

# Have fun with bubbles

## Chemistry and physics combined

(UK & Italy)

### Background

This is based on a joint project named 'Beyond Water' between a primary and secondary school.

The project focus was not to explain water but use water to provoke students' interests in all the relevant scientific laws. Here we will use water to teach the students about light and measurement.

### You will need:

- ✓ a small empty bottle e.g. 500 ml
- ✓ 15 ml of detergent
- ✓ 15 g of brown sugar
- ✓ tap water
- ✓ drinking straws
- ✓ a cloth to clean table

### Follow these steps:

1. Add 15 g of brown sugar into bottle.
2. Add 15 ml of detergent to bottle.
3. Fill the bottle with tap water and shake.
4. Allow it to stand for at least 20 minutes before using.
5. On a classroom table top surface, pour a small amount of mixture onto your hand and spread onto the table. Apply more if needed.
6. Using the straw blow bubbles on the table.

7. Have fun blowing the bubbles, then ask students to put bubbles inside bubbles. See who can blow the largest bubble. What happens the shape of a bubble when more than one bubble is placed around it.



Light is reflected from both the thin outer and inner surface of the bubble. When an incoming ray of light strikes the outer surface of a bubble, part of the light ray is reflected immediately, while the other part is transmitted into the bubble film.

The colours seen on a rainbow, came from differential refraction, but the colours you can see here on the bubble come from **interference** of the light reflecting off the inner and outer surfaces of the thin bubble film.

Students were asked to get the diameter of the bubble. They simply burst the bubble and using a ruler measure the diameter of the ring of mixture left on the table. But this is a great way to have them discuss the most appropriate tools to use.

### Questions to ask students:

1. What is helping your bubble last longer?
2. What is reflected off the surface of the bubbles?
3. What can they see?
4. What is this band of colours called and how does it occur? What natural phenomenon can we link it to?
5. Leaving some measuring tools on the tables ask: how to find the diameter of the bubble. Let them work it out

### So what happened?

The addition of brown sugar to the solution helps the bubbles last longer. The water in bubbles evaporates quickly, and hence are more fragile. The sugar slows down this evaporation, making the bubbles last longer.

We see a spectrum of colours in the surface of the bubbles.

Why?

### What next?

- Students can add glycerine to the solution, making the solution even stronger.
- Compare different types of washing up liquids as some liquids have glycerol added to them.