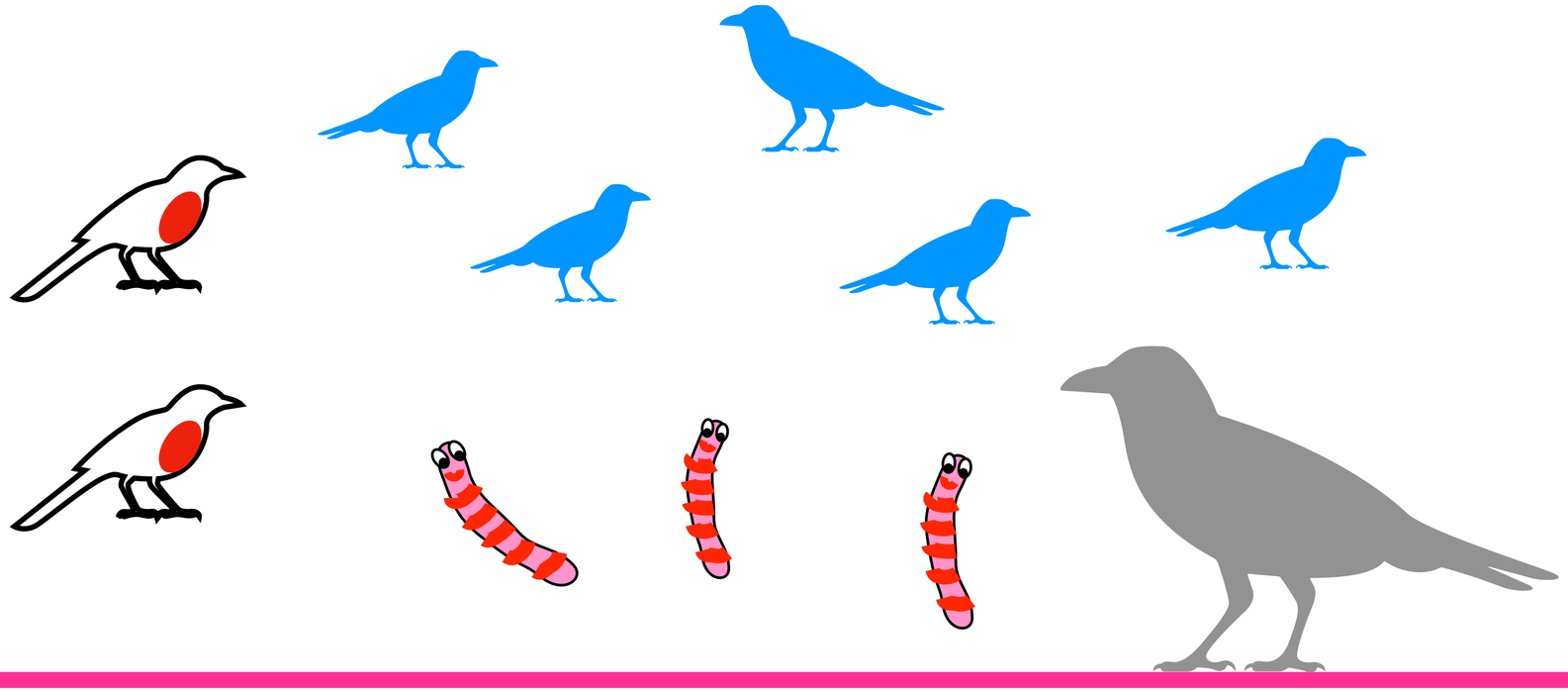
Theatre of Science Ecosystems 1: Populations, Communities and Species!



Give a number for the…

Robin population: __ Earthworm population: __

Number of species in the community: ____

Number of animals in the community: ____

Number of animals in the bird community: ___

What affects ecosystems?

(What affects how plants and animals in an ecosystem interact?)

Experiment: Ecosystem in a jar!

You will need two jars of soil (more if you like!)

1) “I am going to investigate how _____ affects the growth of my ecosystem in a jar”. (Water? Light? Temperature? Type of soil?)

2) I am going to make sure these factors stay the same:

Hypothesis: (What do you predict will happen?)

Method:

3) I am going to measure how many plants appear / the average height of the plants

Diagram

GCSE Questions!

1) A pond contains marsh frogs, common frogs, pond skaters, dragon flies, and pondweed. What word can be used for all the marsh frogs in the pond?

A: Ecosystem
B: Habitat
C: Population
D: Community

2) Name three abiotic factors that might affect life in the pond.

_____

_____

_____

Thanks for supporting me on Kofi!

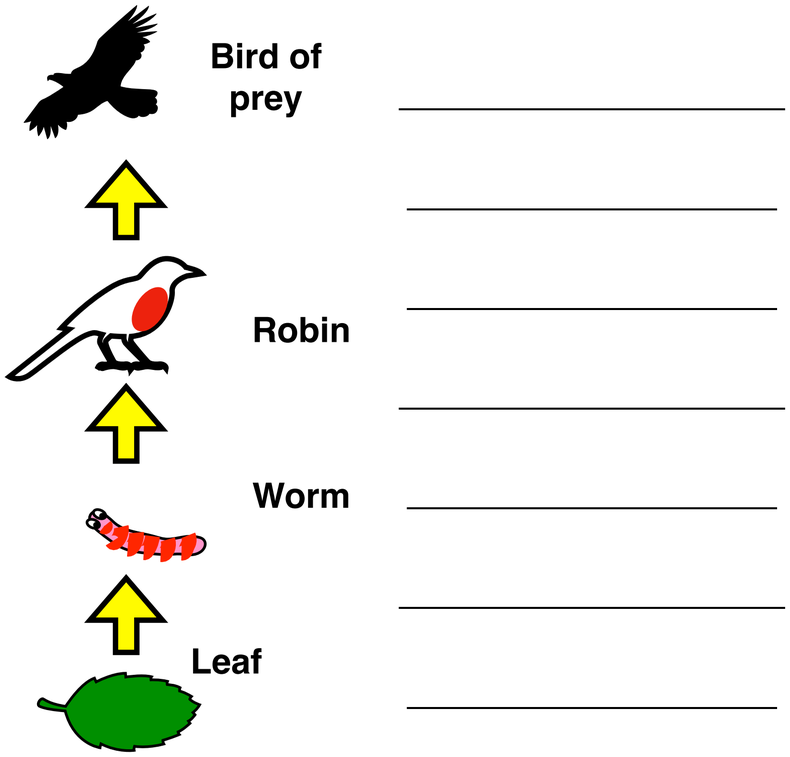
Challenging Question!

Is a nest an ecosystem? Explain your thinking.

Theatre of Science Ecosystems 2: Food Chains

To join in bring: Paper, scissors, felt pens

1) What do the arrows on a food chain show?



2) Producer or Consumer?!

Circle your choice.

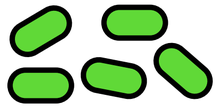
Sunflower

Producer / Consumer

Snail

Producer / Consumer

Algae



Producer / Consumer

Bacteria making carbon dioxide gas into sugar

Producer / Consumer

Venus Flytrap

Producer / Consumer

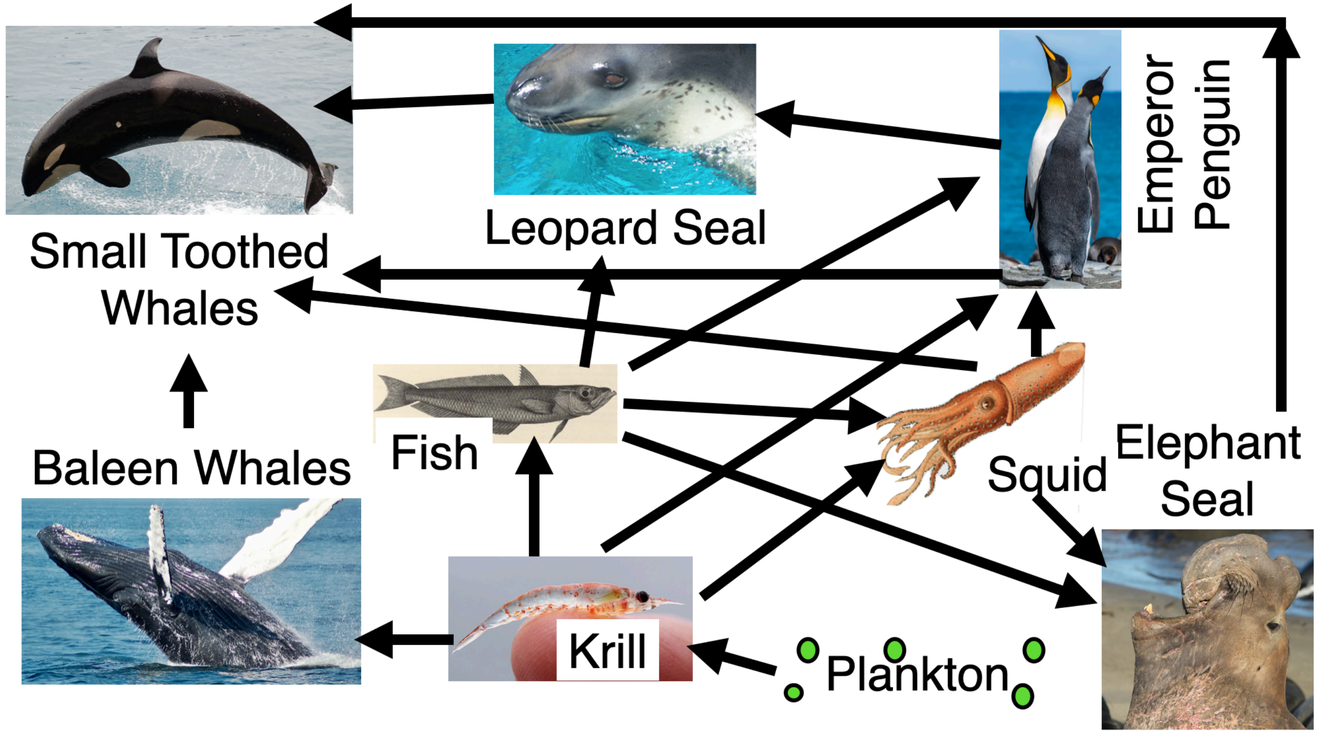
Human making cake

Producer / Consumer

The Sun

Producer / Consumer

Thanks for supporting me on Kofi!



1) What's the producer in this food web?

_____

2) Name a primary consumer

_____

3) Name a secondary consumer

_____

4) What do emperor penguins eat?

_____

_____

5) What eats leopard seals?

_____

5) What would happen to baleen whales if the krill disappeared?

_____

5) What might happen to the emperor penguin population if the elephant seals disappeared?

_____

_____

_____

_____

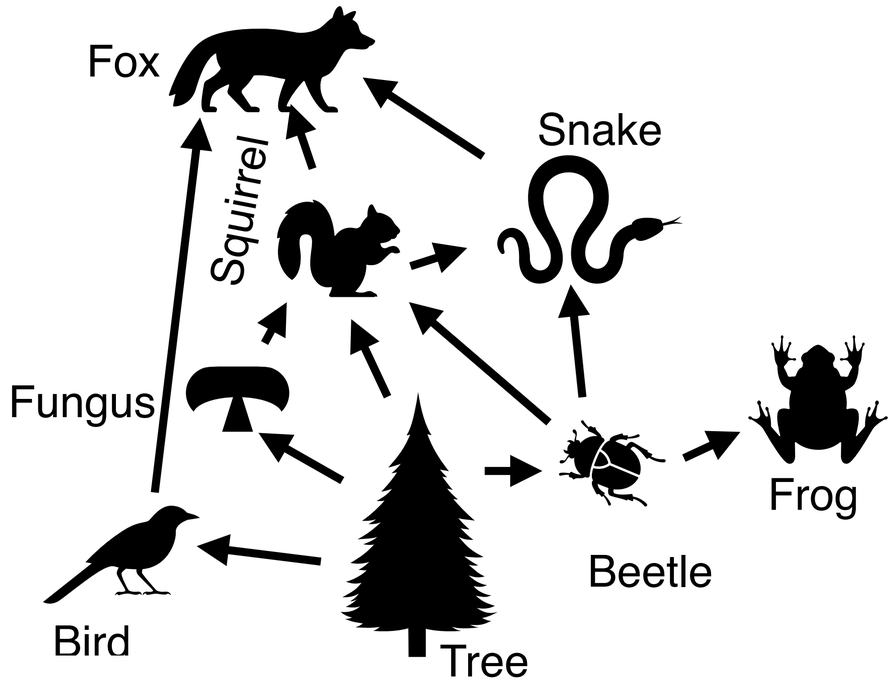
_____

_____

_____

_____

GCSE Questions!



1) Name one producer in this food web.

2) Name one primary consumer in this food web.

3) Draw an arrow between the snake and the frog to complete the food web

4) Draw a food *chain* using *five* organisms in the food web.

5) Suggest a reason why *snakes* going extinct might lead to *frogs* going extinct.

I'm **entirely funded** by people supporting me at https://ko-fi.com/theatreofscience
If you're finding these lessons useful, sign up and I'll post you magazines, stickers and rainbow glasses!

Theatre of Science Ecosystems 3: Biomass

Why isn’t 100% of the maize’s biomass stored in the cow?!

Label the cow to show where it goes

To join in bring: Elastic band / hair bobble, A4 paper, ruler, pens.

Done? Guess which ones are:

- ■ Egestion
- ● Excretion
- ▲ Respiration

Drawing Pyramids of Biomass

1) How many pieces of kelp, sea urchins and otters can you see?

Kelp _____

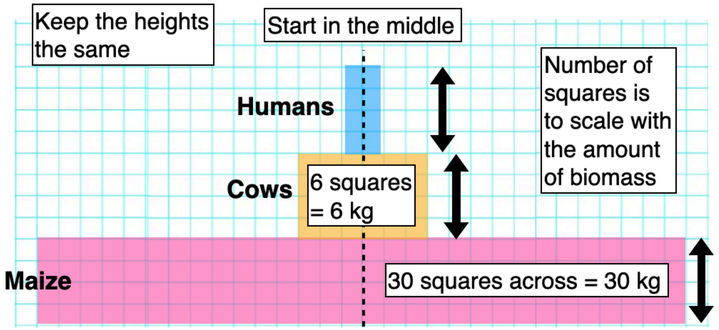
Urchins _____

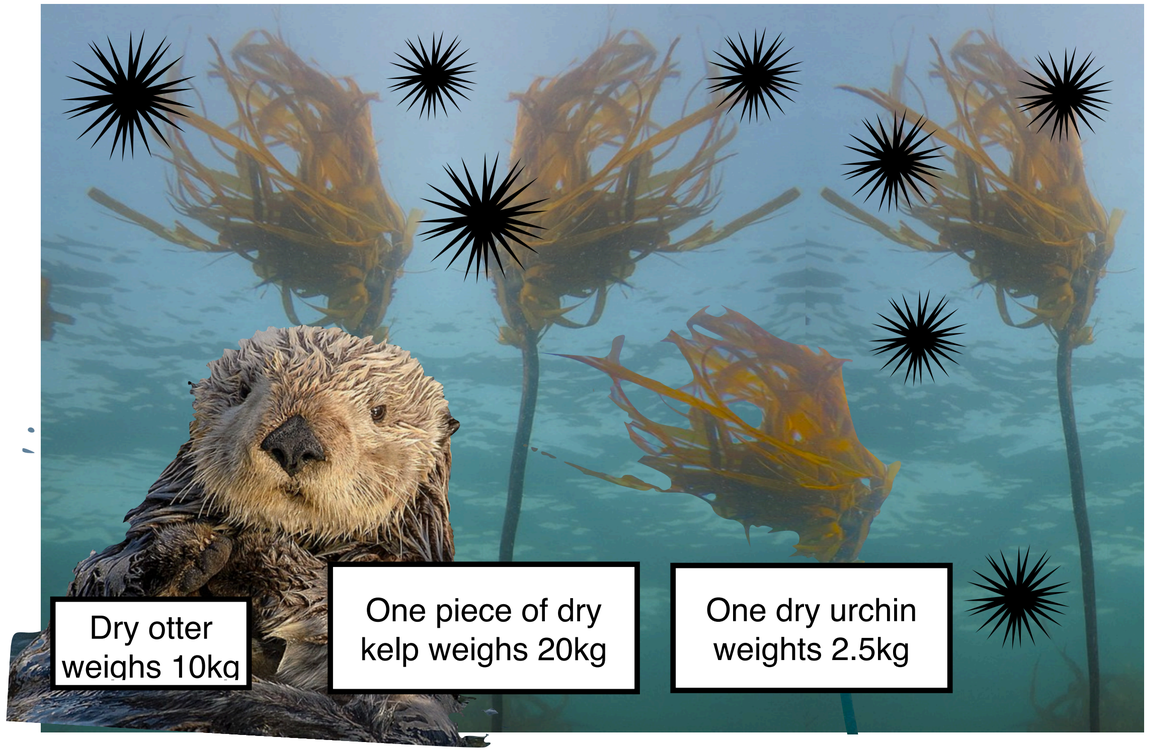
Otters _____

2) Draw a pyramid of number for them on your paper.

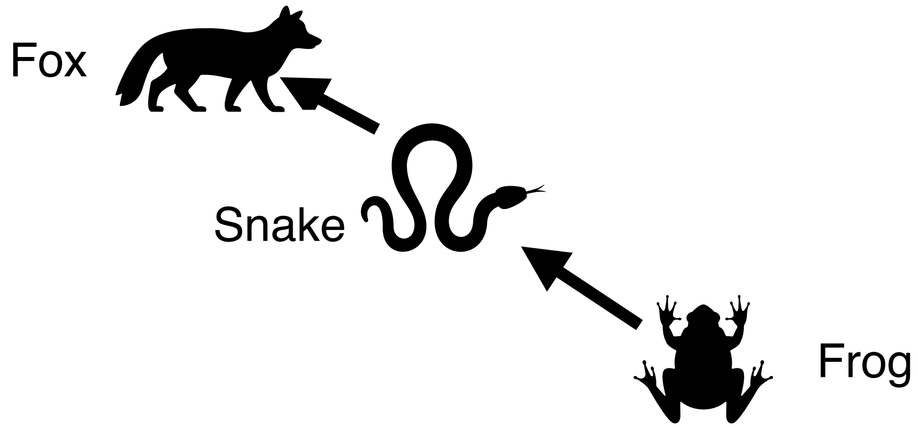
3) Draw a pyramid of biomass on the other side.

4) What's the difference?!
Which one do you think is better and why?





GCSE Questions!



1) Sketch a pyramid of biomass for the food chain pictured.

2) Give two reasons why the biomass of the snake is less than the biomass of the frog

3) Which of the following is **not** excreted from the human body?

a) Sweat
b) Faeces
c) Urea

I'm **entirely funded** by people supporting me at https://ko-fi.com/theatreofscience. If you're finding these lessons useful, sign up & I'll post you magazines, stickers & rainbow glasses!

Theatre of Science Ecosystems 4: Competition!

To join in bring: A green leaf!

1. What do plants need?!

Fill in the gaps yourself first, then listen to me talking about how plants make food and tick / make corrections!
(It's good if you make corrections because it means you've learned something! Which is, you know, the point of the lesson).

L_____, W_____

C_____ _____,

and minerals such as

N_____ , P_____, M_____

2. Plants also need: S_____

3. There's something on your list that plants *need,* but they don't compete for it. Put a star next to it.

4. A restaurant operates from your house every evening. And they use the food in your house to make meals! You can't afford to eat in the restaurant. How do you get dinner?

(List your ideas. You may want to note down what animals use the same technique when we go through them!)

Animals compete for three main things. Can you name them? Each group of pictures is a clue!

Later: say if each image shows interspecific or infraspecific competition

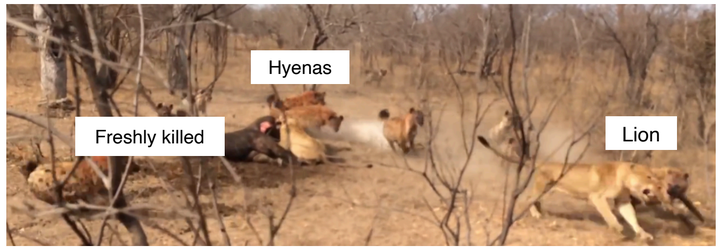
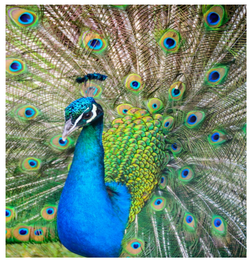
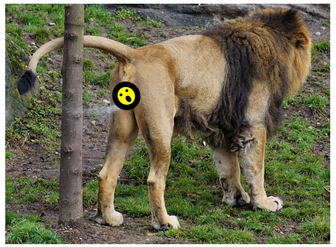


Image courtesy of Kruger Sightings HD via Wikimedia Commons! License: https://creativecommons.org/licenses/by/3.0/legalcode



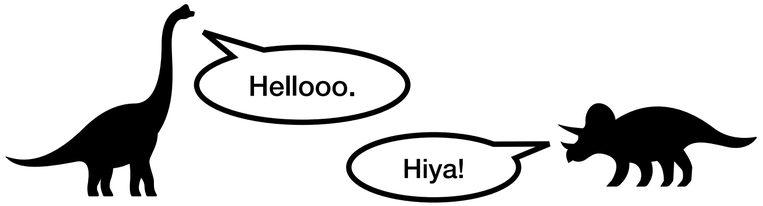


Lion image courtesy of eatcha via Wikimedia Commons! License: https://creativecommons.org/licenses/by/4.0/deed.en

Dino puzzles!

Why there were lots of small carnivorous dinosaurs, and lots of large ones, but hardly any medium sized ones?!

How did different species of enormous plant-eating dinosaurs manage to exist together in the same forest?



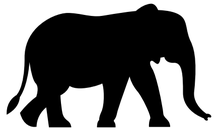
Theatre of Science Ecosystems 5: Adaptions!

Bring: Two ice cubes, tbsp of butter/marg, something to wipe your hand with!, paper, red pen, 6 toy bricks / Lego / stock cubes!

Lots of activities before you do a worksheet in this lesson! But you might want to use this page to make some notes on how these animals have adapted to survive in their environments…

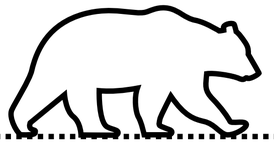
Penguins

African Elephant



Weddell (Antarcti) Seal

Polar Bear

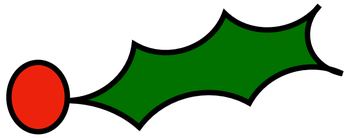


Label parts of this snowshoe hare to explain how it is adapted to survive in the Arctic.

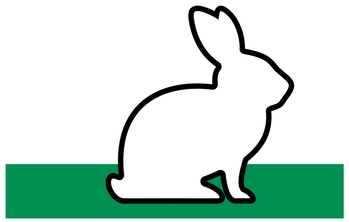
(Clues: it’s in a cold place, and there are other animals hunting it!)

Puzzles!

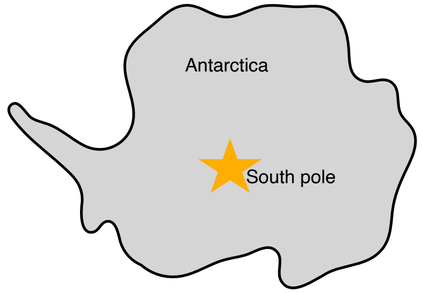
Why did a study show holly leaves are more prickly on the bottom 2.5 metres of the trees?



How do snowshoe hares avoid being seen in spring and summer when the snow melts?



Are penguins adapted to live at the South Pole? Explain yes or no!



Imagine an animal needed to store lots of fat on its body to use for energy, like a polar bear, but it lived in a hot country! Sketch what it might look like!

I'm **entirely funded** by people supporting me at https://ko-fi.com/theatreofscience
If you're finding these lessons useful, sign up and I'll post you magazines, stickers and rainbow glasses!

Theatre of Science Ecosystems 6: Sampling and Counting!

Bring: Baking tray, A4 paper, marker pen/felt tip, bowl, teaspoon of rice/dried beans similar, calculator, ruler.

How many _____ in our field?!

For organisms that stay still or move slowly! We can pick 8 random segments and count how many grains are in each .

Grains in quadrant 1: ____

Grains in quadrant 2: ____

Grains in quadrant 3: ____

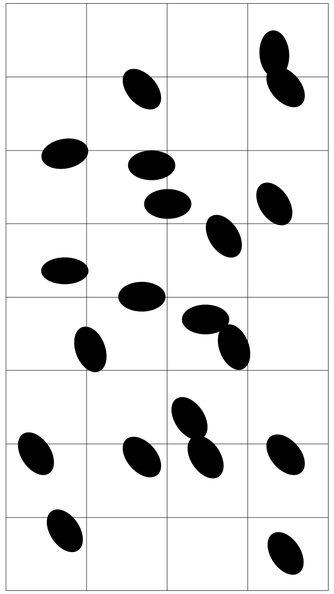
Grains in quadrant 4:_____

Grains in quadrant 5: ____

Grains in quadrant 6: ____

Grains in quadrant 7: ____

Grains in quadrant 8: ____



Total grains counted _____

There are 32 segments in our tray. We've counted the grains in 8 of them - a quarter. So times this number by 4 to get an estimate of the total number of grains on the tray.

Total on tray is about:

How many _____ in our field?!

The trapping method; for organisms that can move! Take twenty grains and mark them on both sides with a felt pen. This is your first sample. Then put all grains, marked and unmarked, in a bowl.

Take a pinch of grains; count them all, and how many are marked. Record in the table. Put grains back in the bowl. Repeat 10 times! That's your second sample.

Pinch	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Total grains										
Marked grains										

Count the total numbers of grains you pinched. This is the size of your second sample: S. Count the number of marked grains you pinched. This number is R.

S = _____ R = _____ M = 20 (The number you first marked)

You can estimate how many grains you have in the bowl altogether using the equation N = (M x S) / R.

Total in bowl is about:

You'll have to count them after the lesson to see how accurate your estimates were!

Counting how many species of lichen there are in your area!

How many different species of lichen are around - the lichen's diversity - is a great way to tell how polluted air is. The cleaner the air, the more kinds of lichen. Scientists actually measure air quality using a **Lichen Diversity Value**!

To measure the lichen diversity in an area, you put quadrats on trees. But there are rules you have to follow…

1) What kind of tree do you put your quadrat on?

a) Trees with trunks over 1cm wide
b) Trees with trunks over 80cm wide
c) Trees of any size

Why? Have a guess!

2) Lichens need light to grow. What kind of conditions should the tree you measure be in?

a) Light or shade
b) Just light
c) Just shade

Why? Have a guess!

3) Which side of the tree do you measure?

a) North and South
b) East and West
c) North, South, East and West

Why? Have a guess!

4) Do you record ALL species of lichen you find?

a) Leave out species that are hard to identify
b) Leave out species that are hard to find
c) Record all species
d) A and B

Why? Have a guess!

Thanks for supporting me on Kofi!