



UNIVERSITY OF
KWAZULU-NATAL™
INYUVESI
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Issue 1



STEC@UKZN

“Lock Down”



Dots and Boxes Game

DEAR FAMILIES

Welcome to the first issue of the Stec@UKZN “Lock Down”. The purpose of these pages are to “unlock” the boredom that some of you might experience during these times.

Dots and Boxes is a paper and pen game for two (or more) players. It was first published in the 19th century by French mathematician Édouard Lucas.

How to play

The players take turns. They start making a box by adding a single horizontal or vertical line between two adjacent dots. There can only be one line between 2 dots. Diagonal lines are not allowed. A player who completes the fourth side of a 1×1 box earns one point and takes another turn. Players identify their boxes by placing their mark (for example their initial) in the box. The game ends when no more lines can be placed. The winner of the game is the player with the most points.

*Do you have any questions or comments?
Need any help with the experiments?
Contact us via email on: stec@ukzn.ac.za*

WHAT ANIMAL AM I?



I have 6 legs.
I eat meat and plants.
I weigh about 25 times less than a grain of rice.
I am about half the size of a paperclip.
I don't have ears.
I live everywhere except in Antarctica.
If you are as strong as I am, you can lift a small car.
I don't get very old, but my queen can get up to 30 years old.



You don't have a printer and you want to try it out? Make your own grid. For example a 3 dot by 3 dot grid if you just want to learn the game. Use a pen and paper and arrange the dots just the way you see it here. You can even design your own grid.



WHAT FRUIT OR VEGGIE AM I?

People think I am a vegetable, but I am a fruit.
You know me as dark green, but I can have different colours like yellow, white or orange.
I have been used for almost 4000 years.
I can get up to 60 cm long and 10 cm in diameter.
I have lots of vitamins and antioxidants.
I am about 95% water.
I don't make people fat.
People put slices of me on their faces to keep their skin young.

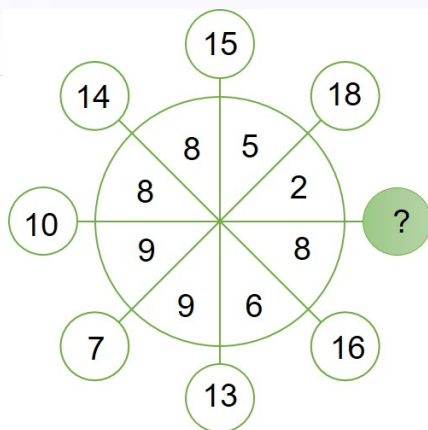


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MATHEMATICS CHALLENGE

Solve the pattern puzzle below. Find the missing number to replace the question mark.



What will happen when you touch the tip of the cotton swab in the centre of the plate with the milk?

4. It's important not to stir the mix. Just touch it with the tip of the cotton swab.
5. Now place a drop of liquid dish soap on the other end of the cotton swab or onto your finger and place the soapy end of the cotton swab (finger) back in the middle of the milk and hold it there for 10 to 15 seconds.

Can you see how the colours mix? What colours do you get when blue meets red, red meets yellow and yellow meets blue?

7. Add another drop of soap to the tip of the cotton swab and try it again. Experiment with placing the cotton swab at different places in the milk. Notice that the colors in the milk continue to move even when the cotton swab is removed. What makes the food colouring in the milk move?

What's Happening?

Milk is mainly made of water and the other big ingredient is usually fat (not all milk has the same amount of fat). The liquid dish soap bonds with the fat in the milk. This bond is so strong that the water and food colouring are pushed out. The swirling effect is everything else moving around to make room for the dish soap and fat bond.

Do you think this experiment will work with Fat Free milk?

Adapted from: Steve Spangler
<https://www.stevespanglerscience.com/lab/experiments/milk-color-explosion/>

Solution:
What animal am I: Ant
What fruit or veggie am I: Cucumber
Mathematics Challenge: $9+8=17$



“ESSENTIAL GOODS” EXPERIMENT Magic Milk

You can get all the ingredients for this activity even during level 5 lockdown.

You will need:

- A plate
- Some Milk (full cream if possible)
- Food colouring (for example yellow, red, blue)
- 1 Ear bud (or your finger)
- Some dishwashing liquid

What To Do:

1. Pour enough milk in the plate to completely cover the bottom to the depth of about 0,5 cm. Allow the milk to settle.
2. Add one drop of each of the four colours of food colouring – red, yellow and blue – to the milk. Keep the drops close together in the centre of the plate of milk.
3. Find a clean cotton swab for the next part of the experiment. Or use your finger.