Fizzics Education

In this issue it's "Slime Time!":

Biological slime
Soapy & sudsy experiments
Flubber science experiment
Video on making cornflour slime
Nobel prize for Soap Slime!

Biological slime!

Slime – you may or may not be the type who revels in it, but a quick web search will show that the educational and entertainment value of slime is bigger than you think. From the 1968 Japanese-American sci-fi thriller, which saw green slime take over a space station with monstrous effect; to scientists at the Scripps Institution of Oceanography, at UC San Diego, who late last year warned of the "Rise of Slime" due to a combination of climate change, ocean acidification and excess nutrient run off.

Biological slime forms when millions of microorganisms combine to create a gooey mass. Algae and "blue-green algae" – actually cyanobacteria – are the culprits, and can form oxygen-inhibiting blooms in lakes, rivers, dams and the ocean. These blooms have played a significant role in the evolution of life. In fact, algae have flourished for 2.7 billion years, and are currently thriving in the conditions created by warming, nutrient-rich waters, at the cost of more complex organisms such as corals and fish.

In November 1991, an estimated 1000-kilometre stretch of the Barwon and Darling rivers in New South Wales gained the dubious privilege of hosting the world's largest recorded blue-green algal bloom. A state of emergency was declared and drinking water had to be brought in to the area. It was reported that from the air it looked "like a long ribbon of pea soup."
http://www.science.org.au/nova/017/017key.htm

More on algal blooms in Australia: Tamanian DPI

Kids love slime and a few activities can combine the chemistry and physics of slimy materials and Science & Environment themes. Toxic algal blooms are caused by nutrient run off from household and agricultural use of phosphorus-containing compounds such as detergents and fertilisers. Most household detergents contain phosphorus, so read below for how you can make your own phosphorus-free, cheap, safe detergent with some simple ingredients available in most supermarkets.

Soapy, Sudsy & Phosphorus-free Detergent Experiment

Concentrated washing powder
4 cups grated laundry soap or soap flakes
2 cups borax
2 cups washing soda

Mix the dry ingredients well and store the detergent in an airtight plastic container. Use about two tablespoons per wash, or three for top loaders. Note this detergent will not make suds, but it still washes your clothes. Of course, if you want to be careful with your good clothes use commercial detergent.

Liquid detergent
Makes 10 litres
~9 L water
1 bar grated generic laundry soap or 1 cup of soap flakes
1/2 cup washing soda
1/2 cup borax
Option: essential oils such as tea tree, lavender, eucalyptus or rose oil
Melt 1.5L of water and soap in a saucepan until completely dissolved. Stir in washing soda and borax and remove from heat. Pour mixture into a large bucket and add remaining water. Stir and leave to cool. Use around ¼ cup per load, more for top loaders. Again, maybe use commercial detergent if you want to be careful with your good clothes.

Flubber science experiment!

Can't get enough of slime and have some borax left over?
Try these this recipes from our website: **Gooey Slime (PVA/Borax slime)**

Video experiment: Cornflour slime in just over 30 seconds!

Click here for the video

Did you know a Nobel prize was awarded for Soap Slime?

The slimy bottom of a soap bar once it's been left in the shower is an everyday example of a liquid crystal, a substance that flows like a liquid but maintains

Slimey quotes:

"Every revolution evaporates and leaves behind only the slime of a new bureaucracy"

German writer Franz Kafka, 1883–1924

Another quote

"But somewhere, beyond space and time, is wetter water, slimier slime! And there (they trust) there swimmeth one, who swam ere rivers were begun. Immense, of fishy form and mind, squamous, omnipotent, and kind."

English poet Rupert Brooke 1887–1915

Yet another quote

"Pollution is nothing but the resources we are not harvesting. We allow them to disperse because we've been ignorant of their value."

US engineer and architect, Richard Buckminster Fuller, 1895–1983

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some of the ordered structure characteristic of crystals. Liquid crystals can be found around the home in thermometers, computer screens, and ‘mood’ rings.

Play the liquid crystal game from the Nobel Foundation – if you’re a fan of Tetris, you’ll love this one!

http://nobelprize.org/educational_games/physics/liquid_crystals/

French theoretical physicist, Pierre-Gilles de Gennes won the Nobel Prize in Physics in 1991 after finding some “fascinating analogies between liquid crystals and superconductors as well as magnetic materials”.

More about liquid crystals:

http://plc.cwru.edu/tutorial/enhanced/files/lc/phase/phase.htm

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