

Maths In ANIMALS

My name is:

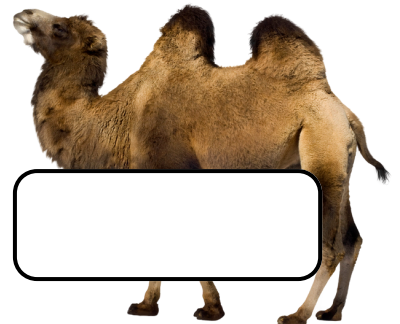
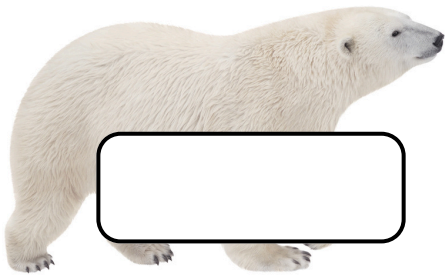


Lesson 1: Furry animals

Something to think about:
Why do animals have fur?



Space for your
thoughts or doodles



Insulation



Space for your thoughts or doodles



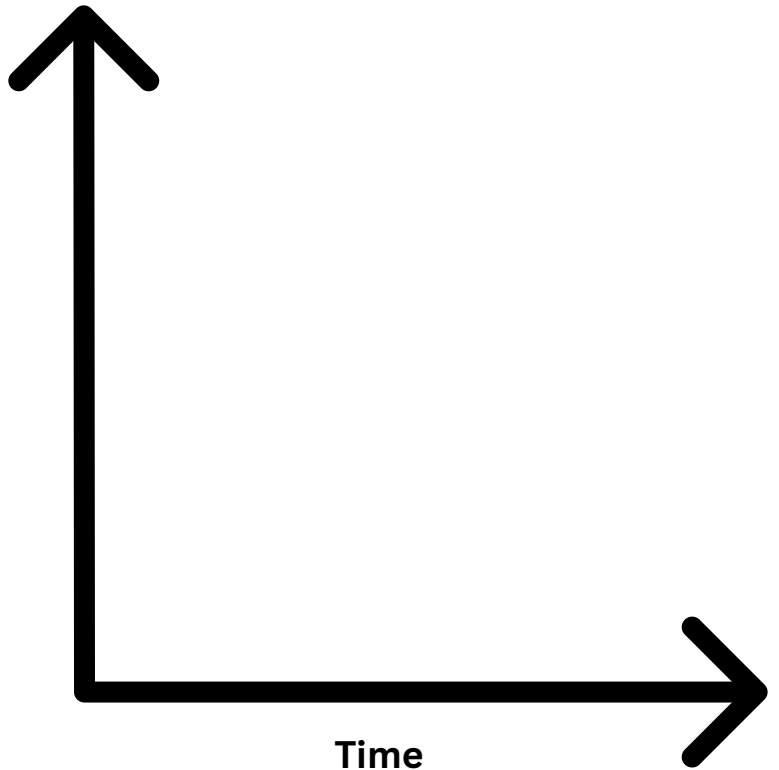
Hot water

Control



What do you think will happen?

Temperature

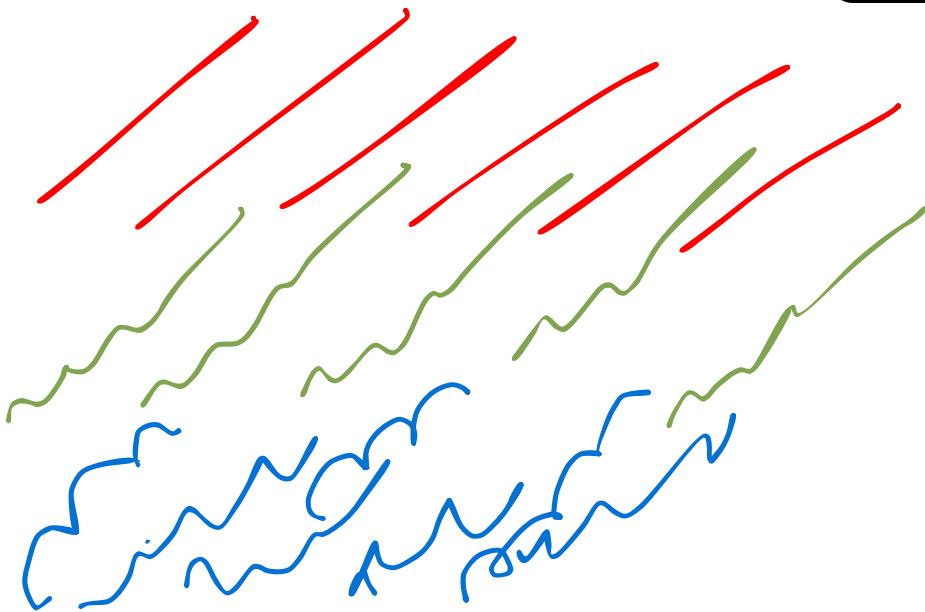


Cold water

Control



What do you think will happen?



Guard hair

Longer, stronger, straight and coloured

Awn hair

A mix between

Down hair

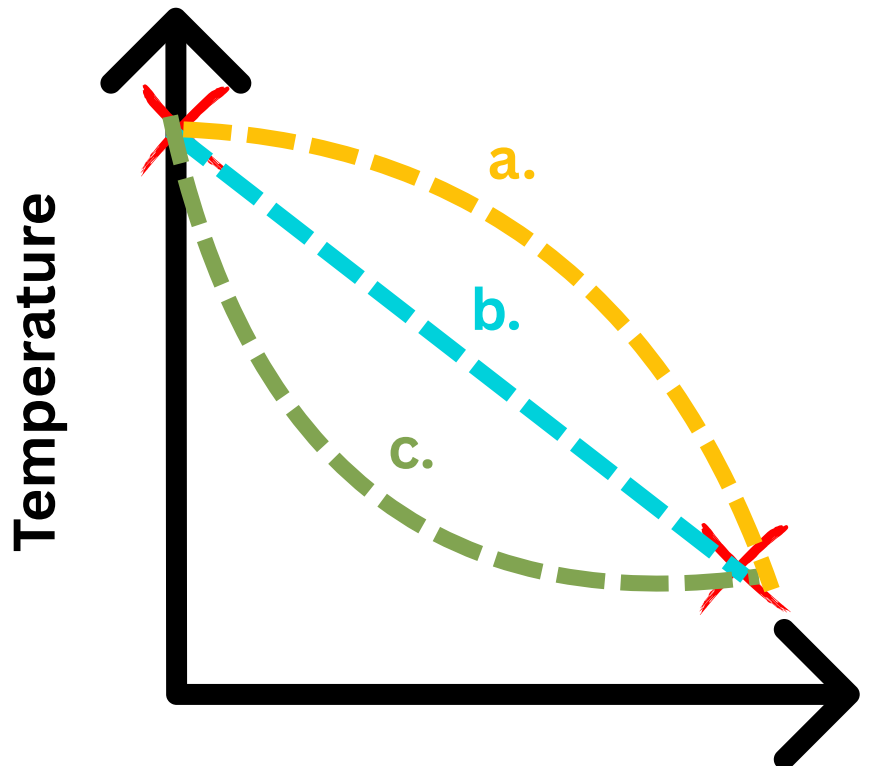
Wavy, curly and short

Hot water

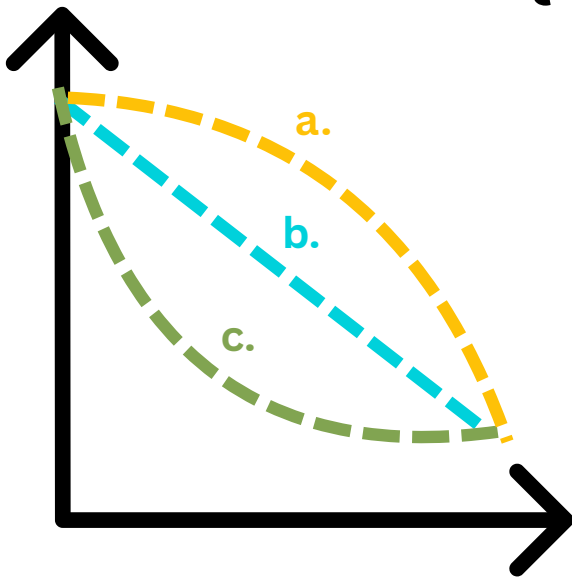
1. It cooled at the same rate the whole time

2. It started off cooling quickly and the cooling got slower as time went on

3. It started off cooling slowly and the cooling speeded up as time went on.



Quiz



Which curve shows something cooling slowly at first and speeding up as time passes?

Animal fur insulates from:

- r - The cold weather
- s - The sun
- t - All extreme temperatures

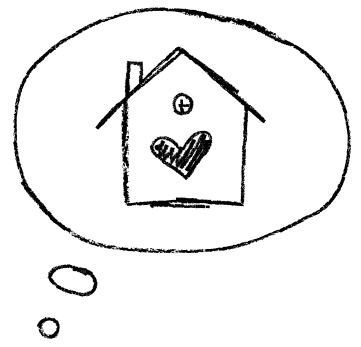


The layer of fur nearest the skin, that traps air to help regulate body temperature is called:

- a - Guard hairs
- b - Awn
- c - Down



Explore at home:



Try the experiment again, but this time get a range of insulating materials and see which one keeps your water the warmest for the longest

Hot water

Control



Foil

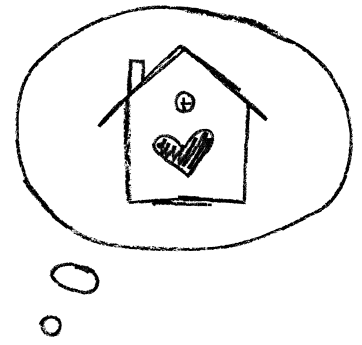


Wool



Plastic

Explore at home:



Try the experiment again, taking the temperature every 5 minutes over 1 hour.

Hot water

Control



Plot your graph by hand on some graph paper or using Geogebra:

<https://www.geogebra.org/classic>

Time in mins	Temperature
0	
5	
10	
15	
20	
25	
30	
35	
40	
45	
50	
55	
60	

Explore more real life graphs on Transum

https://www.transum.org/Maths/Activity/Travel_Graphs/Default.asp?Level=1

Lesson 2: Feathered animals

Something to think about:
Why do birds have feathers?



Space for your thoughts or doodles

What is the benefit of feathers?



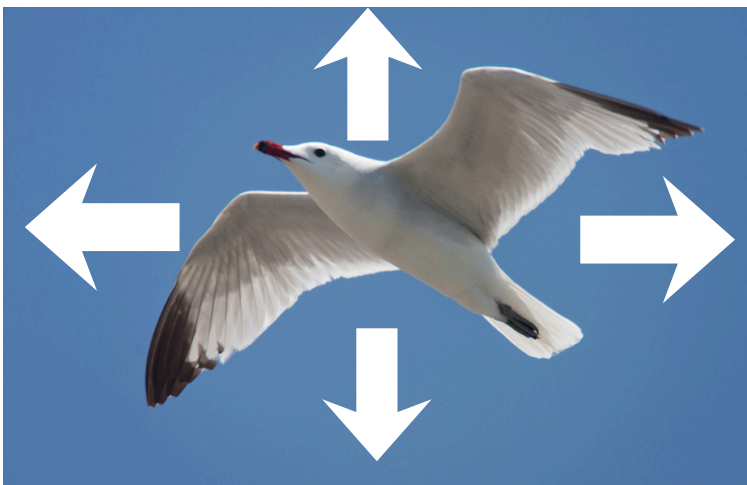
Forces

Drag

Weight

Lift

Trust



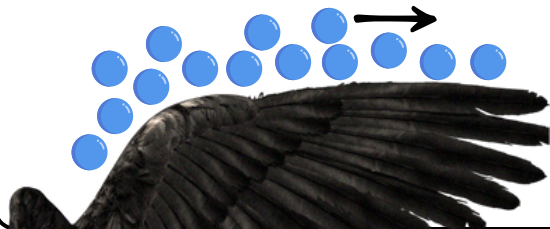
Newton's 3rd law

For every action, there is an equal and opposite reaction



Drag

Friction with the air



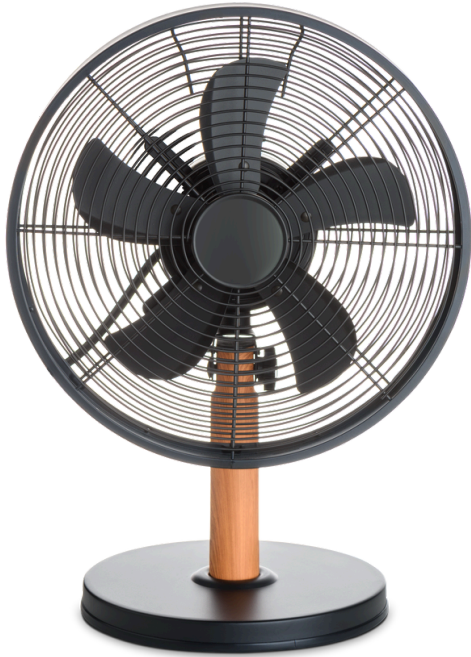
Owl



Falcon

Which bird will have more drag?

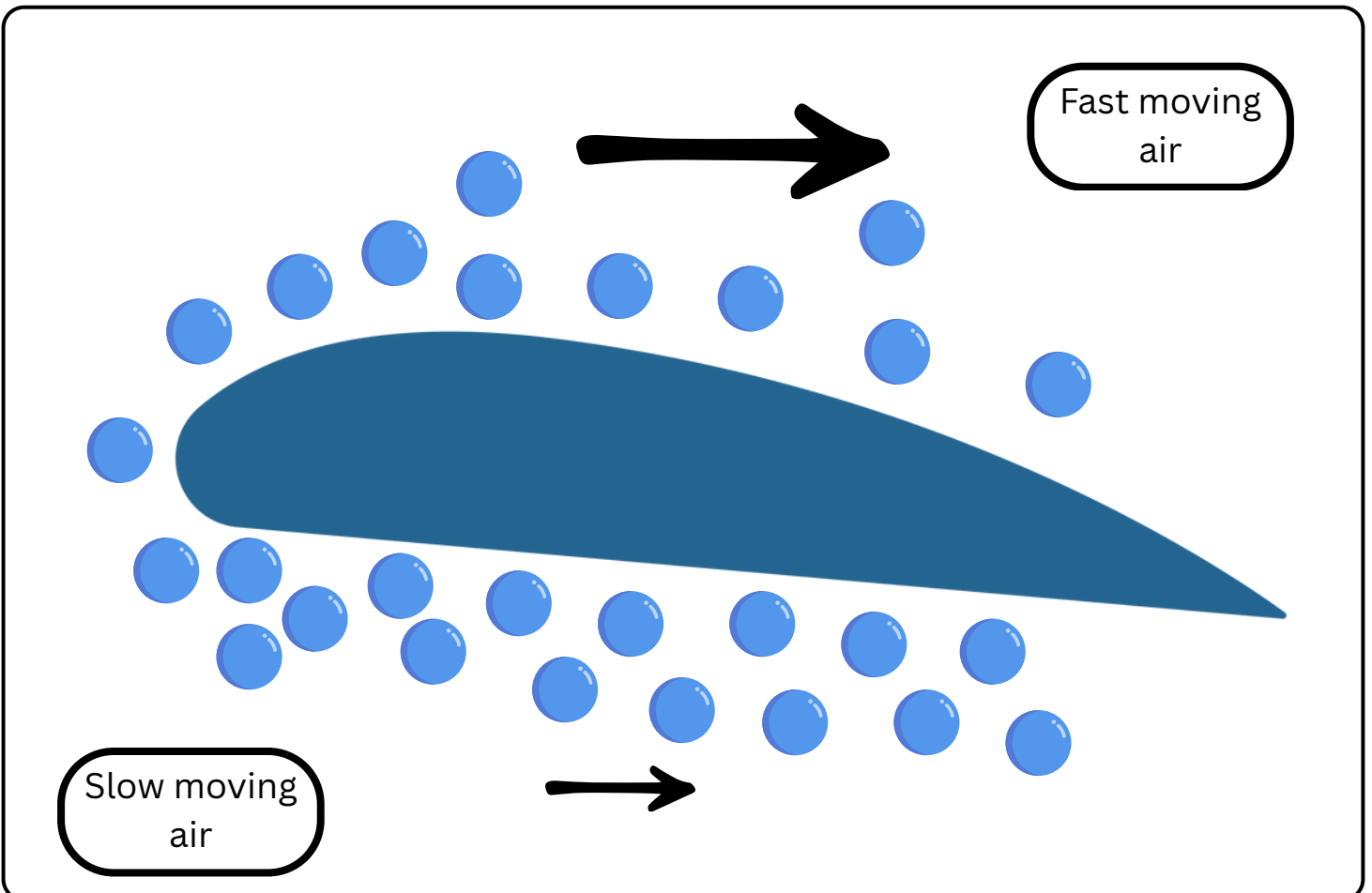
Pressure



Which creates higher pressure?

Fast moving air

Slow moving air



Quiz

The 4 forces involved in flight are...

F - Pressure, wind, thrust and drag

E - Thrust, drag, lift and speed

D - Thrust, drag, lift and weight

Feathers are good for flight because they are...

I - Lightweight, strong and flexible

J - Insulating

K - Brightly Coloured

When air is moving faster the pressure is ...

R - Lower

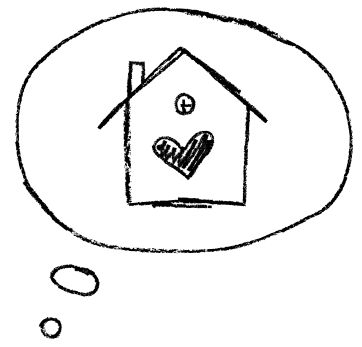
S - Higher

Larger wings means

B - More Drag

C - Less Drag

Home made bird feeder



With winter just around the corner, it can be harder for our feathered friends to find food. Here's how you can make a natural bird feeder to help them out.

What you will need.

- Bird seed
- Lard (room temperature)
- Pine cone
- Twine or string
- Meal worms (optional)



What to do.

Step 1 - Tie the string or twine to the pine cone.

Step 2 - In a bowl mix together the lard and the bird seed/meal worms.

Step 3 - Once they are all mixed together well push the mixture into the scales of the pinecone until covered.

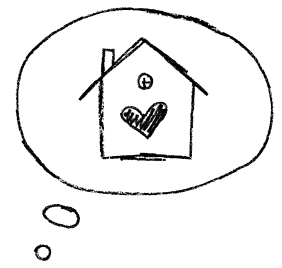
Step 4 - Pop in the fridge to set.

Once set hang outside.



What sort of birds have visited your bird feeder?
How were you able to identify them?





Migration

Below are 3 different types of birds.
In the winter these birds migrate to different countries.
What countries do these birds end up in?



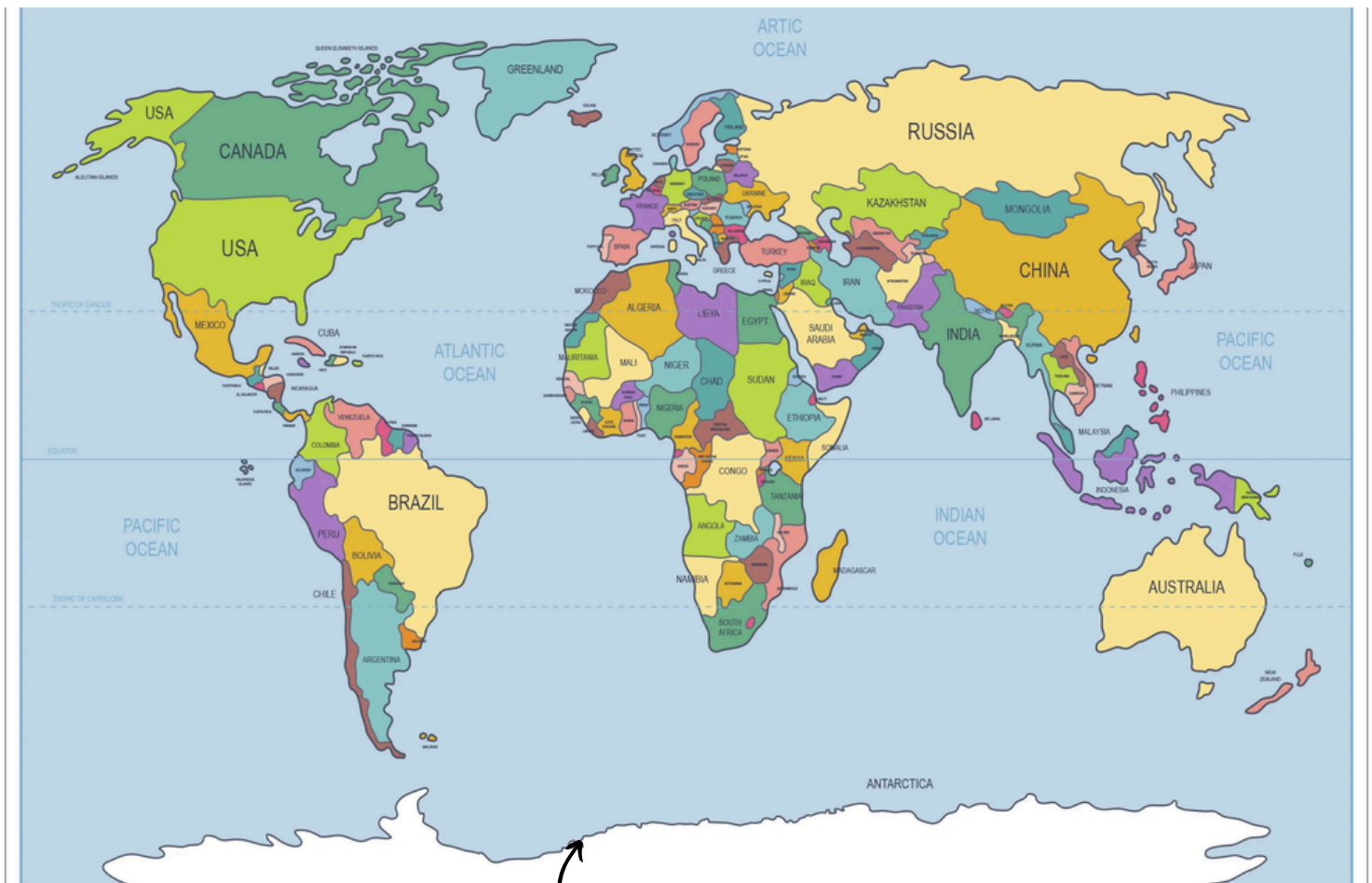
Thrush migrate to UK from



Pink footed geese migrate to UK from



Osprey migrate from UK to



Have a look at the map to see the amazing distances they travel.

Lesson 3: Scaled animals

Something to think about:

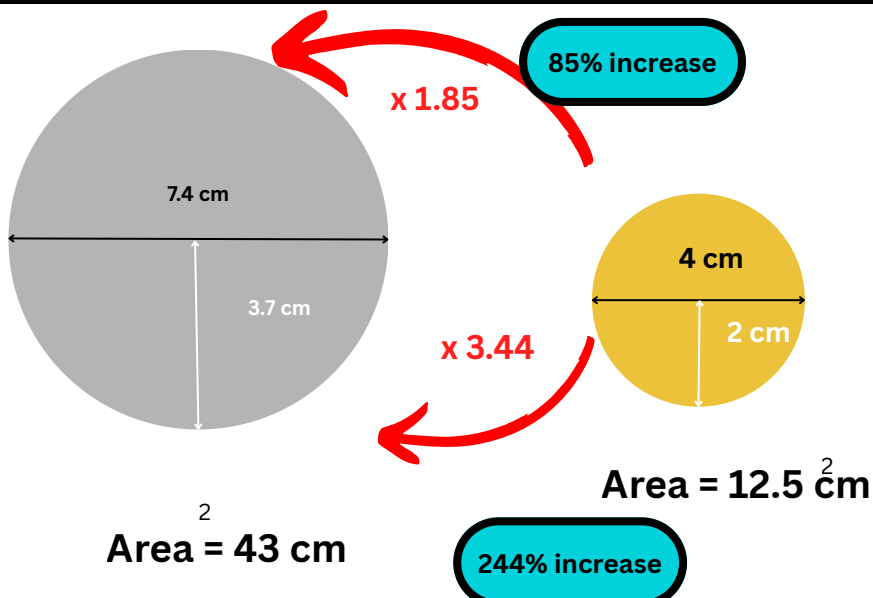
Circle the animals that have scales



Space for your thoughts or doodles

Burmese python

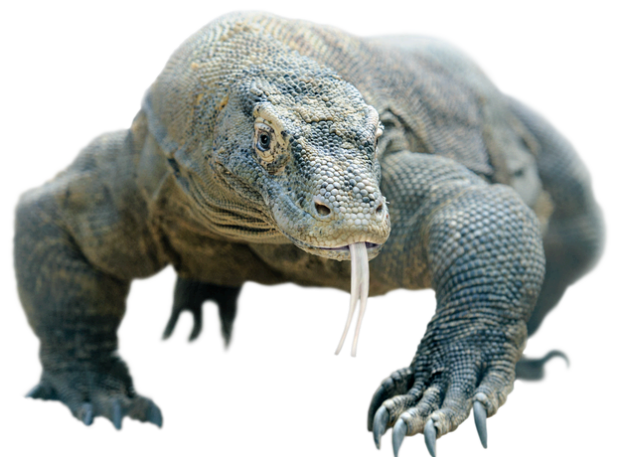
Invasive species in Florida



Komodo Dragon

Can eat up to 80% of it's
body weight in one go

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100



Quiz

Karen



Brenda



Karen



Reptiles, fish, mammals and even birds have types of scales

Brenda



Only reptiles have scales

Karen



You can't have % over 100

Brenda



You can change by percentages over 100

Karen

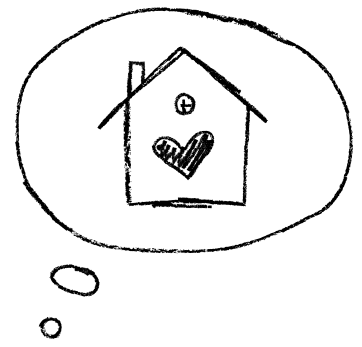


If you want to find 1% of my weight, divide my weight by 100

Brenda



If you want to find 1% of my weight, divide my weight by 80



Finding 80% of your body weight

Use the formula below to work out what 80% of what your body weight is.

START

Weigh yourself Eg:
60KG

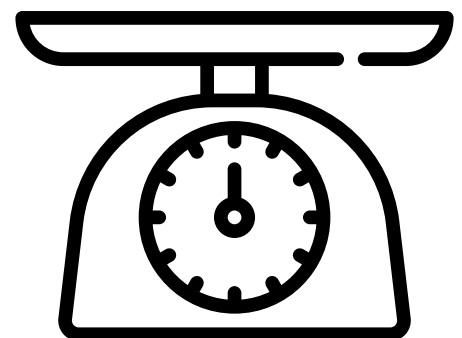
Space for your thoughts or doodles

Find 1%:
Divide your weight by 100

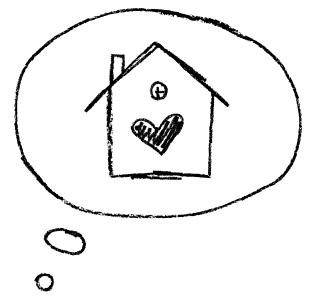
$$\begin{aligned} 1\% &= 60 \div 100 \\ &= 0.6 \end{aligned}$$

Find 80%:
Multiply your answer by 80

$$\begin{aligned} 80\% &= 0.6 \times 80 \\ &= 48 \text{ kg} \end{aligned}$$



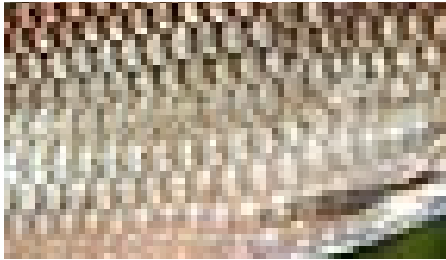
ANSWER



Match the scales to the animal

Many different animals have scales. Can you match the scales to the animals.

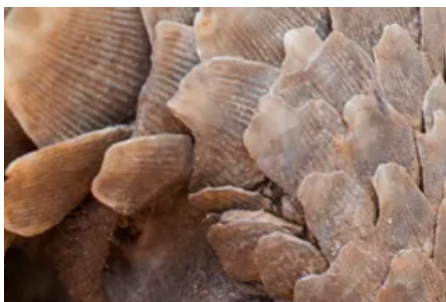
1.



2.

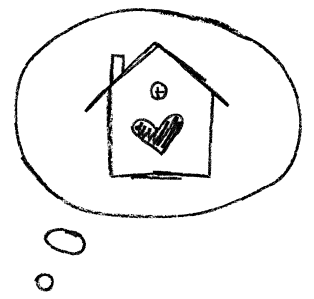


3.



4.





Match the scales to the animal

Many different animals have scales. Can you match the scales to the animals.

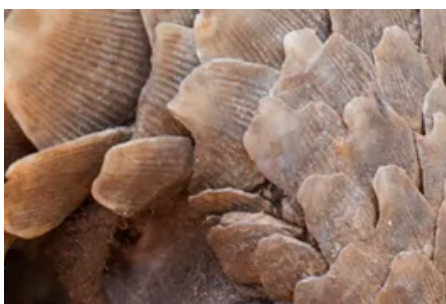
1.



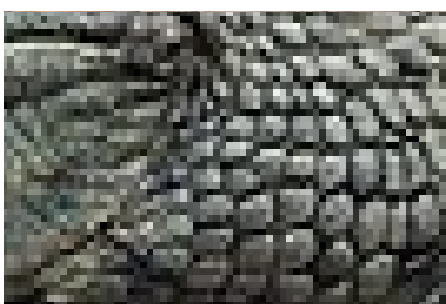
2.



3.



4.





Bala sharks like other fish have scales to help them move through the water.

Their scales also offer protection from predators and parasites.



Snakes have scales for protection, to help retain moisture and to help them move efficiently.



Pangolins have scales to protect against predators.

Their scales are made of keratin and are strong enough to withstand leopard and hyena bites



Crocodiles have scales to protect against predators and prevent dehydration.

Crocodile scales are made of keratin and form irregular geometric patterns on their heads.

Lesson 4: Animals with shells

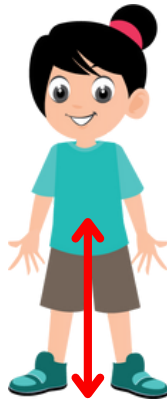
Something to think about:
What do you notice?



Space for your thoughts or doodles

Measure

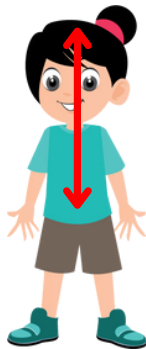
1. Belly button to the ground



Space for your thoughts or doodles

Measure

2. Belly button to the top of your head



Space for your thoughts or doodles

Measure

Take your 1st number and divide it by your second number

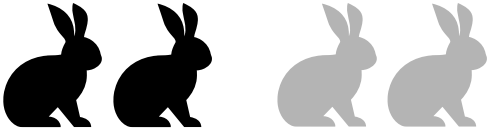
CIRCLE THE ANSWER



Space for your answer

Jan 

Feb 

Mar 

Apr 

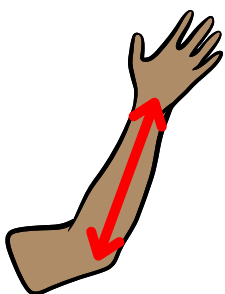
May?

Fibonacci sequence

1, 1, 2, 3, 5,,,

Measure

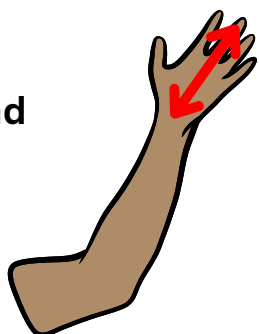
Wrist to elbow



Space for your answer

Measure

Length of your hand

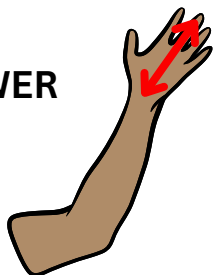


Space for your answer

Measure

**Do the 3rd measurement divided by
the 4th measurement**

CIRCLE THE ANSWER



Space for your answer

Quiz

Nina

Fibonacci taught people how to calculate using roman numerals



Nate

Fibonacci brought the Hindu-Arabic system to Europe from Africa



Space for your answer

Nina

The golden ratio is also known as the symbol



Nate

The golden ratio is also known as the symbol

π



Space for your answer

Nina

We can find the ratio between two numbers using division

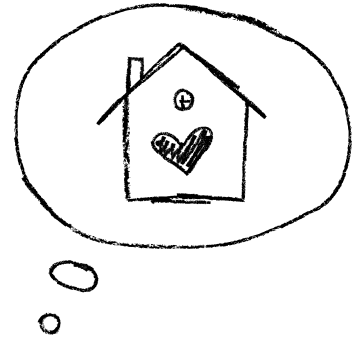
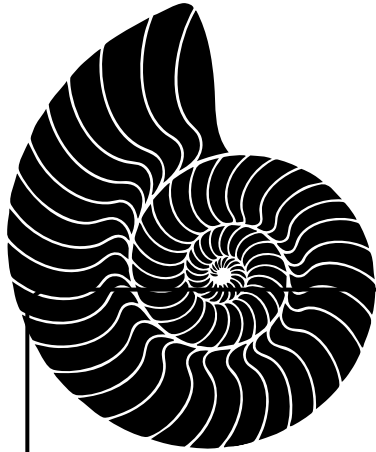


Nate

We can find the ratio between two numbers using multiplication



Space for your answer

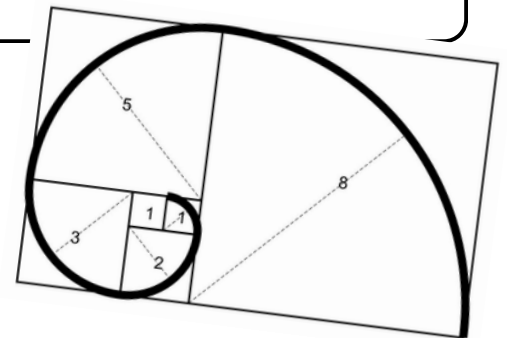


Read at home

Here are two links to good articles about Fibonacci

<https://nrich.maths.org/articles/fibonaccis-three-wishes-1>

<https://nrich.maths.org/articles/fibonaccis-three-wishes-2>



Lets have a go.
Using blocks or lego bricks create a
fibonacci sequence.
What is the largest number you can
reach?

Lesson 5: Animals with exoskeletons

Something to think about:

What are the pros and cons of armour?



Space for your thoughts or doodles

Exoskeleton



Hard, protecting the squishy bits

Something for the muscles to attach to



Stop the animals losing water

Pros

Harder than skin

Protection

Looks cool



Cons

Weights a lot

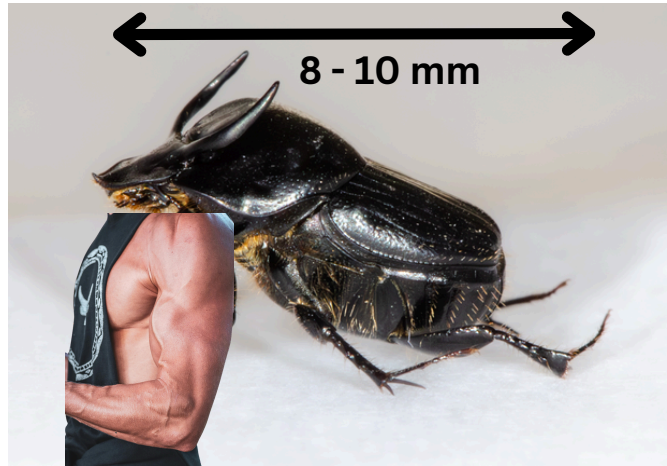
Restricts movement

high cost

Do these apply to the dung beetle?

**Onthophagus
taurus dung beetle**

**World's strongest animals
(In ratio to it's size)**



Original file: <https://www.inaturalist.org/photos/308636278>

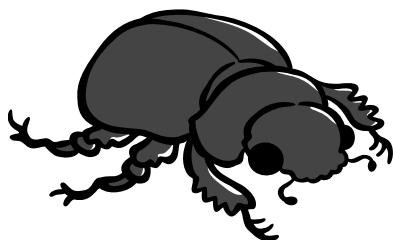
**Onthophagus taurus
dung beetle**

“Rose” can lift 1141 times
their own body weight!



Original file: <https://www.inaturalist.org/photos/308636278>

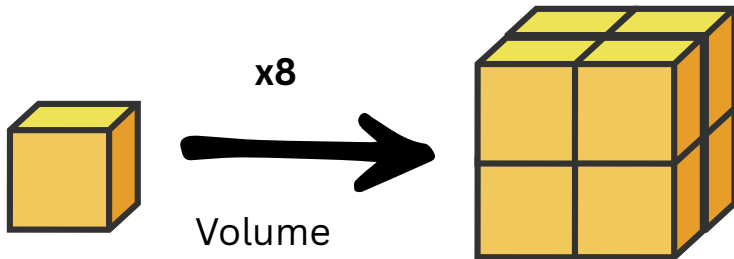
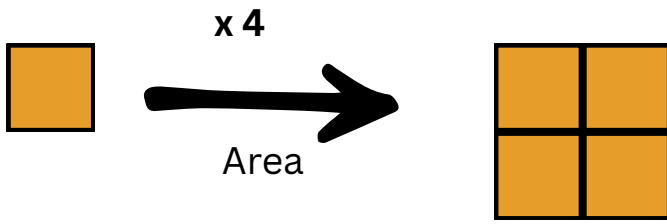
Why could Rose never be that big?



Space for your thoughts or doodles

Double the length means....

**Square - cube
law**

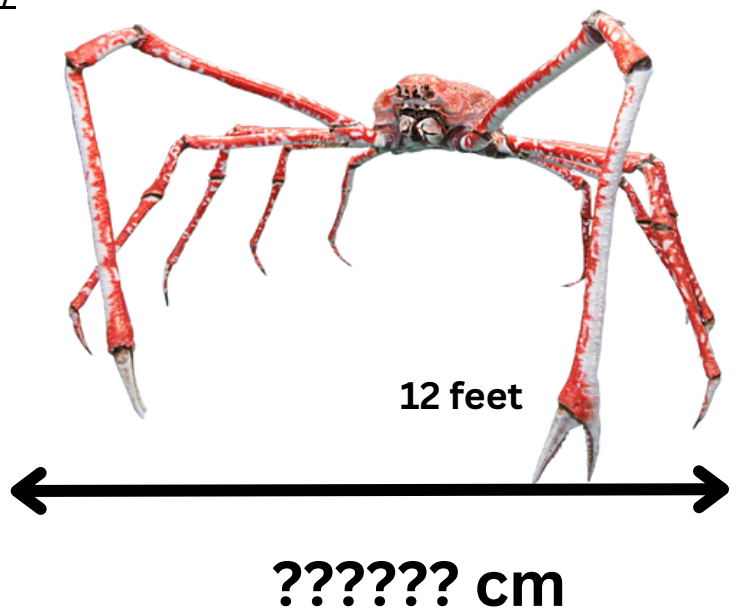


Japanese spider crab

[https://commons.wikimedia.org/wiki/
File:Macrocheira_kaempferi.jpg](https://commons.wikimedia.org/wiki/File:Macrocheira_kaempferi.jpg)

1 foot = 30 cm

Geoff



Quiz

Rose



Geoff



Rose



I am proportionally stronger than a human

I am proportionally stronger than you Rose

Geoff



Rose



Exoskeletons are harder than skin

Exoskeletons are harder than bone

Geoff



Rose

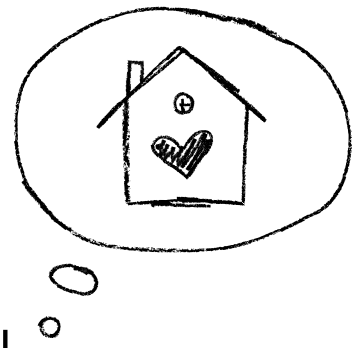


If I double in length, my area increased 4 times

If I double in length, my area doubles too

Geoff



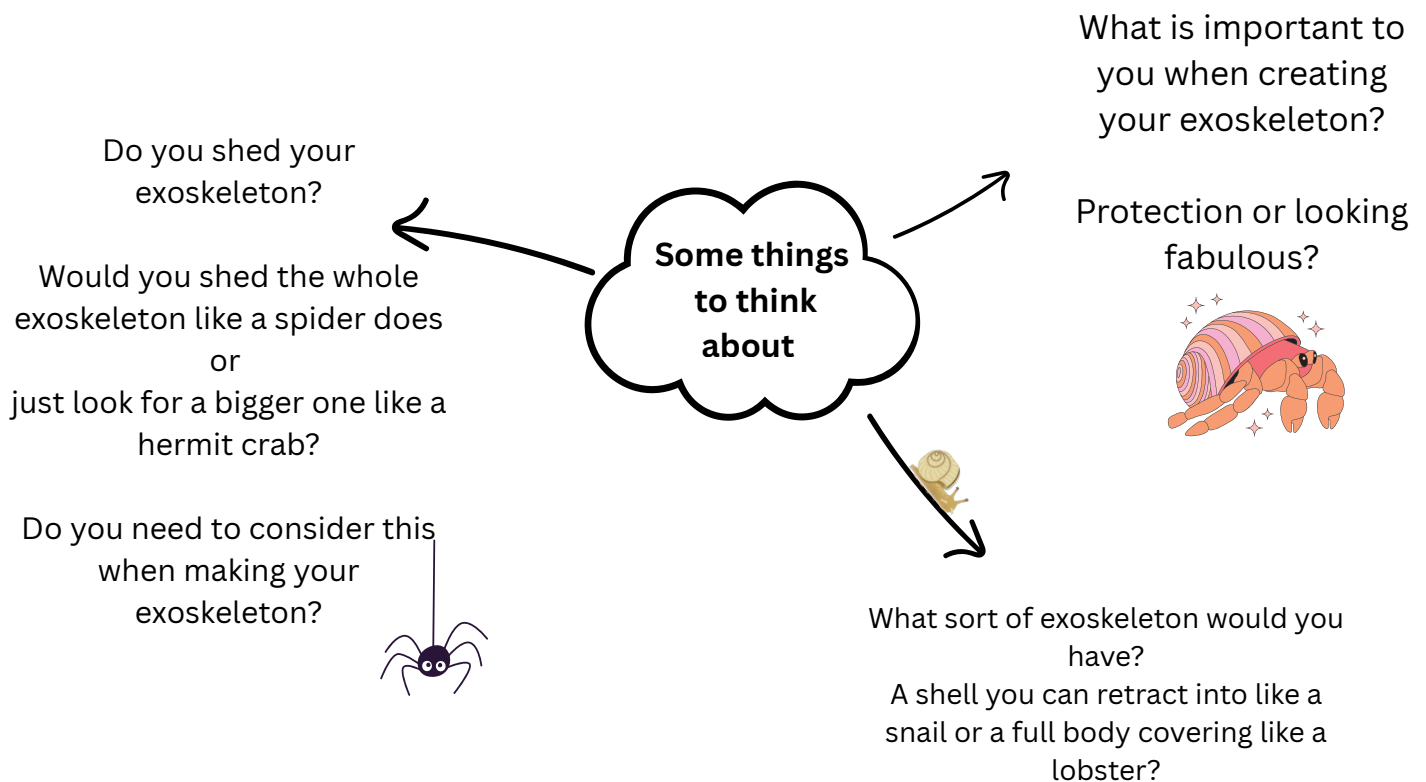


Create your own exoskeleton!

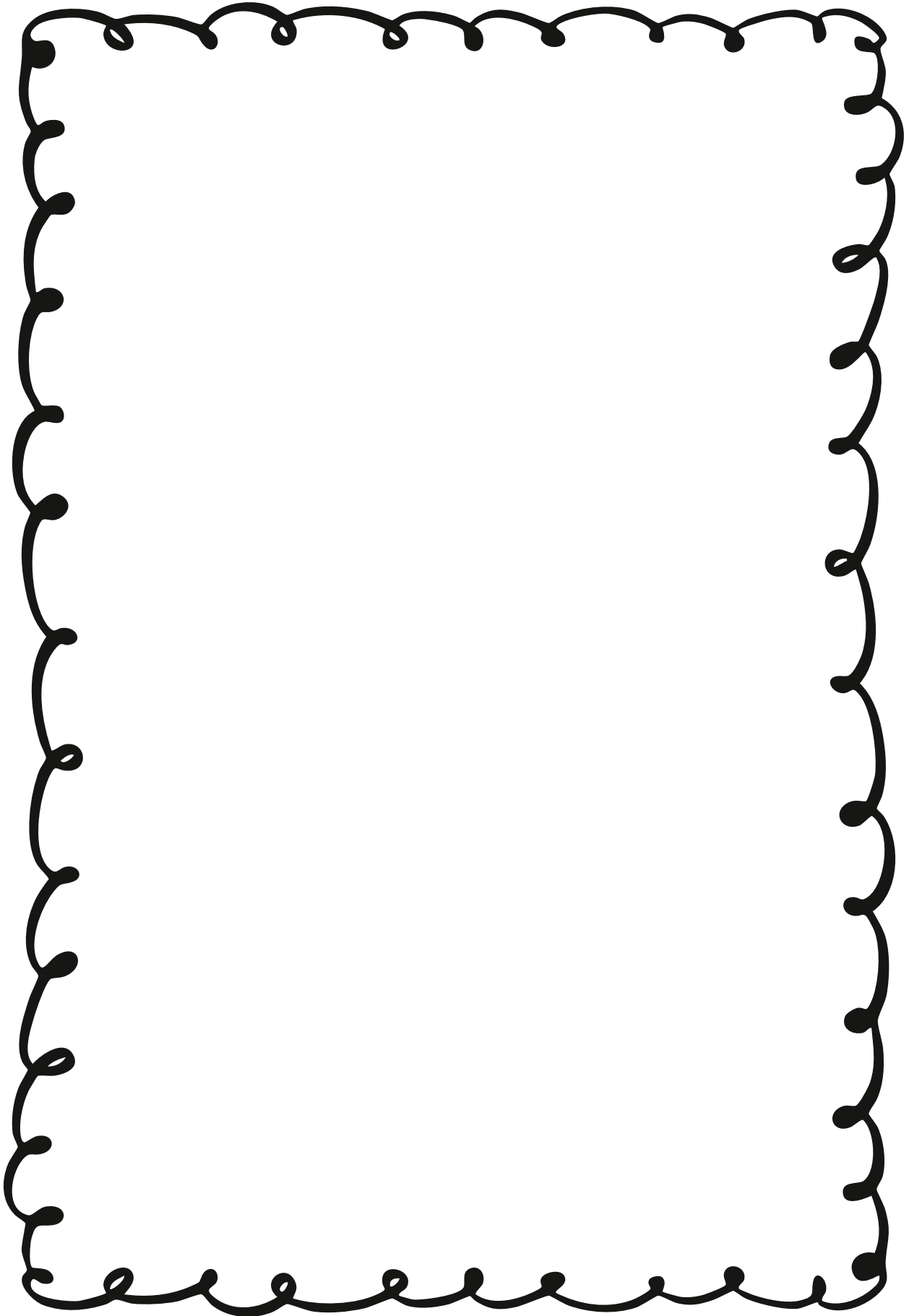
Have a look around your space, what items do you have to hand that you could use to create and exoskeleton for yourself!

Materials needed

Have a look around the house, raid the recycling bin, get super creative and see what you can find to create your exoskeleton.



Space for a picture of your creation



Lesson 5: Animals with skin

Something to think about:

What animal am I talking about?

One female queen

Workers gather food

Only the queen has babies

Non reproducing workers

Workers protect the colony

Space for your thoughts or doodles

Naked Mole rats

Honey Bees

Large front teeth

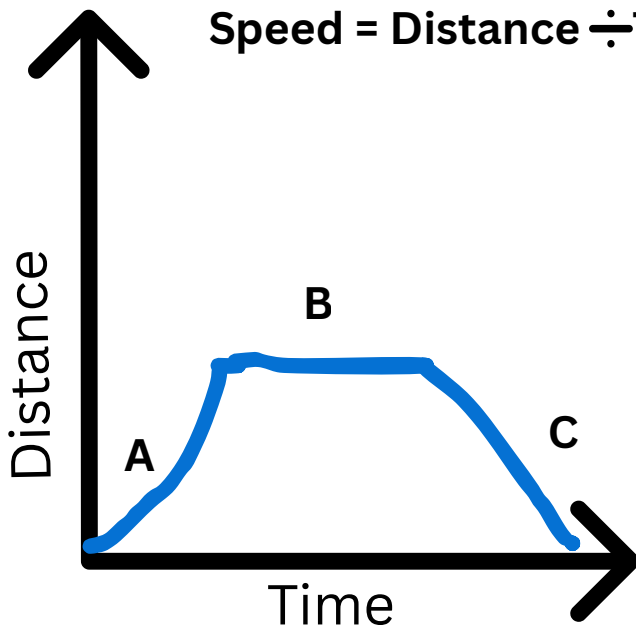
Workers gather food

Have a Queen

Live under water

Very furry

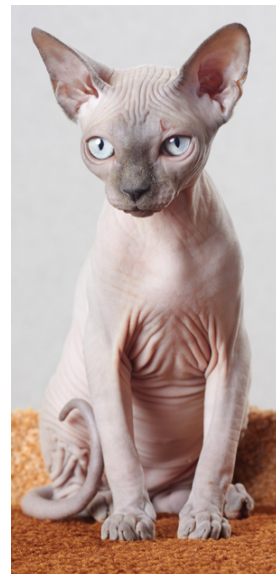
$$\text{Speed} = \text{Distance} \div \text{Time}$$



Speed the same

Stopped

Speeding up



<https://creativecommons.org/licenses/by-sa/4.0/deed.en>

Top speed (Hairless animals) - bar chart

Animal	Top speed (KMPH)
Hippo	35
Sphynx	45
Hairless dog	40
Naked mole rat	2

Space for your graph

Quiz

Debbie



Barry

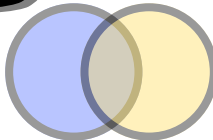


Tick the box of who you think is true.

Debbie



Information can lie outside the circles of a venn diagram if it doesn't fit in the categories given



No information can lie outside the circles of a venn diagram

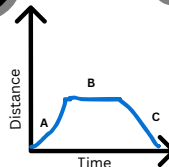
Barry



Debbie



If the line is going down on a distance - time graph, the speed is going down



If the line is going down on a distance - time graph, they are travelling back again

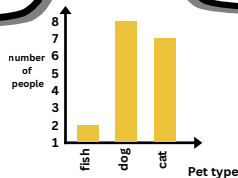
Barry



Debbie



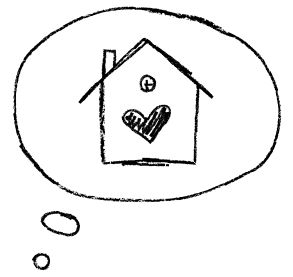
On a bar chart, there must be gaps between the bars



On a bar chart you can have gaps or no gaps. Either is fine

Barry





Information quest

Have a look at the animals below and lets research the following ...



Bull Hippo

Average size
(metres)

Average Weight
(kg)

Thickness of skin
(inches)



Bull Elephant

Average size
(metres)

Average Weight
(kg)

Thickness of skin
(inches)



Bull White Rhino

Average size
(metres)

Average Weight
(kg)

Thickness of skin
(inches)



Bull Sperm Whale

Average size
(metres)

Average Weight
(kg)

Thickness of skin
(inches)



Hippo

Hippos have skin that is thick but also super sensitive to the sun. Their skin secretes an oily fluid that works as a sun cream.

This also acts as an antibiotic to protect against infections from cuts and bites.

As the fluid is red it is known as blood sweat (although it isn't actual blood or sweat)



Sperm Whale

Sperm whales have incredibly thick skin
Up to 35cm thick.



Octopus

An Octopus is able to transform its skin to match its surroundings keeping it safe from predators.



Sea horse

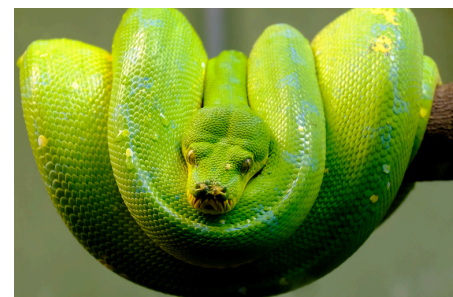
A sea horse has skin not scales. This makes the sea horse more rigid but also means it has a tougher protection from predators.

Super Skin Facts



Bornean flat-head frog

The bornean flat-head frog has tiny under developed lungs so instead breathes through its skin.



Snake

Snakes shed their skin to grow, remove parasites and heal any wounds.

They do this by rubbing against rough objects like rocks and bark.

Lesson 6: Maths in Christmas

Something to think about:

How many gifts are given in total in the song
The Twelve Days of Christmas?



Space for your thoughts
or doodles

Something to think about:

How many gifts are given in total in the song
The Twelve Days of Christmas?



Partridge in a
pear tree



Gold rings



Ladies dancing



Turtle doves



Geese a-laying



Lords a-leaping



French hens



Swans a-swimming



Pipers piping



Calling birds



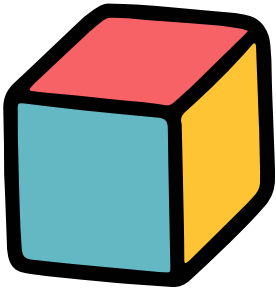
Maids a-milking



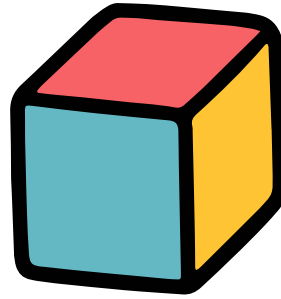
Drummers
drumming

Space for your thoughts or doodles

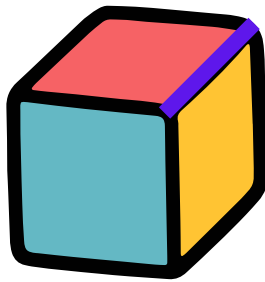
Cubes



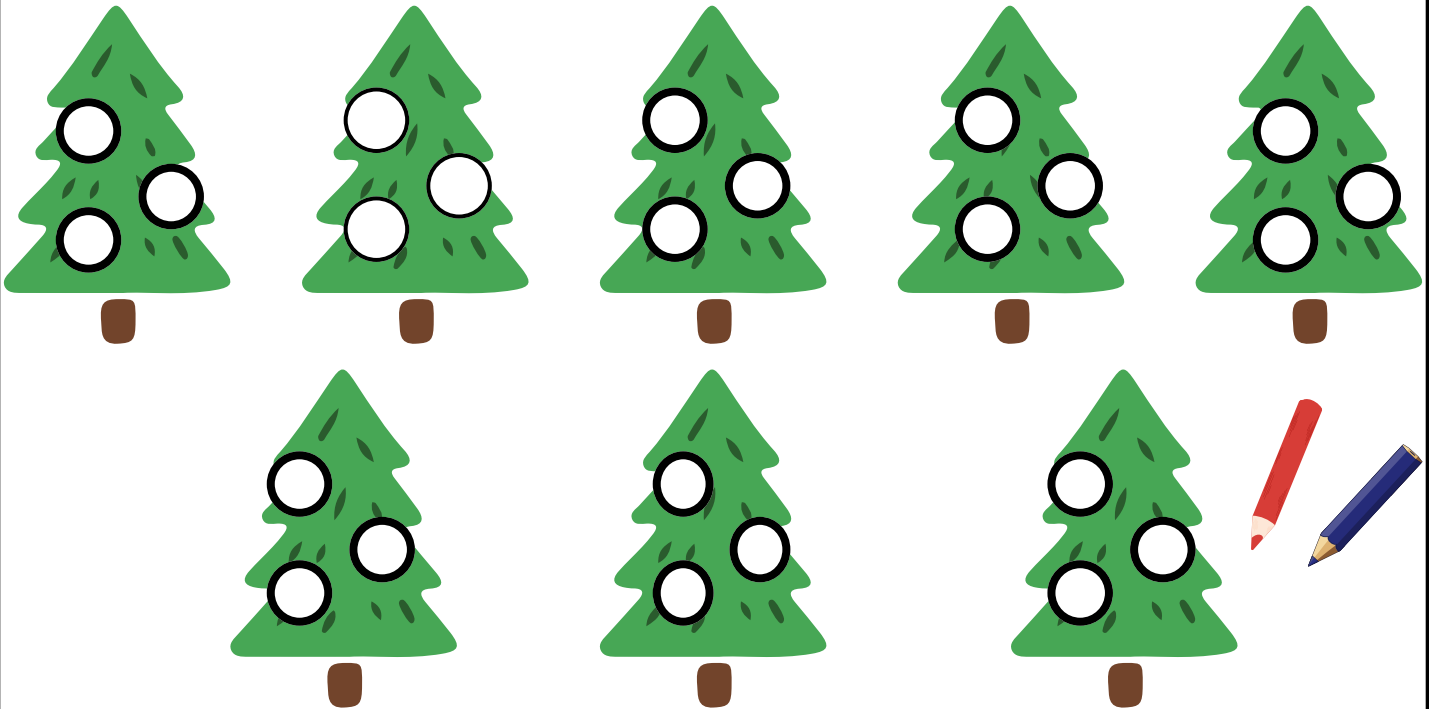
What is special about them?




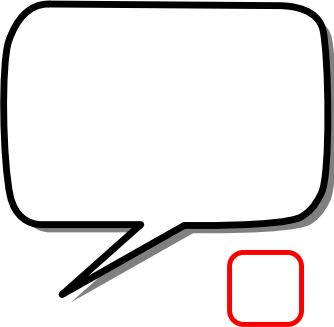
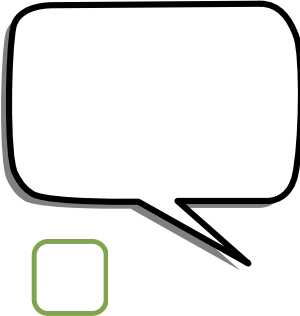
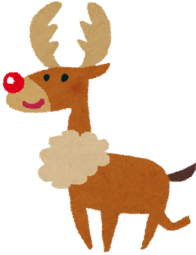
Faces







Edges


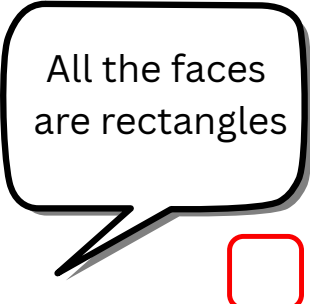







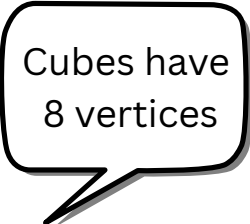

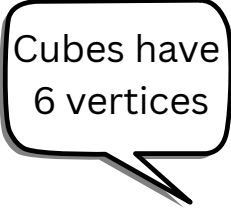


Quiz


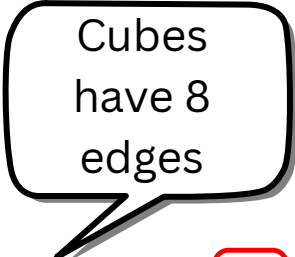

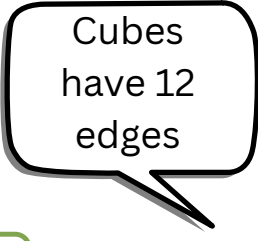


   

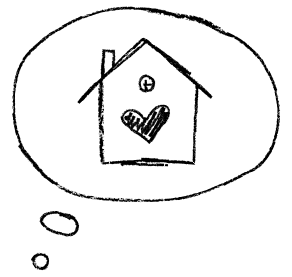
Santa  Cubes have 6 faces  **Rudolph**  Cubes have 4 faces 

Tick the box of who you think is true.

  All the faces are rectangles   All the faces are squares  

  Cubes have 8 vertices   Cubes have 6 vertices  

  Cubes have 8 edges   Cubes have 12 edges  



At home

Here is a link to some great christmas maths games.
<https://www.transum.org/Search.asp?q=christmas>

Solve the Christmas maths

$$\begin{array}{c} \text{Santa} \\ + \\ \text{Santa} \\ = \\ 10 \end{array} \qquad \begin{array}{c} \text{Santa} \\ = \\ \underline{\hspace{2cm}} \end{array}$$

$$\begin{array}{c} \text{Tree} \\ + \\ \text{Santa} \\ = \\ 8 \end{array} \qquad \begin{array}{c} \text{Tree} \\ = \\ \underline{\hspace{2cm}} \end{array}$$

$$\begin{array}{c} \text{Tree} \\ + \\ \text{Gingerbread} \\ = \\ 9 \end{array} \qquad \begin{array}{c} \text{Gingerbread} \\ = \\ \underline{\hspace{2cm}} \end{array}$$

$$\begin{array}{c} \text{Tree} \\ + \\ \text{Gingerbread} \\ + \\ \text{Santa} \\ = \\ \underline{\hspace{2cm}} \end{array}$$

