



STEC@UKZN

"Lock Down"



DEAR FAMILIES

Welcome to the ninth issue of the STEC@UKZN "Lock Down". Missed the first issues? Find them at http://www.stec.ukzn.ac.za/lockdown_activities.aspx

Join us this Thursday for our "live" workshop on "Building Bridges". For more information or to register contact us via email on: stec@ukzn.ac.za



WHAT ANIMAL AM I?

I am a carnivorous amphibian. I come in all sorts of colours, ranging from brown, grey and green to bright red or yellow and black. There are over 7000 species of my kind worldwide. Most of us can see in front, to the sides, and partially behind. Some of us can even jump more than 20 times their body length. When I swallow food, I pull my eyes down into the roof of my mouth. That helps to push the food down my throat. In the Muppet Show, I was Ms Piggy's boyfriend. In fairy tales, if you kiss me I turn into a prince.



WHAT FRUIT OR VEGGIE AM I?

I am a fruit and come from a plant called *Fragaria*. My flavour and fragrance are widely used in food, beverages, sweets, perfumes and cosmetics. I have lots of vitamin C. I make a great jam. It looks like I have seeds on my skin, but these are individual fruit with seeds inside, called achenes. I have my own museum in Belgium. By the way, even though there is the word berry in my name, I am not a berry.

Battleships

The aim of the game is to guess the positions of your opponent's battleships and to "destroy" them.

What you need.

- Paper and pen/ pencils for each player

How to Play:

- Each player draws two 10 x 10 grids, labelled along the sides with letters and numbers. On the left-hand grid the player secretly draws rectangles representing his or her fleet of ships: 1 x *Aircraft carrier* = 5 squares, 1 x *Battleship* = 4 squares, 1 x *Destroyer* = 3 squares, 2 x *Submarines* = 2 squares, 2 x *Patrol boats* = 1 square (see example below).

	1	2	3	4	5	6	7	8	9	10
A										
B				X			X		X	
C										
D										
E							X			
F										
G										
H										
I										
J										

	1	2	3	4	5	6	7	8	9	10
A										
B										
C				X				O		
D				X						
E										
F								O		
G										
H								O		
I										
J										

- Now the players take turns to place a shot at the opponent, by calling out the coordinates of a square (eg F6). Your opponent responds with "hit" if you hit his ship or "water/miss" if you miss. If you, or your opponent hits the last remaining square of a ship it must be announced; e.g. "You sank my destroyer".
- During play you should record your opponent's shots on the left-hand grid, and his shots on the right-hand grid. You can mark a hit as "X" and a miss as "O" (see example above, e.g. 2 hits (C4,D4) and 3 misses (C8,F6,H8) are recorded on the right side).

Adapted from: <http://www.papg.com/show?1TMC>



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MATHEMATICS CHALLENGE

Apples in a Box



There are 3 boxes, a blue, a green, and a red one, holding a total of 12 apples.

The *blue box* has two more apples in it than the *green box*.

The green box has four fewer apples than the *red box*.

How many apples are in each box?

Source: <https://nrich.maths.org/2002>

“ESSENTIAL GOODS” EXPERIMENT



Ice, Cream... and Science

Do you know what goes into ice cream? For this recipe you need ingredients such as milk, cream, and sugar. But don't forget another main ingredient – air.

You will need:

- A large bag of ice
- Salt
- 1 cup milk/cream
- 1 tablespoon sugar
- 1 teaspoon vanilla essence - optional
- Ziploc bags
- Tea towel, or gloves

What to Do:

1. Pour the cup of milk/cream into a Ziploc bag. Add the sugar and vanilla essence (you can also try flavoured milk). Very important. Make sure the bag is properly sealed! You don't want to eat salty ice cream.
2. Take a larger Ziploc bag and half fill it with ice.
3. Add a good amount of salt into the bag with the ice.



4. Put the milk bag into the ice bag and shake it. Keep the milk in contact with the ice as much as possible and keep the ice rolling over the milk.
5. The ice in the bag will get VERY cold, so put a towel around the bag, or wear gloves to protect your hands.
6. Check the milk after 5 minutes, it should be a similar consistency to ice cream, if not keep going for a bit longer.

What's Happening?

Some interesting science happens when you mix salt and ice. Pure water freezes at 0°C. The addition of salt lowers the freezing point by a few degrees. Scientists call this freezing point depression. A 10% salt solution freezes for example at -7°C. Ice has to absorb energy to melt, changing the phase of water from a solid to a liquid. When you use ice to cool the ingredients for ice cream, the energy is absorbed from the ingredients and from the outside environment (like your hands, if you are holding the bag of ice). When you add salt, it lowers the freezing point of the ice, so even more energy has to be absorbed from the environment for the ice to melt. This makes the ice colder than it was before, which is how your ice cream freezes. The shaking moves the warmer cream mixture from the inside to the outside of the bag so it can freeze evenly, but you also get some air into your ice cream. The main role of air is to make the ice cream soft. Do you know that typical ice cream consists of 30% ice, 50% air, 5% fat and 15% liquid syrup?

Source: <https://www.science-sparks.com/how-to-make-ice-cream-with-ice-and-salt/>

<https://www.stevespanglerscience.com/lab/experiments/homemade-ice-cream-sick-science/>

<https://www.thoughtco.com/how-to-make-ice-cream-in-a-bag-602195>

Solution:

What animal am I: Frog

What fruit or veggie am I: Strawberry

Mathematics Challenge: 6 in the red box, 2 in the green box and 4 in the blue box

