Maths In Dinosaurs

FREE all ages interactive Maths lesson

My name is:

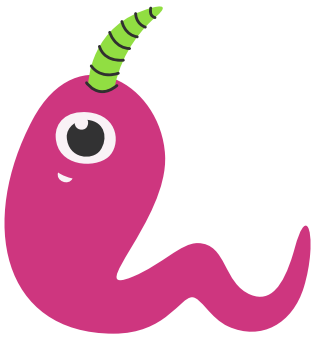
Joyfulmathswithruth

Lesson 1: The BIGGEST dinosaurs

Something to think about:

Which is the biggest?

Why?



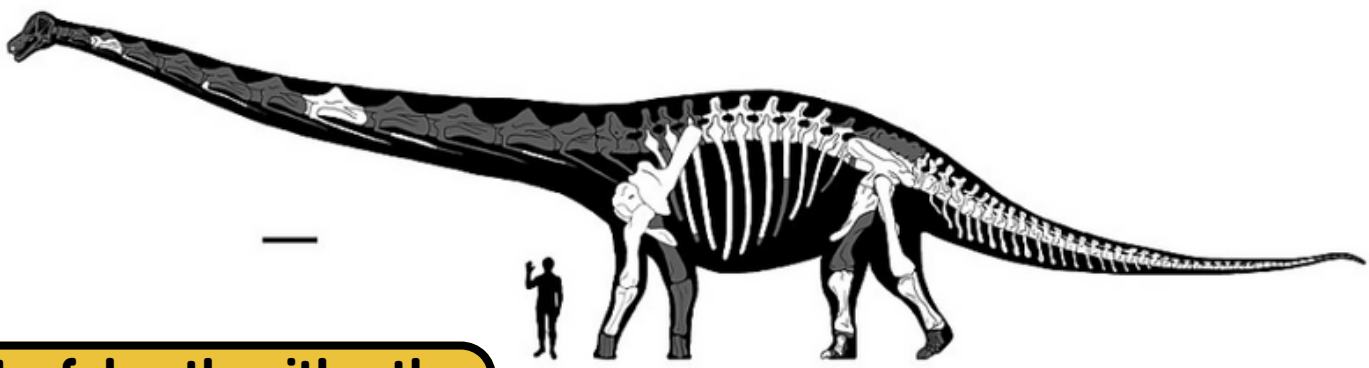
Space for your thoughts or doodles

Sauropods

Can you spot some features that make them so big?

Length:

Why might it be hard to tell the exact length?



Scale factor:

Dippy

Patagotitan

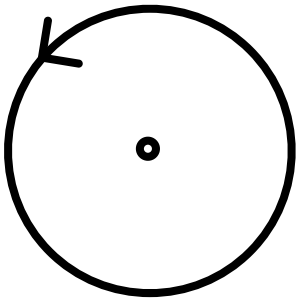
21.3 m long

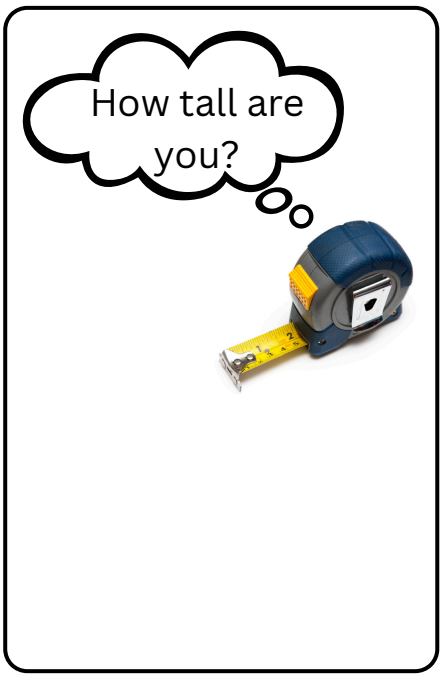
154cm

238cm

Mass:

In living quadrupeds, if you add together the ..... of the humerus, which is the upper arm bone, and femur, which is the thigh bone, the result is directly proportional to the animal's mass.

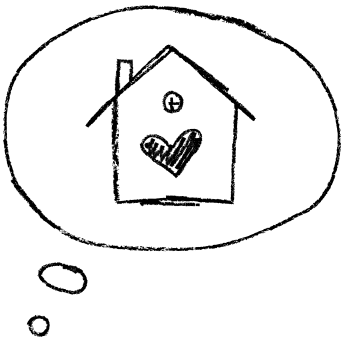




Quiz:

●●●●● ●●●●● ●●●●●

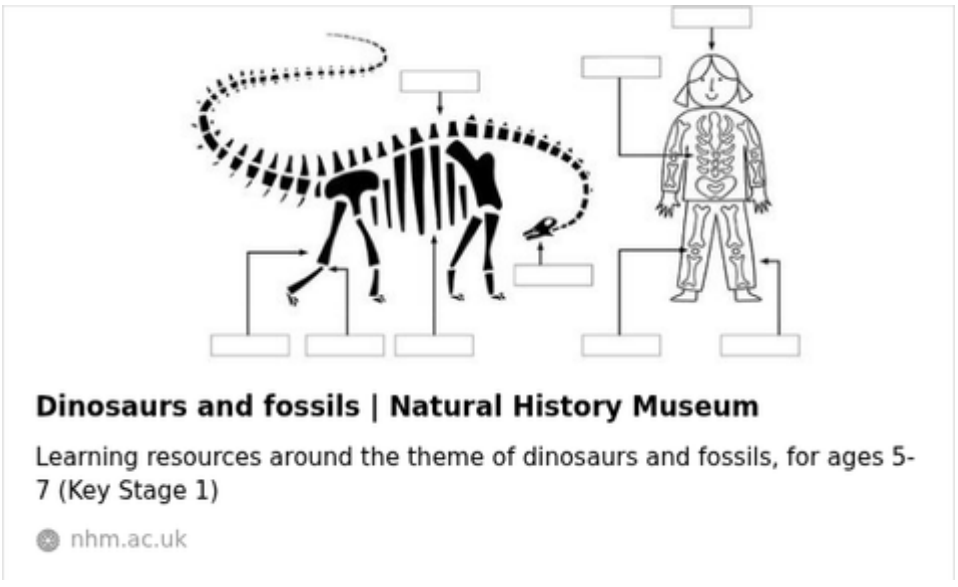
Explore at home:



Video: Why were dinosaurs so big?

https://www.nhm.ac.uk/discover/why-were-dinosaurs-so-big.html

Try this longest bone activity at home



https://www.nhm.ac.uk/schools/teaching-resources/key-stage-1/dinosaurs-and-fossils.html

Lesson 2: Timelines

Something to think about:

Would t-rex have hunted and eaten diplodocus?

Space for your thoughts or doodles

248 million years ago

213 million years ago

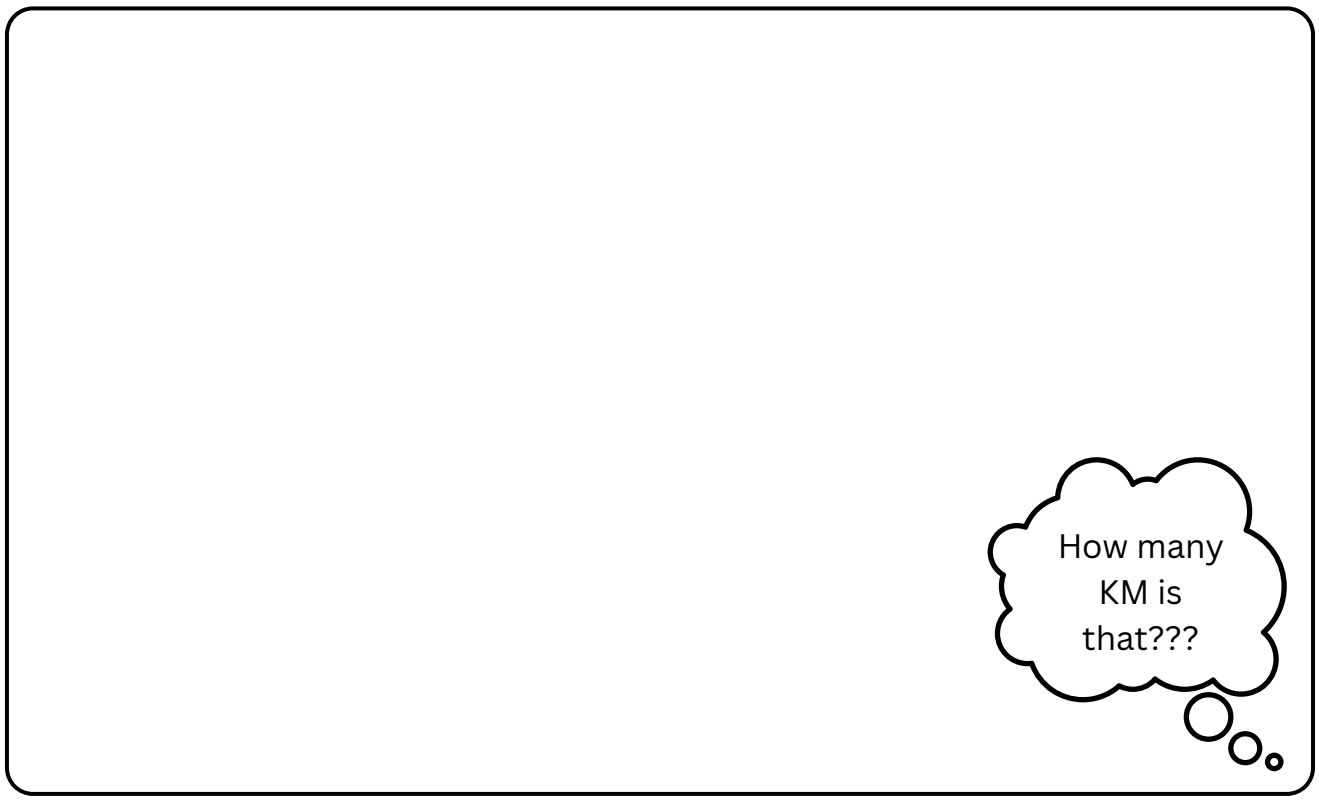
144 million years ago

65 million years ago

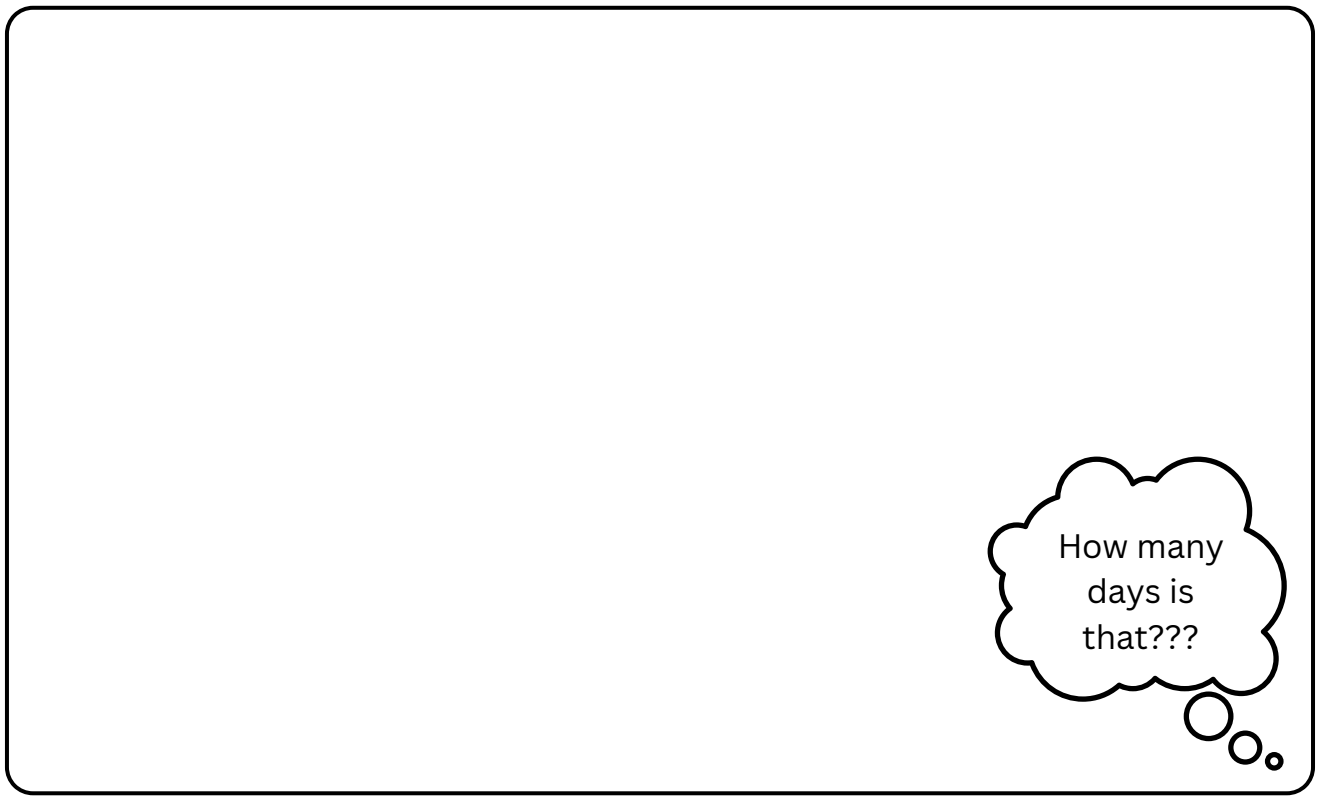
Mesozoic Era

Triassic | **Jurassic** | **Cretaceous**

1 million cm....



1 million seconds....



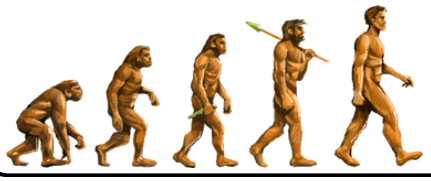
Quiz

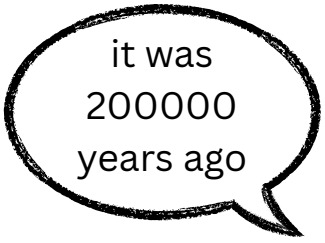
Question 1 - Put these in order

- ☐ Cretaceous period
- ☐ Triassic period
- ☐ Jurassic period

What fraction of million years ago do humans evolve?

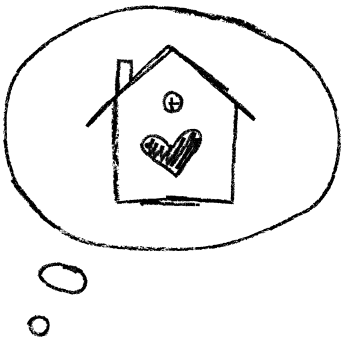
1/5 ¼ 1/2





What is one Newton

- ☐ 1000 bags of sugar in 1 square meter
- ☐ 100 bags of sugar in 1 square meter
- ☐ 1 bag of sugar in 1 square meter



Explore at home:

Time lines

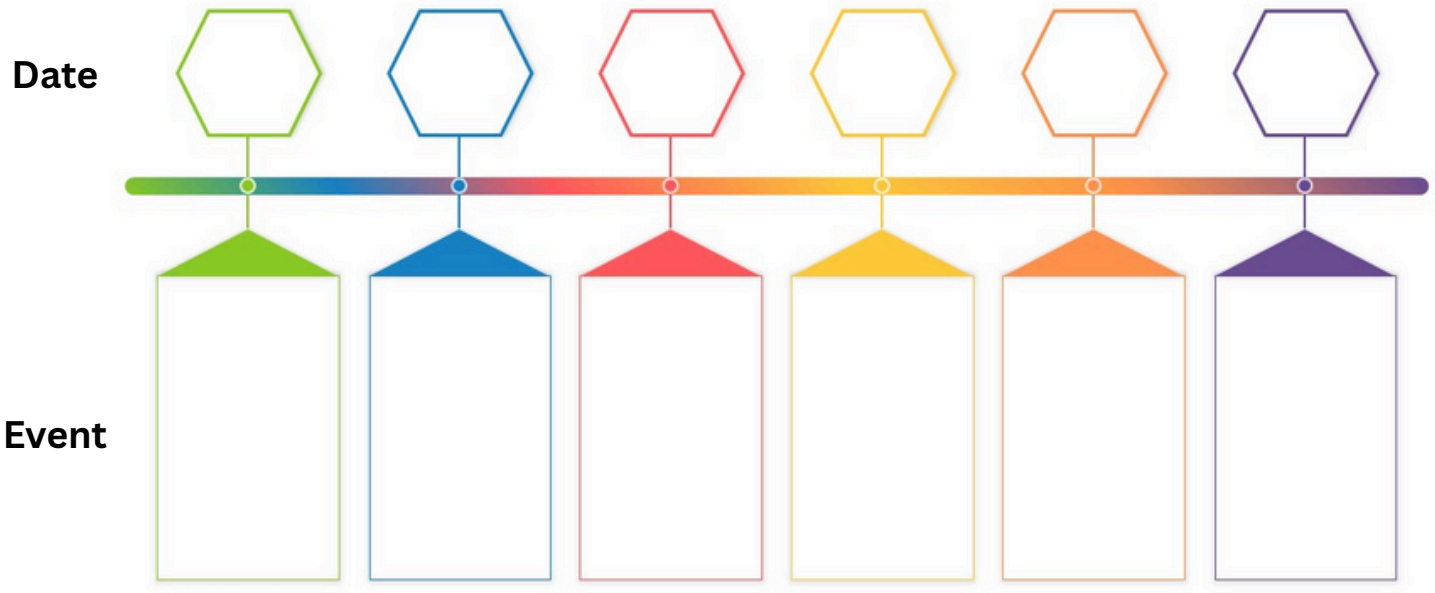
What do you love, what makes you smile, what do you know about yourself or your family?

Dinosaurs, Archery, cars, cats, the history of you!
Pick a topic and create a timeline from when it started to when it ended
(or even to today if your focus is still on going!)

It could be a tiny time line or something super creative!
Include fun facts, pictures, drawings, anything you want!

Follow the link below for time line inspiration

https://theowlteacher.com/10-different-timelines/
or
You can the timeline model below.

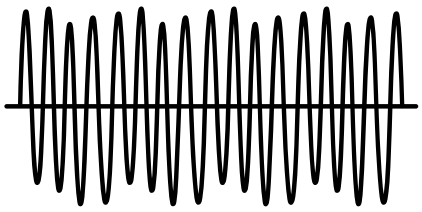


Lesson 3: The LOUDEST dinosaurs

Something to think about:

How far can the cry of a blue whale be heard?

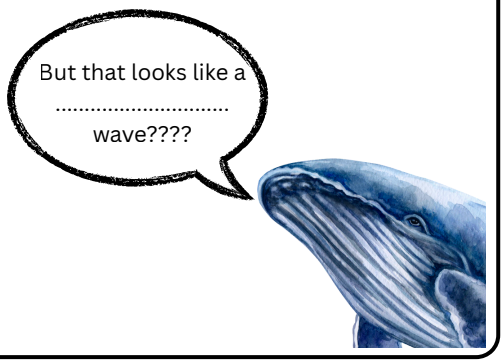
Space for your thoughts or doodles



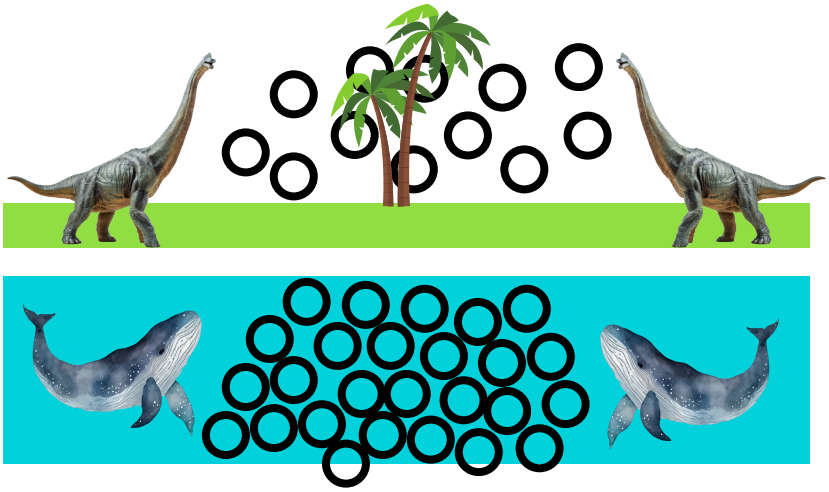
Sound waves are

.....

But we model them as sine waves



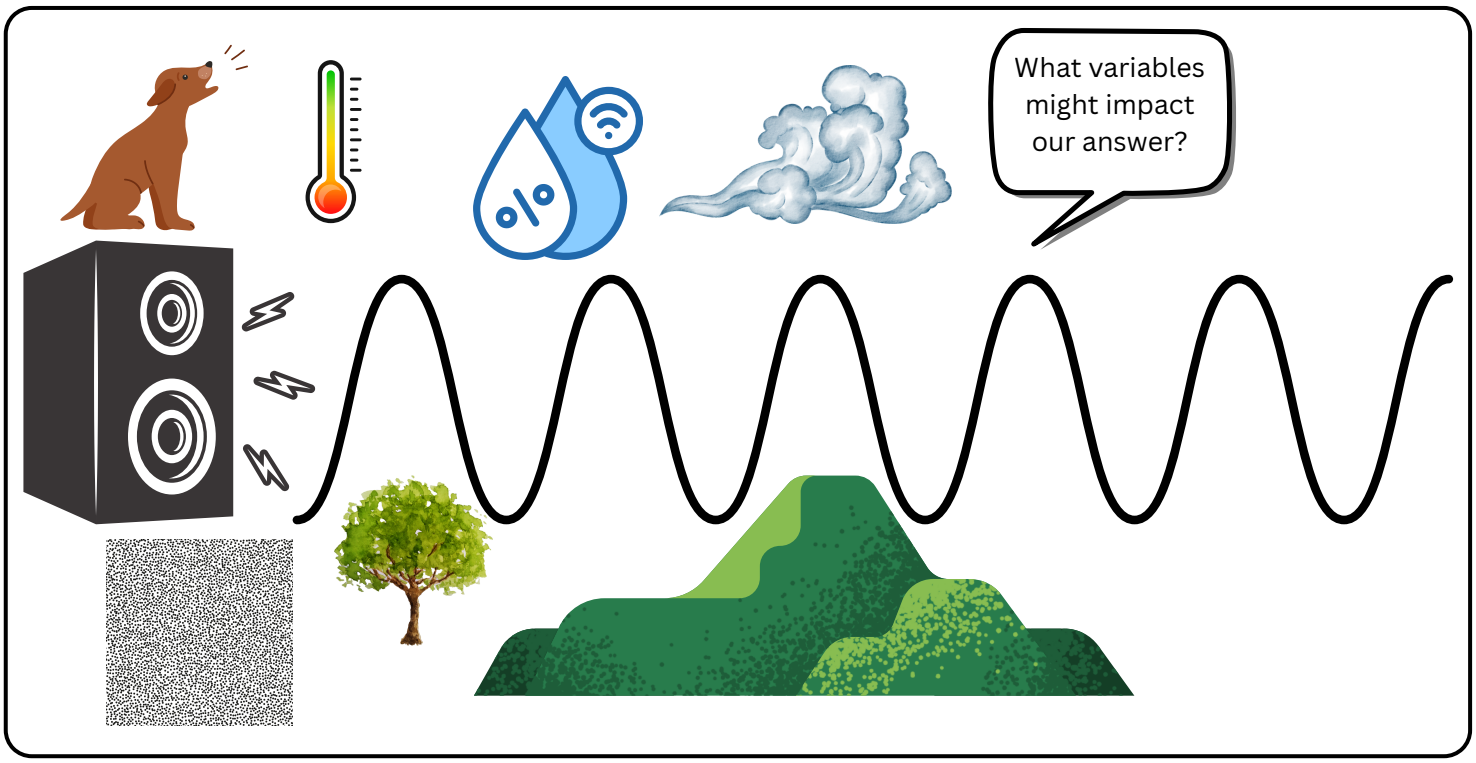
Space for your thoughts or doodles



Variables

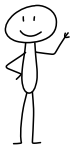
$$\text{speed} = \text{distance} \div \text{time}$$

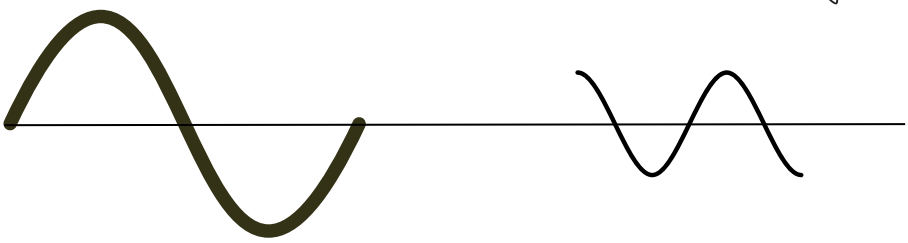
Variables



Quiz

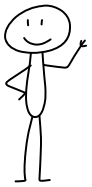
Question 1 - Who is louder





Steve **Betty**

Sound travels faster in ...



Steve

Betty

☐ Water ☐ Air

We can't use scale factor to model sound because...

Steve

☐ Sound relies on more than just size

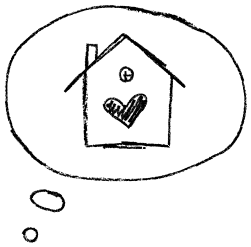
☐ We don't have enough evidence from fossils

Betty

☐ We don't know how big the dinosaurs really were

☐ Dinosaurs didn't swim

Explore at home:

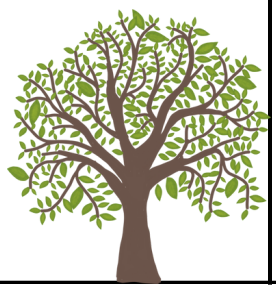


Head outside and see what you can hear.
use the check list below and see if you notice any of the sounds.

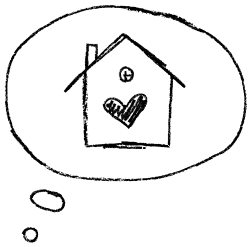
If you want a different challenge head outside and see what you can hear is it man made sound or a natural sound?
We would love to hear what sounds you find and what you prefer!

Sound scavenger hunt

- ☐ Bird song.
- ☐ Crunching leaves.
- ☐ A car.
- ☐ Sirens
- ☐ .Voices
- ☐ The wind.

Natural sound	Man made sound
	

Explore at home:



Rain stick

What you will need

- A cardboard tube (from wrapping paper, poster tube, or a toilet roll - you could even make your own tube by rolling up card or paper)
- Rice, beans, or small pasta (for the “rain” sound)
- Paper, felt, cardboard or tin foil (to seal the ends)
- Tape, glue or string.

Instructions

Step 1
Make or find your tube, this would be a good time to get creative and decorate the tube. If you are rolling paper or card it might be easier to decorate whilst it is still flat.

Step 2
Once you have decorated your tube use your material of choice to cover one end, seal this with glue, tape, string or an elastic band.

Step 3
Once you have sealed one end add dried rice, pasta, beans etc to the open end - you could even mix these together.

Step 4
Seal the tube completely and listen to the noises made by your rain stick.

We would love to see your creations!

Lesson 4:Scales and Spines

Something to think about:

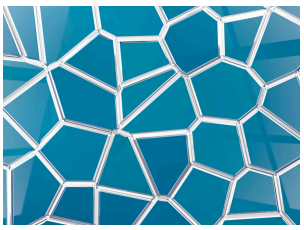
What is wrong with this picture?

Velociraptor

T-Rex

Space for your thoughts or doodles

Space for your thoughts or doodles



A

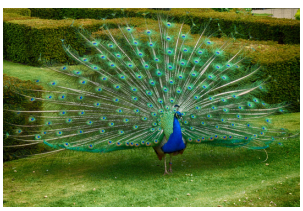
B

Do these show tessellation?

C

D

What were my plates for?



Space for your thoughts or doodles

Joyfulmathswithruth

Quiz

Question 1 - Who lights the most candles

Steve

All scales tesselate

Some scales overlap - they don't tesselate

Betty

Who lights the most candles

Steve

A bigger surface area means the object will cool quicker

A bigger surface area means the object will cool slower

Betty

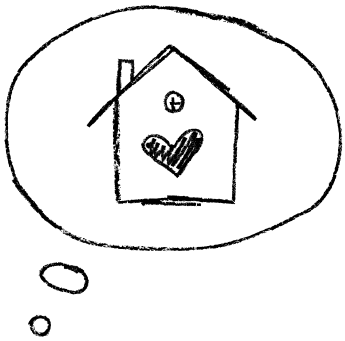
What is one Newton

Steve

We know for sure what dinosaur scales looked like

We have some limited evidence about dinosaur scales and can make predictions from that

Betty



Explore at home:

Potato prints

What you will need.

- Potato
- Knife or cookie cutter
- Paint
- Card or paper

Cut the potato in half, either use a cookie cutter or knife to carve out a shape or print.

Press into paint and print onto paper, tessellating the shapes to fit around each other.

Bonus activity

Use the template or create your own dinosaur fact file.
Really consider what your dinosaur looks like and why?
Does the skin of you're dinosaur tessilate? If so use the speace draw down your amazing ideas.

DINOSAUR FACT FILE!

By :-

Image of my dinosaur

KEY INFORMATION

Name -

Diet -

Fun facts -

DINOSAUR IDENTIFICATION!

DINOSAUR SCALES

IDENTIFYING FEATURES

Lesson 5:Speed

Something to think about:

These are my footprints, how fast was I going?

Space for your thoughts or doodles

What clues did you use to work out how fast I was going?
What other information would you like to know?

Robert McNeill Alexander was a British zoologist and a leading authority in the field of biomechanics 1976

$$v = 0.25g^{0.5} SL^{1.67} h^{-1.17}$$

v = speed of locomotion
h = hip height
SL = stride length

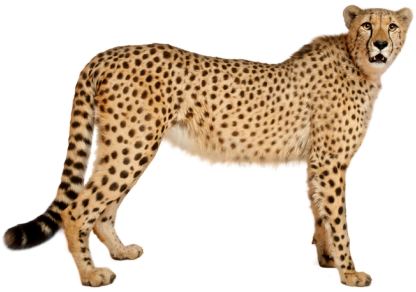
He said:
"Hip height could be estimated from the size of the foot print"

Can you tell the speed of a dinosaur from fossilised footprints?

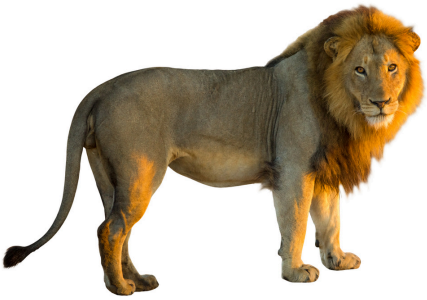
Space for your thoughts or doodles

A cheetah is faster - but why?

Cheetah



Lion

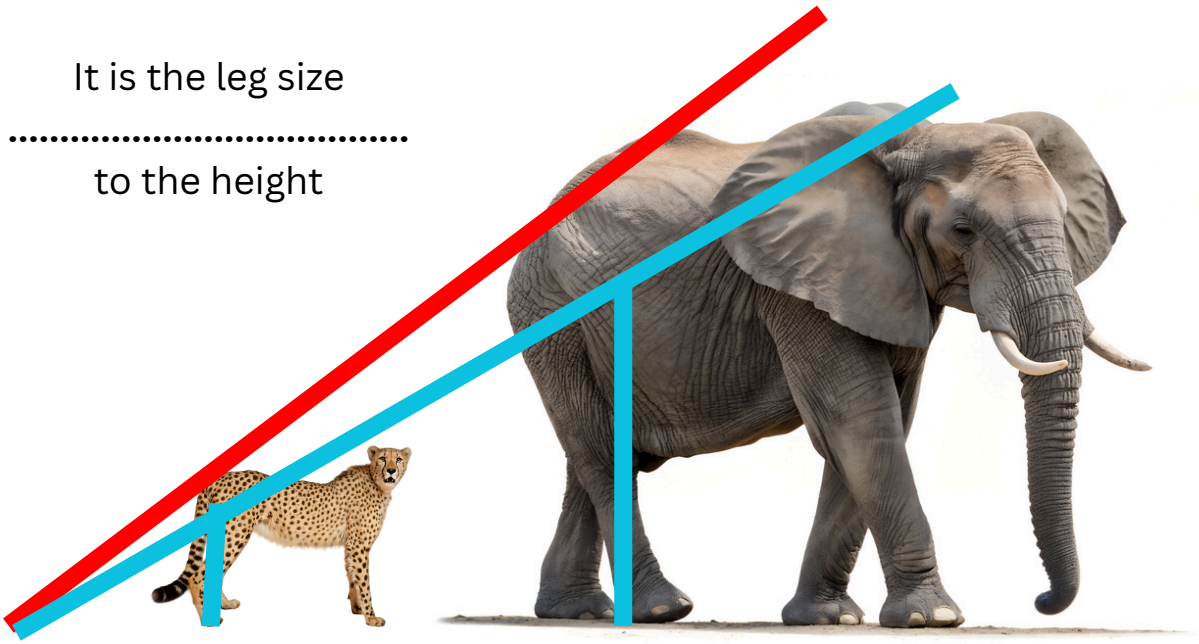


Space for your thoughts or a doodle

It is the leg size

.....

to the height



Quiz

I am going for a littler jog.
As I move along, I am going to change some things. Will I get faster or slower?

_____

I stretch out my legs further

Faster? ☐

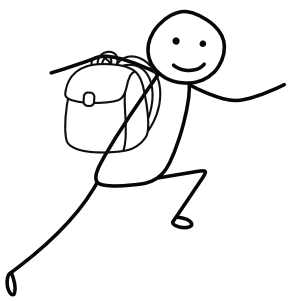
Slower? ☐

I pick up a heavy bag

Faster? ☐

Slower? ☐

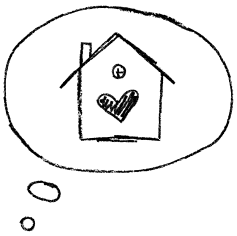
I run for twice as long



Faster? ☐

Slower? ☐

Explore at home:



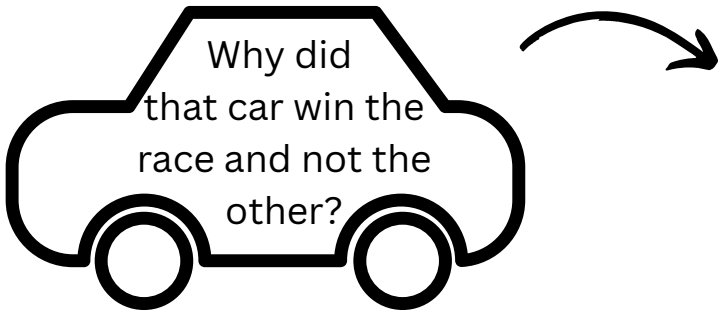
Car racing!

What you will need

- Toy cars

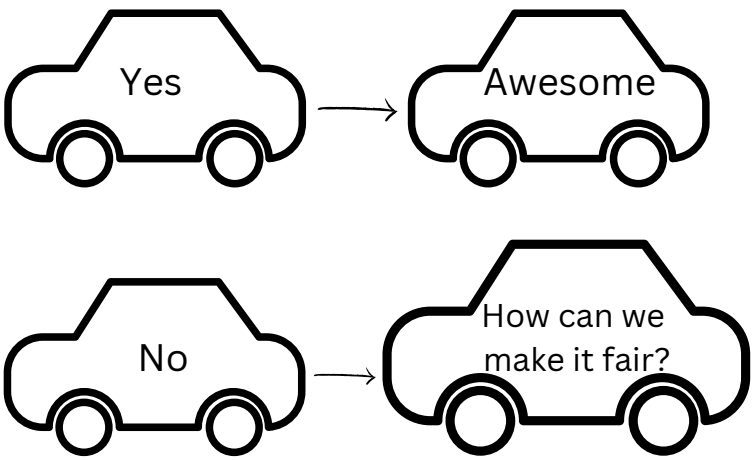
Grab your toy cars and race them against each other on a flat, smooth surface. Make sure you have a start and an end point - you can either draw these on paper, or use something else for reference.

Which car won the race?



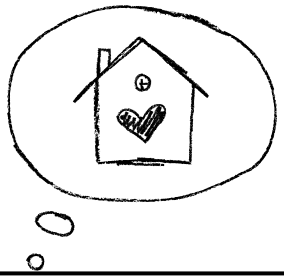
Space for your thoughts

Was it a fair race?



Space for your thoughts

Explore at home:



Speed it up or slow it down!

Have a look around your home, what can you use to make your cars travel faster or slower?
We would love to see your ideas and your results
Here are some of our ideas!

Use a ramp

Use flour or oats on the ground

What about through water?

Try on carpet

Ready...Set...GO!!!

Grab your family, friends and lets get racing!

Before you get started lets make some predictions

Who will be fastest?
Why will they be the fastest?
Where your predictions correct?

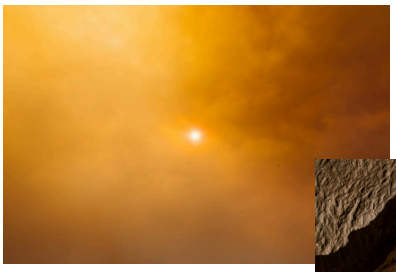
Lesson 6: Extinction

Something to think about:
What do you notice?

Space for your thoughts or doodles

Why don't some people believe that dinosaurs existed?

Lesson 6: Extinction



Why did the dinosaurs die?

If it happened today - which group would survive and why?

Lesson 6: Extinction

Space for your thoughts or doodles

Why did some birds survive?

Which can get to the other side of the room quicker? Why?

Space for your thoughts or doodles

Why did some birds survive?

Pick up with your feet

Space for your thoughts or doodles

Why did some birds survive?

First person to fill their container wins

Quiz

Dinosaurs had feathers

Prediction ☐ Know for sure ☐

Dinosaurs could fly?

Prediction ☐ Know for sure ☐

All none Avian dinosaurs died in the mass extinction.

Prediction ☐ Know for sure ☐

Quiz

Birds evolved from dinosaurs

Prediction ☐ Know for sure ☐

An asteroid collided with earth around 66 - 67 million years ago

Prediction ☐ Know for sure ☐

We know how and why all the none avian dinosaurs died?

Prediction ☐ Know for sure ☐

Explore at home:

Asteroid experiment

What you need

- Flour
- Tray
- Rocks of various sizes, paper or tinfoil scrunched into a ball.
- Opitional - Chair or stool.

What to do

Place your tray on a table or the floor, fill it with flour.

Stand up and throw your rocks/paper/tin foil etc into the flour.

What sort of impact did it make?
Imagine how big of an impact an asteroid would have had on the planet.

How could you make your explosion bigger? (more force, standing on a chair for a larger distance, etc) - We would love to see what you come up with!

Erruption experiment

Prior to the asteroid volcanoes errupted contributing to extinction.

What you need

- Bicarbonate soda 1tbs
- Vinegar 180ml
- Bottle, cup, glass etc.
- Tray (to contain the erruption)

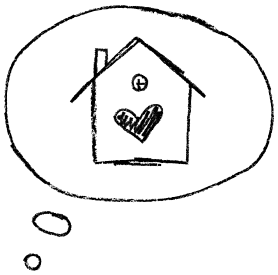
What to do!

Place your bottle/cup/glass on a tray or plate.

Add the bicarbonate soda to the container

Add the white vinegar and prepare for the erruption!
(Jazz it up by adding food colouring)

Explore at home:
Dinosaur dodgeball

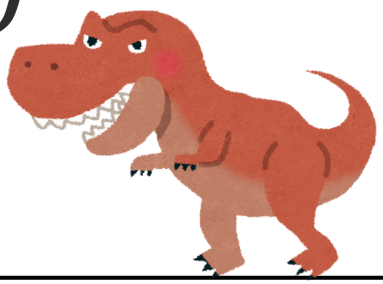


Hey Martin! I heard if you can outrun a ball, you can outrun an asteroid...

Better get moving then Geoff!

Unsuprisingly Geoff and Martin are mistaken...
We estimate that the asteroid that killed the dinosaur was travelling at 45,000 miles per hour

We estimate that the fastest dinosaur could run up to 60mph



That means the asteroid was...a whole lot faster than the dinosaurs

Let's play asteroid dodgeball!!!

Grab a **soft** ball, a bean bag or another **soft** object (No bricks!) and at least 2 players.
The person with the ball is the asteroid
The other players are the dinosaurs.

The asteroids mission - take out the dinosaurs until they are all extinct!

Lesson 7 - Swimming Dinosaurs

Something to think about:
Which one is better at swimming?

Space for your thoughts or doodles

Streamline body

Water proofing

Solid dense bones

Short strong wings

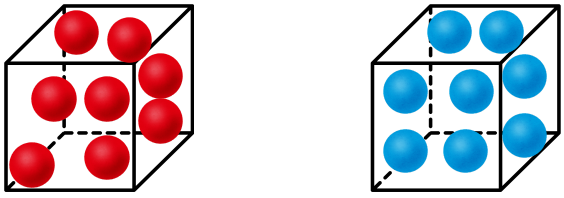
A fat layer to insulate

Webbed feet

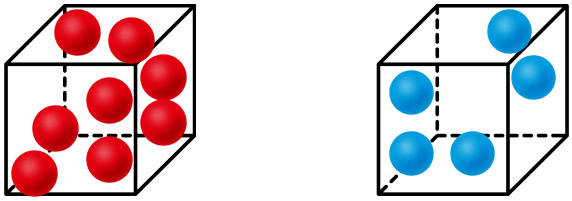
Hollow bones

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

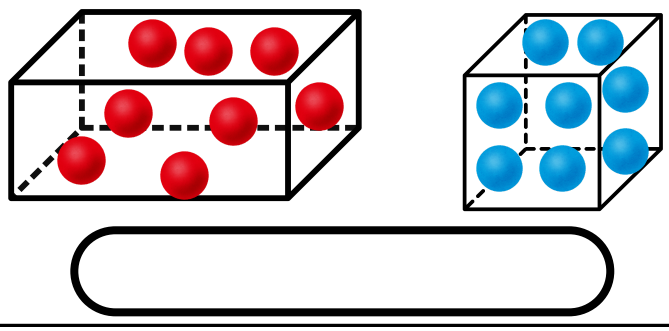
Density = $\frac{\text{mass}}{\text{volume}}$



Density = $\frac{\text{mass}}{\text{volume}}$



Density = $\frac{\text{mass}}{\text{volume}}$

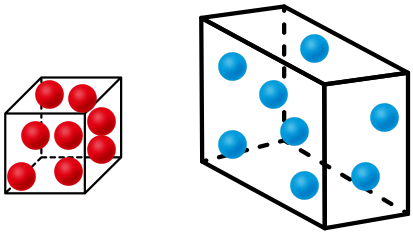


Quiz

Density = ☀

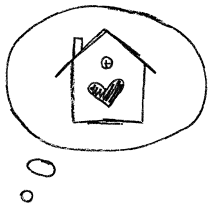
volume

☀ has the higher density



An object that is more dense than water will ☀

Explore at home:



Bottles in water activity

What you will need.

- Water container/bucket/bath tub etc
- 2 plastic bottles with lids.

What to do

Step 1 - Fill one of the bottles with water and seal, leave the other bottle empty.

step 2 - Place both bottles into the water.

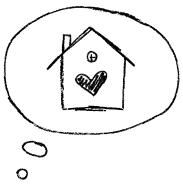
What happened to the bottles?

Why do you think that happened?

What happens if you change the volume of water

Space for your thoughts or a doodle

Explore at home:



URGENT MESSAGE
HELP NEEDED!!

There has been a catastrophic accident offshore.

A ship has crashed, and the crew on board need immediate rescue.

The surrounding water is beyond boiling temperature and is filled with toxic gases from the cargo ship!

No standard rescue boats, submarines or helicopters can get close enough.

PLEASE HELP US RESCUE THE CREW

Create an animal or a suit for a human to wear.
They must be able to swim to the ship and safely rescue the crew.
Use the next page to design and plan your rescue or scrap it and create a model!
Remember this is just a guidence - be as creative as you want

Can it carry all the crew members
or will it be multiple trips?

What temperature does water boil at?

Things to think about

Idea,,,..

Will it travel on the water or underneath?

Space for your ceature or suit