical change which forms new substances. It occurs when two or more molecules interact and the molecules change. Bonds between atoms are broken and created to form new molecules. A chemical reaction is different from changing the physical state of something such as turning water to ice.

### **FAST OR SLOW REACTIONS**

#### **Fast chemical reactions:**

Combustion is a chemical reaction that produces heat and light. The most common form of combustion is fire. Most forms of combustion happen when the gas oxygen joins with another substance. For example, when wood burns, oxygen in the air joins with the carbon in wood.

#### **Very fast combustion can cause an explosion:**

This type of combustion happens in a bomb or a firecracker. During an explosion, air heats up so fast that it expands and moves outward with great force.

#### **Slow chemical reactions:**

Chemical reactions can also be very slow, like the rusting of a steel gate. That rusting happens because the iron (Fe) in the metal combines with oxygen (O<sub>2</sub>) in the atmosphere. Chemical bonds are created and destroyed to finally make iron oxide (Fe<sub>2</sub>O<sub>3</sub>).

### **WHY DO WE CARE ABOUT CHEMICAL REACTIONS?**

#### **Answer:**

By observing chemical reactions, we are able to understand and explain how the natural world works. Chemical reactions are used to produce most of our energy. They turn food into fuel for your body, make fireworks explode, cause food to change when it is cooked. Chemical reactions are used in everyday household activities like cleaning and lighting matches. When you put bleach in the washing machine to clean your clothes, a chemical change breaks up the molecules that cause stains.

Without chemical reactions, nothing would ever change. New molecules wouldn't form. No organisms could live. Breathing is a chemical reaction!

# EXPERIMENTS

**For these experiments you'll need:**

**Chemical reaction experiments can get messy...**

- ✓ Protective clothing (art bibs work well)
- ✓ Protective eyewear (science glasses or sunglasses)
- ✓ Paper plates to protect desks

**To clean up:**

- ✓ Kitchen towel
- ✓ Rubber gloves
- ✓ Cleaning agent

**There are lots of experiments in this episode (some messier than others, and some using non-household chemicals). The materials for each are listed with the instructions below.**

## **Experiment 1: Extinguish a flame without touching it or blowing it out**

**You'll need:**

- ✓ Cups
- ✓ Tealights
- ✓ Matches

**Directions:**

1. Light the candle
2. The oxygen keeps the wick burning
3. Put the cup over the candle this extinguishes the flame by taking away the oxygen

**Result:**

The candle is burning because there is fuel. The chemical reaction is caused by the wick on the candle with the oxygen keeping it lit and the heat that comes from the match. When the cup goes over the candle we take away the oxygen which puts out the flame.

## **Experiment 2: How to inflate a balloon without blowing it up**

### **You'll need:**

- ✓ A balloon
- ✓ Dry yeast
- ✓ A plastic bottle
- ✓ Cup of warm water
- ✓ Sugar
- ✓ A4 sheet of paper

### **Directions**

1. Add water to the bottle
2. Make a funnel with a piece of paper
3. Pour yeast into the bottle through the funnel
4. Pour sugar in through funnel
5. Put the lid back on the bottle and give it a good shake
6. Quickly put the balloon on top of the bottle

### **The science bit:**

Sugar activates the yeast. This causes a chemical reaction which releases a gas called carbon dioxide. This gas fills up the bottle and eventually the balloon.

**Top Tip: The balloon inflates slowly, so do this experiment early in the lesson and check on the balloon as the day progresses**

## **Experiment 3: Chemical reactions with milk and washing up liquid**

### **You'll need:**

- ✓ A baking tray or high sided plastic plate
- ✓ Cotton buds
- ✓ Washing-up liquid
- ✓ Food colouring

### **Directions**

1. Pour the milk into the tray
2. Add some drops of food colouring
3. Put some washing up liquid on your cotton buds
4. Put your cotton bud into the milk and see what happens

### **The science bit:**

When you add washing up liquid to milk it tries to break down the fat. This causes the colours to scatter.

**Top Tip: Make sure your tray or plate has sides high enough to hold the milk if students swirl it about**

## Experiment 4: Elephant Toothpaste

### You'll need:

- ✓ Hydrogen peroxide solution 6% (available in pharmacies or hair salon suppliers)
- ✓ Dry yeast
- ✓ 3 tablespoons of warm water
- ✓ Food colouring

**Top Tip: Hydrogen peroxide is a chemical that needs to be treated with caution. It is best to wear gloves and keep away from eyes**

### Directions

1. Pour 1/2 cup of hydrogen peroxide into your empty bottle
2. Put in a good squirt of washing up liquid
3. Mix warm water with dry yeast in a separate container
4. Swirl it all around
5. Pour the yeast mixture into the bottle with a funnel

**Top Tip: Foam will overflow from the bottle, so be sure to do this experiment on a washable surface, or place the bottle on a tray.**

### The science bit:

The yeast acts as a catalyst, rapidly removing oxygen from the hydrogen peroxide. With the help of washing up liquid, this creates lots and lots of bubbles. Did you notice the bottle got warm? Your experiment created an Exothermic Reaction - it not only created foam, it created heat!

**Top Tip: The foam produced is just water, soap, and oxygen so you can clean it up with a sponge and pour any extra liquid left in the bottle down the drain.**

## Experiment 5: Lava Lamps

### You'll need:

- ✓ A clear glass jar or vase
- ✓ Water
- ✓ Vegetable Oil
- ✓ Effervescent Vitamin C tablets or Berocca
- ✓ A torch

**Top Tip: Led torches work best**

### Directions

1. Pour a little water into the jar or vase until it is about ¼ full
2. Then fill it up with vegetable oil
3. Drop in fizzy vitamin C tablets
4. For the best view of the chemical reaction, turn out lights and use the torch to illuminate your new lava lamp

**Top Tip: The more tablets you use, the better the effect you will have**

# **INVESTIGATORS SHEET**

**What are we going to do?**

---

---

---

**What do you think will happen?**

---

---

---

---

**What actually happened?**

---

---

---

---

**Why do you think this happened?**

---

---

---