EASTER BUSH SCIENCE OUTREACH CENTRE

Get hands-on with real-life science

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Science Outreach Centre

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Dolly, DNA & Me

Secondary Workshop

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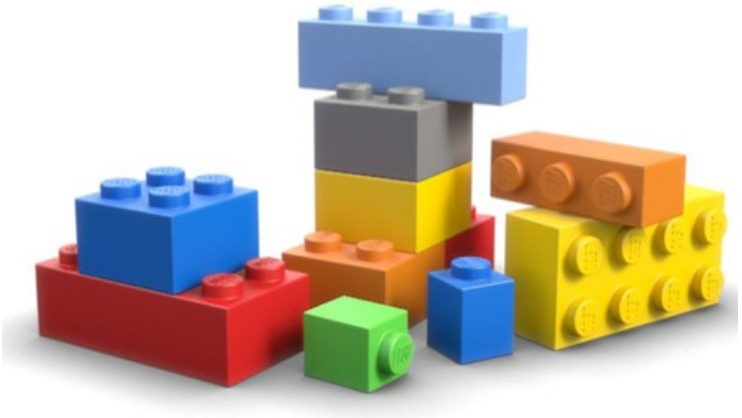
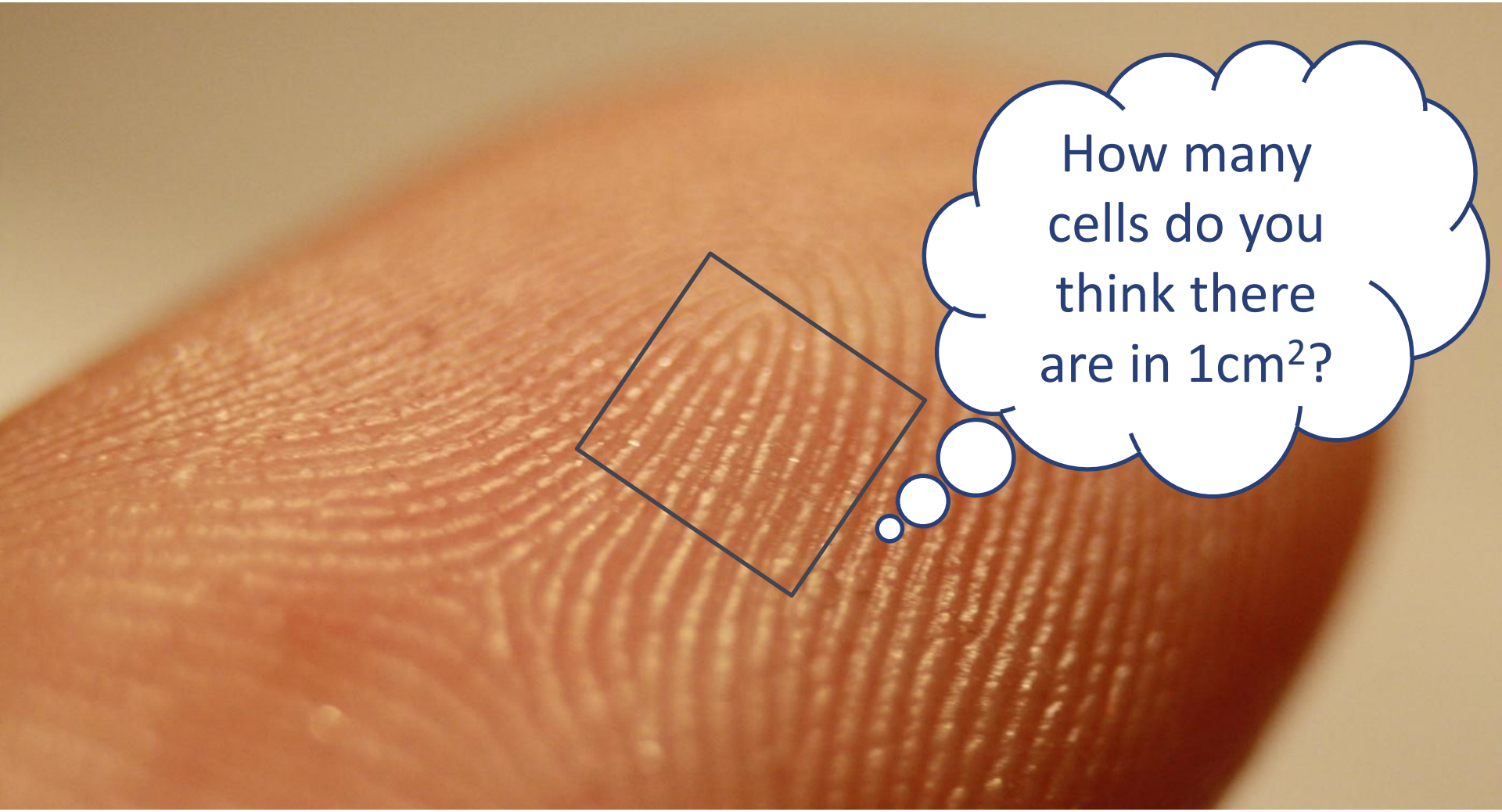
What all living things made of?



Cells are tiny!

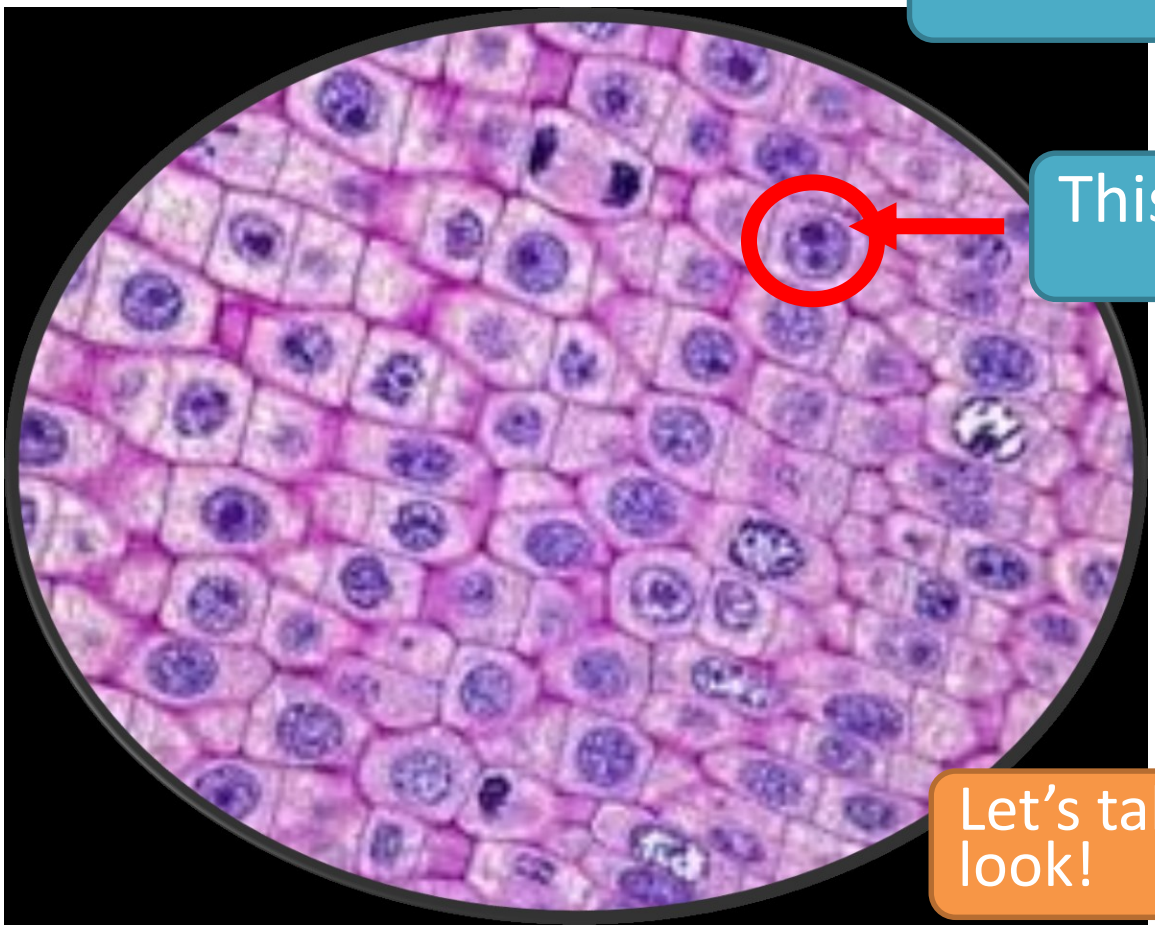


What tool do you need to see cells?

Click for a clue!

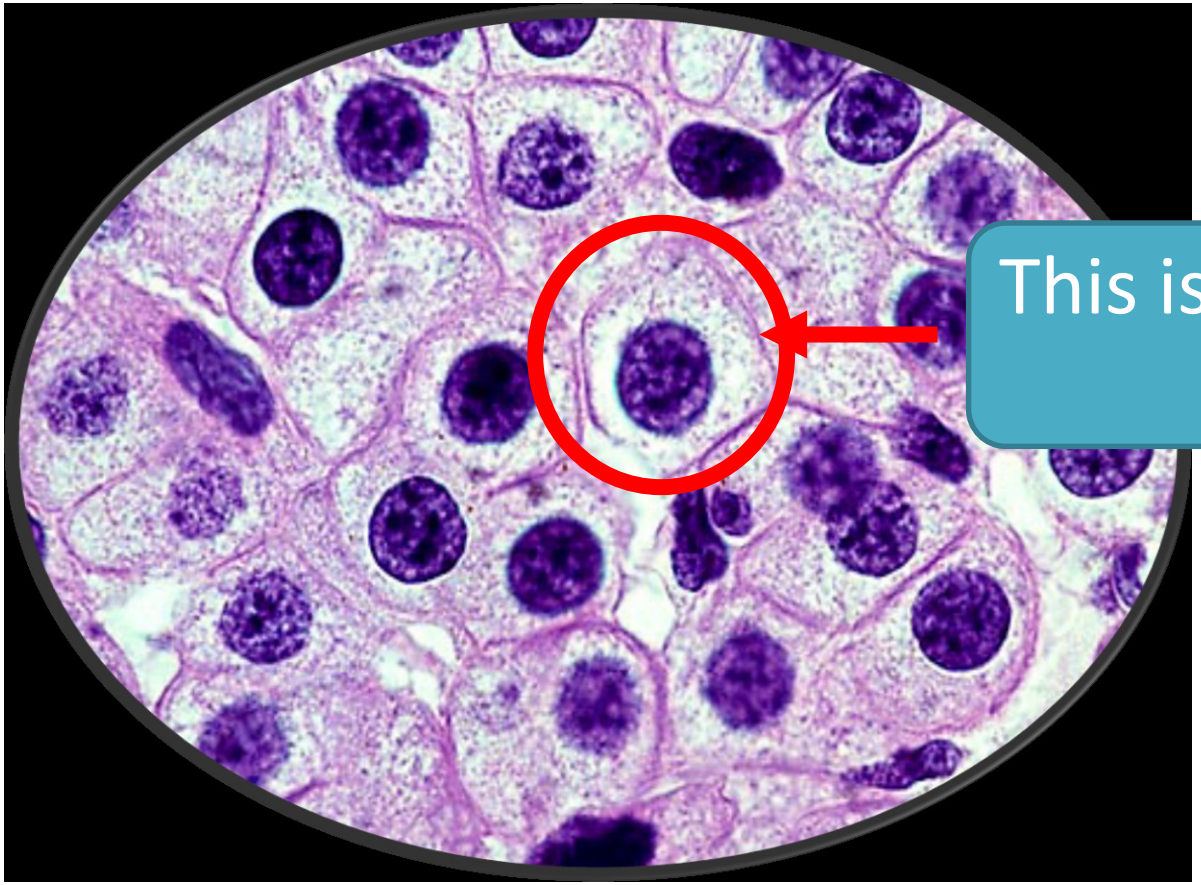
What is this?

These are cells!

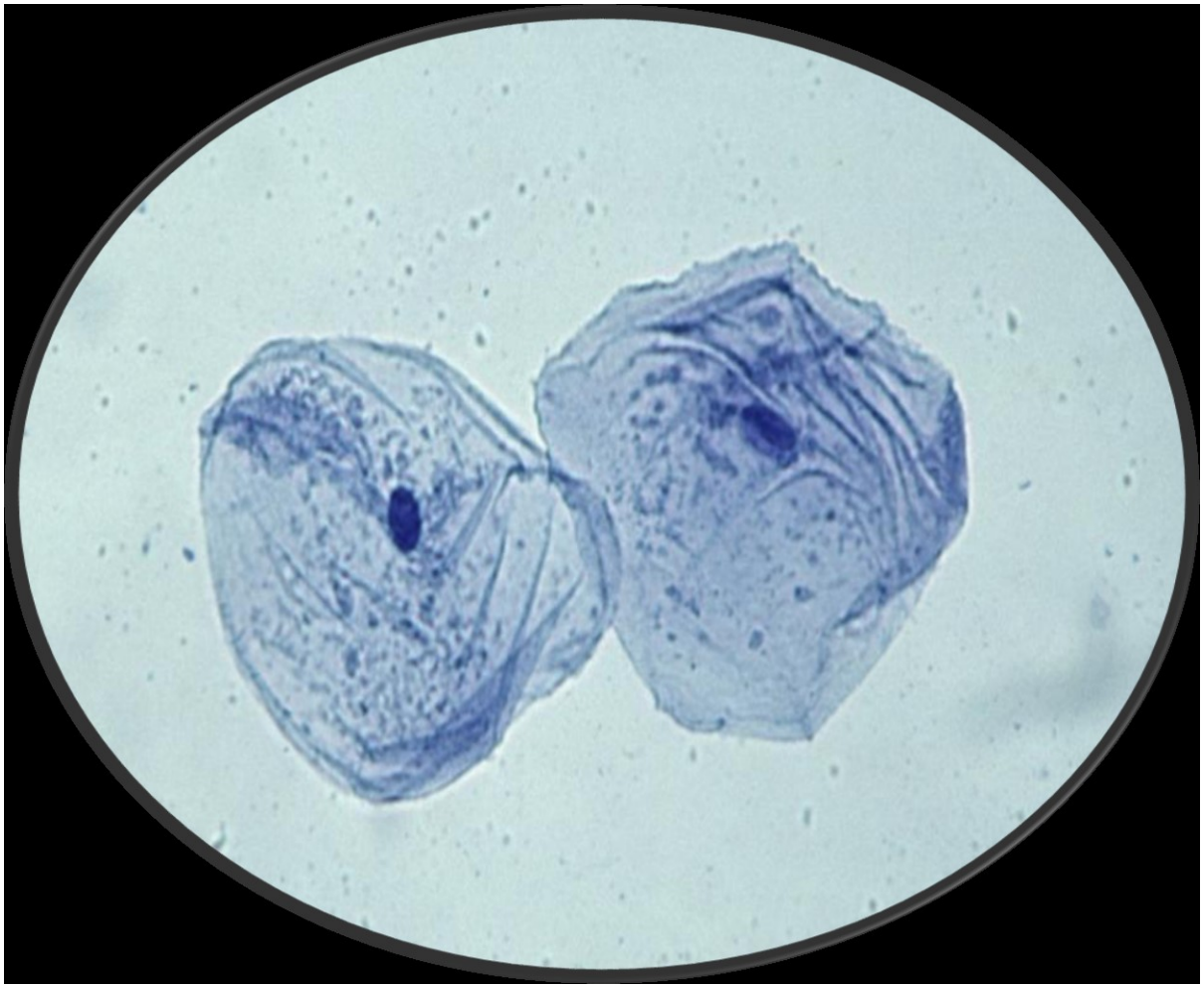


This is one cell

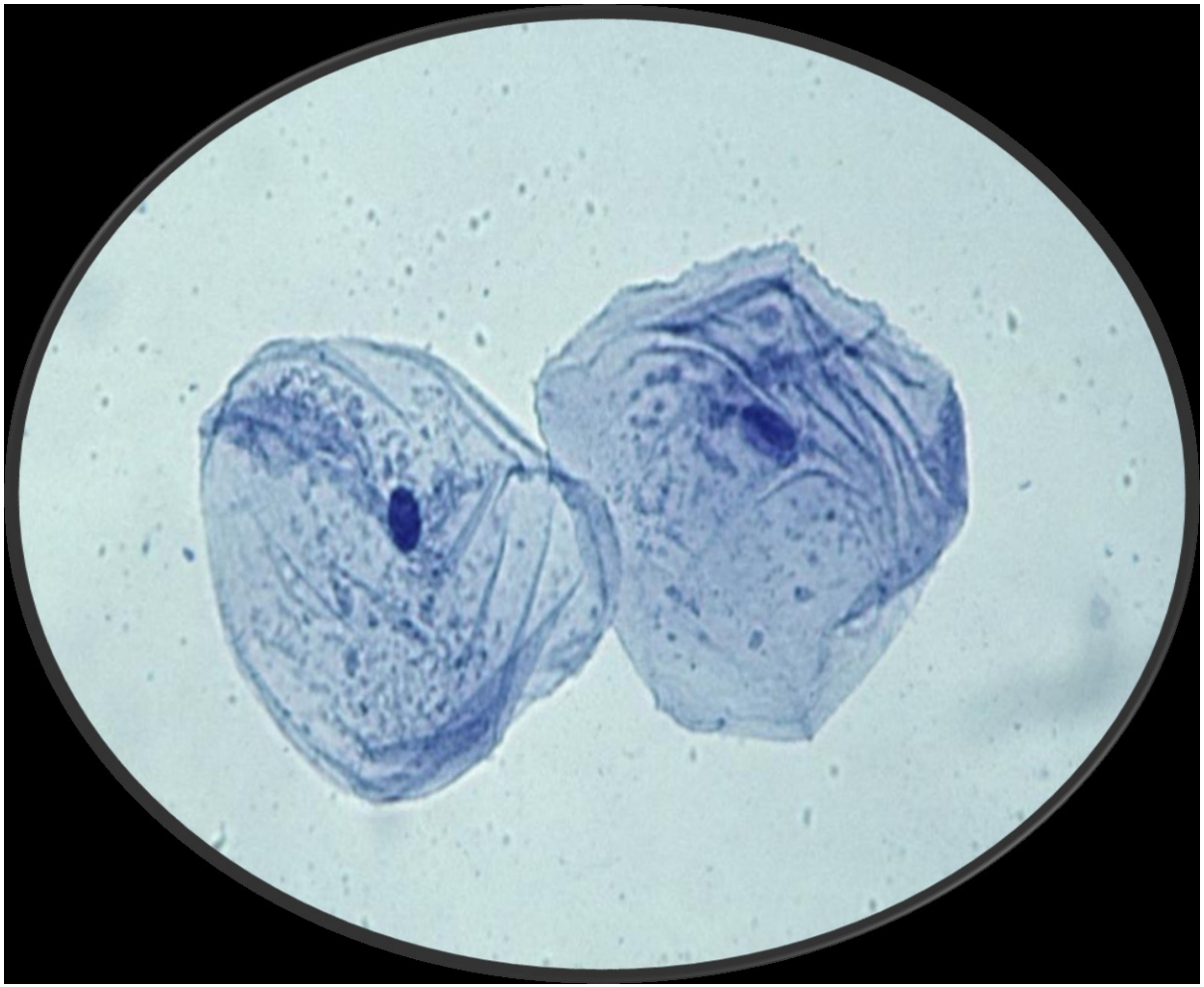
Let’s take a closer look!


This is one cell

What can you see?



Let's dissect our giant ……



How long is the DNA in the model cell?

2m

If we stretched out the 2m of DNA from all of your cells it would…..


…reach the Sun and back …
… 610 times…

Match the words and descriptions with the correct part of the cell

Look at your own cells

1 cotton swab

1 glass slide

1 coverslip

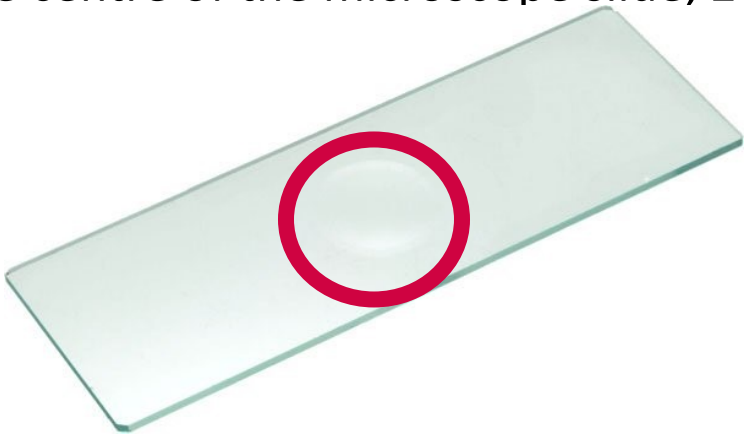
blue dye

1 tissue

1) Take a swab and gently scrape the inside of your mouth.

The slides and coverslips are made of glass.

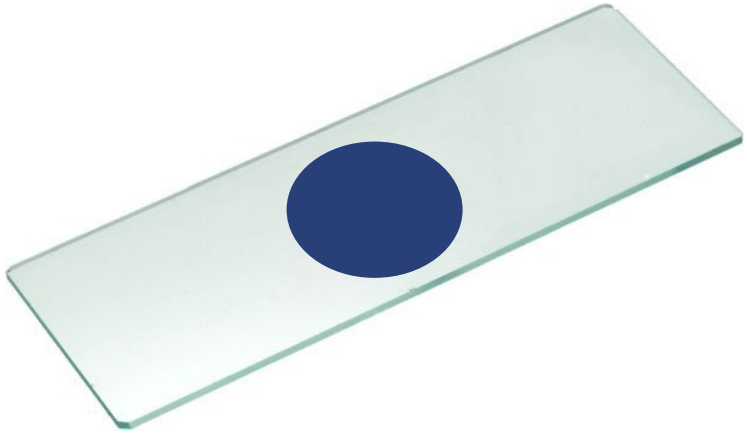
2) Roll the swab on the centre of the microscope slide, 2 or three times.



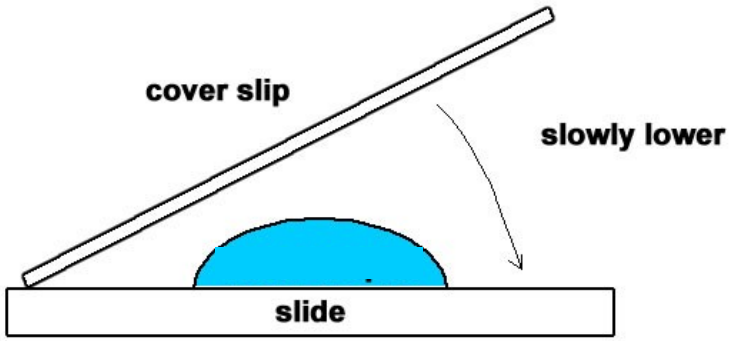
Look at your own cells

Coverslips are very fragile, be gentle and work slowly.

3) Add a drop of blue dye to the cells.

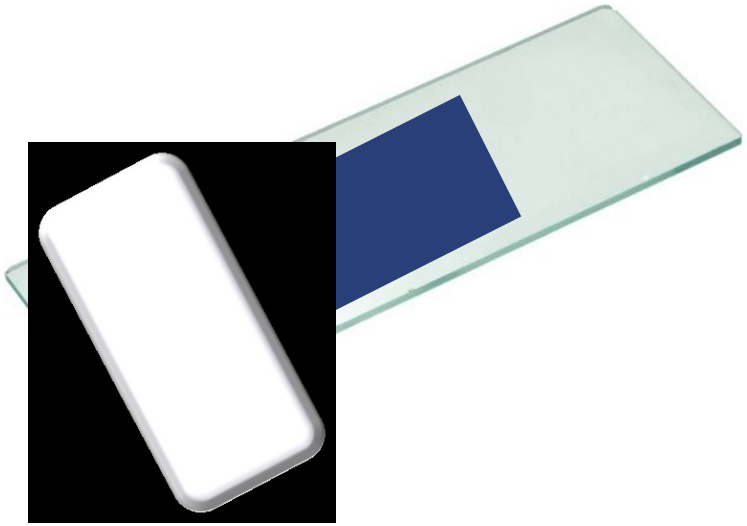


4) Lower a coverslip on top.



Look at your own cells

5) Place the tissue at the edge of the coverslip to soak up some of the dye.



Split into two groups

Microscopes

DNA extraction

Meet the Scientists

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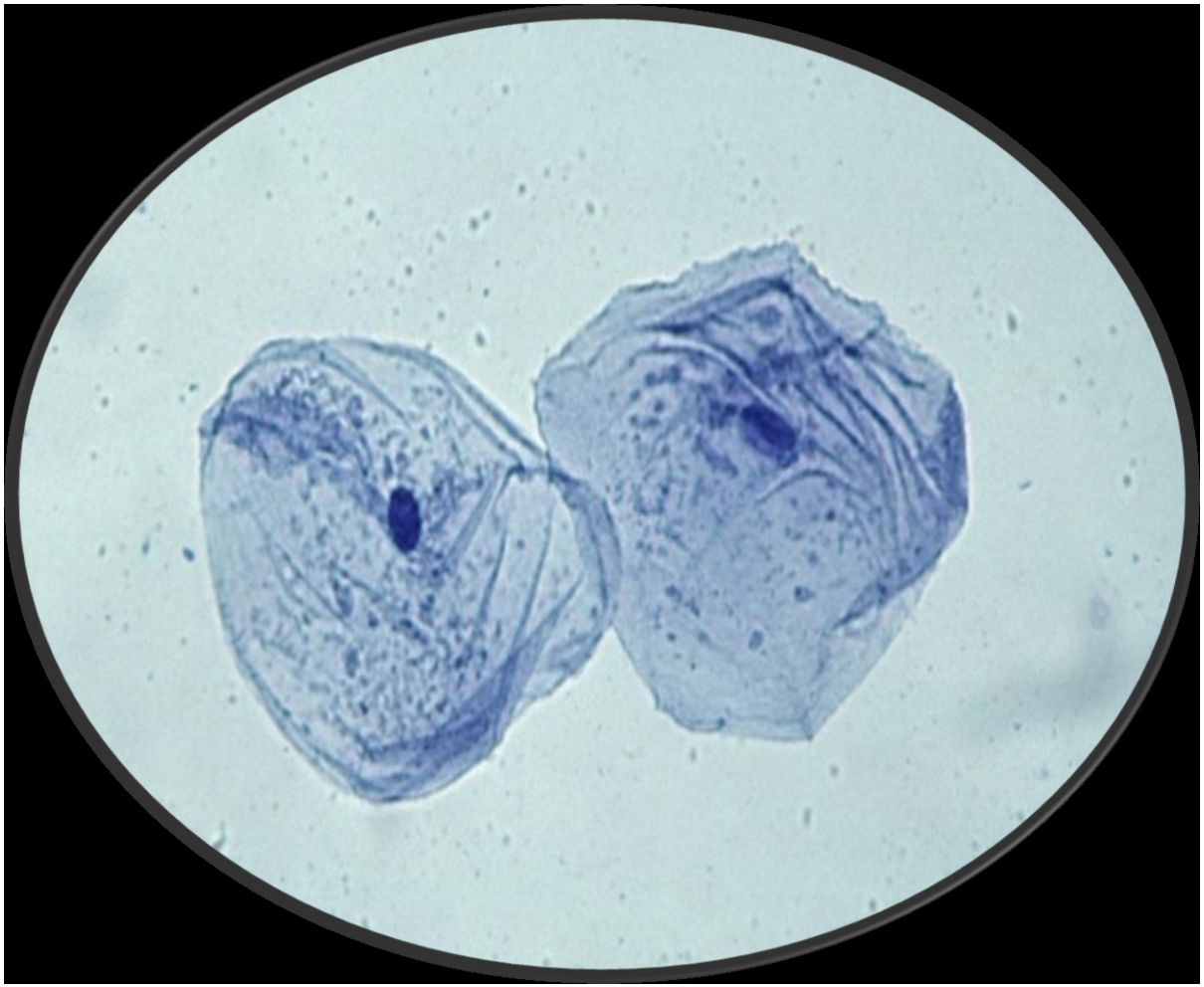
Where is the DNA?



Safety first!

Let's collect your cheek cells!

1. Write your lab number on the cup.

2. Gently chew the insides of your cheeks for 1 minute.

3. Swill your mouth with the salt water in the cup for 1 minute. **Don't swallow it.**

4. Gently dribble liquid back into cup.

Make sure you only handle your own sample

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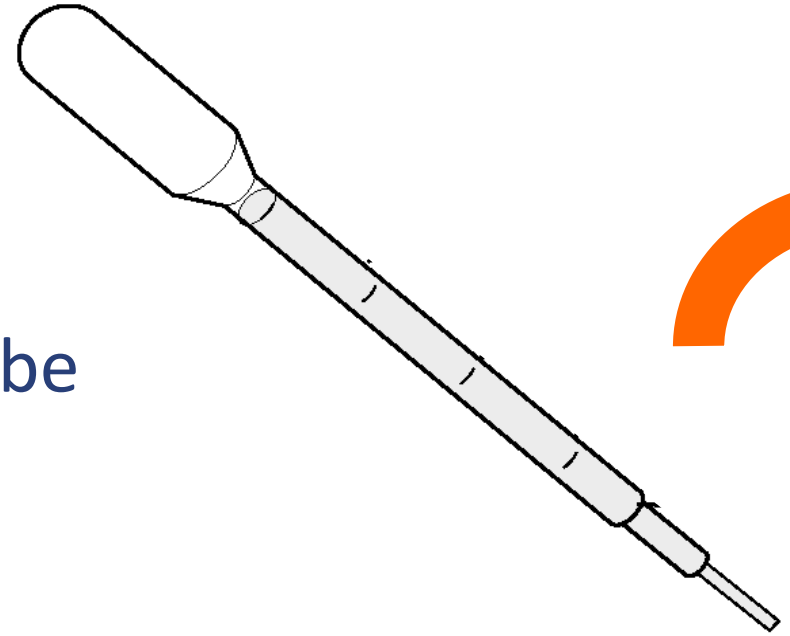
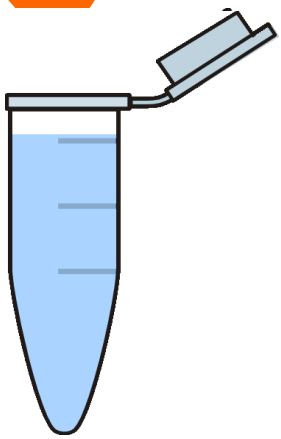
Use marker pen to write your lab number on the **top and side** of a tube.

1. Put the cell sample into the tube ***Take sample from bottom of cup***





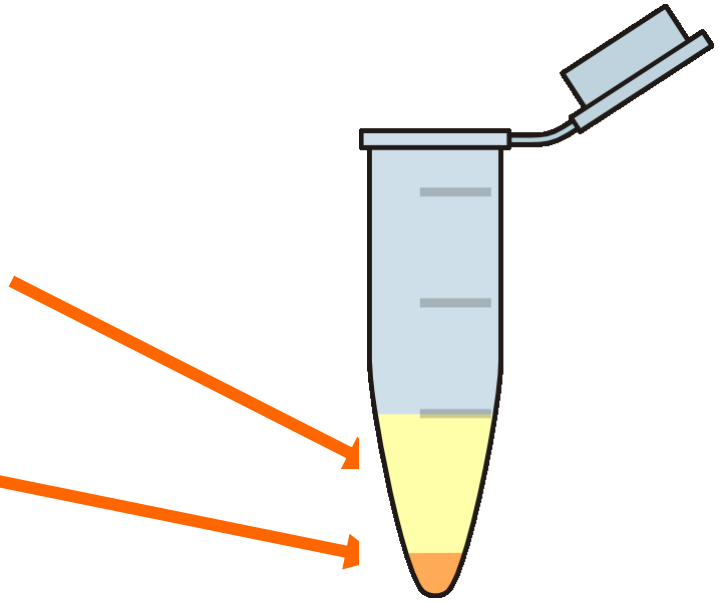
2. Close lid and place tube in small white foam rack

Samples will be centrifuged…why?

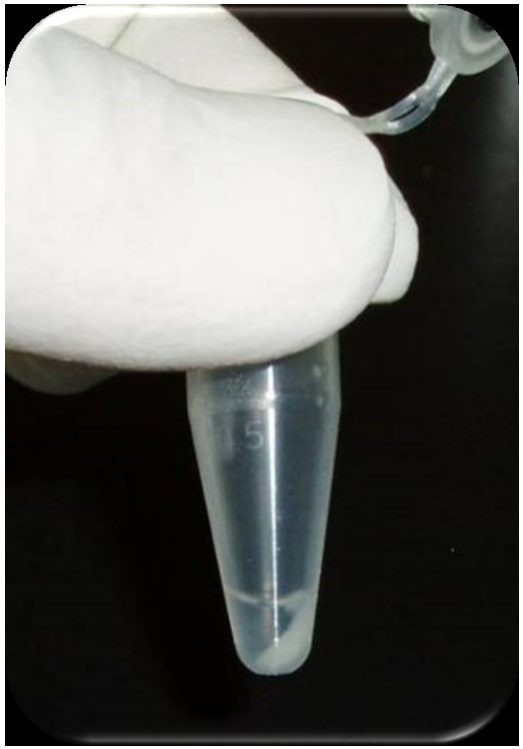
Centrifuge spins tubes at 14,000 time a minute for 2 minutes!

Liquid

cheek cells



Pour off the liquid



Pour most of the liquid back into cup.

Close lid.

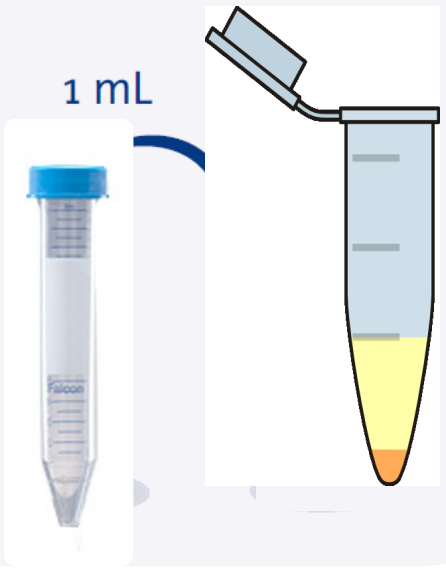
Create a Cell Soup

Make a cell soup!

When finished, place tube in your plastic rack.

Let's get that DNA!

Fig. 1



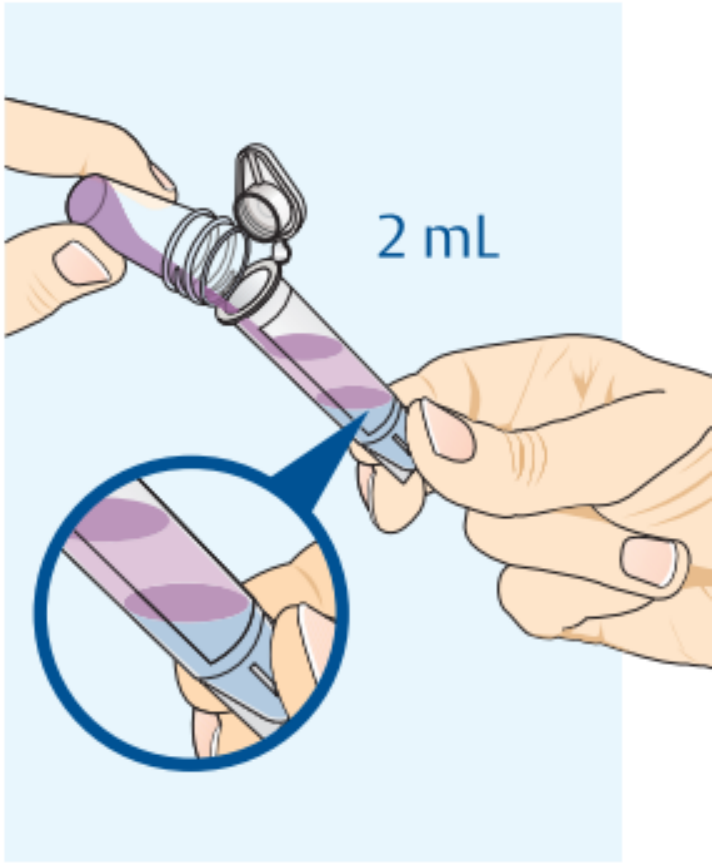
The tube with your cells.

Put 1ml of blue liquid into the tube and flick it!

Let's get that DNA!

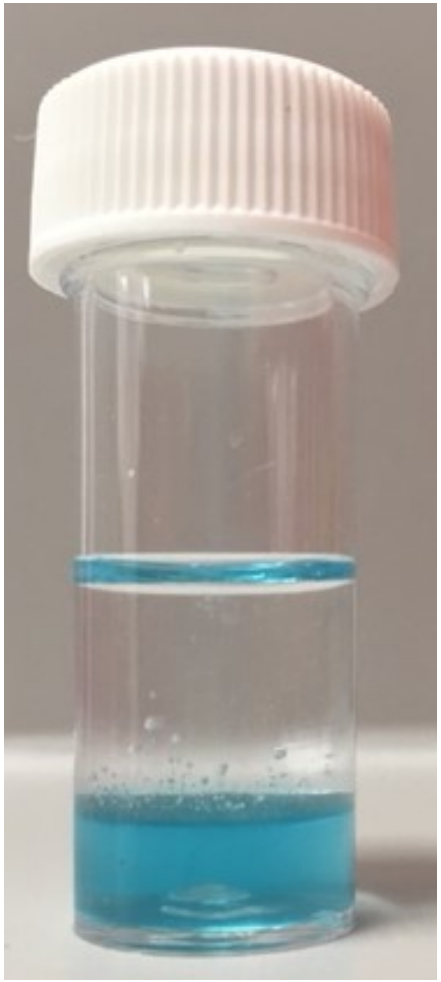
The tube with your cells and blue extraction buffer.

Transfer all your blue cell mixture to the small jar.



Gently pour the alcohol onto the blue liquid.

Watch!



What is it?

Your DNA!

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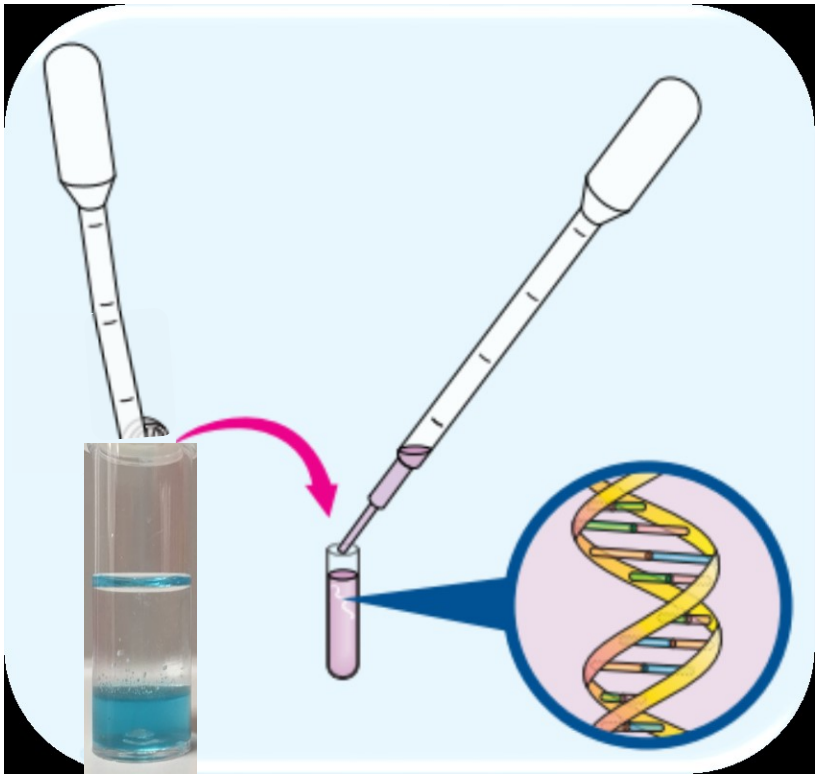
Collect your DNA

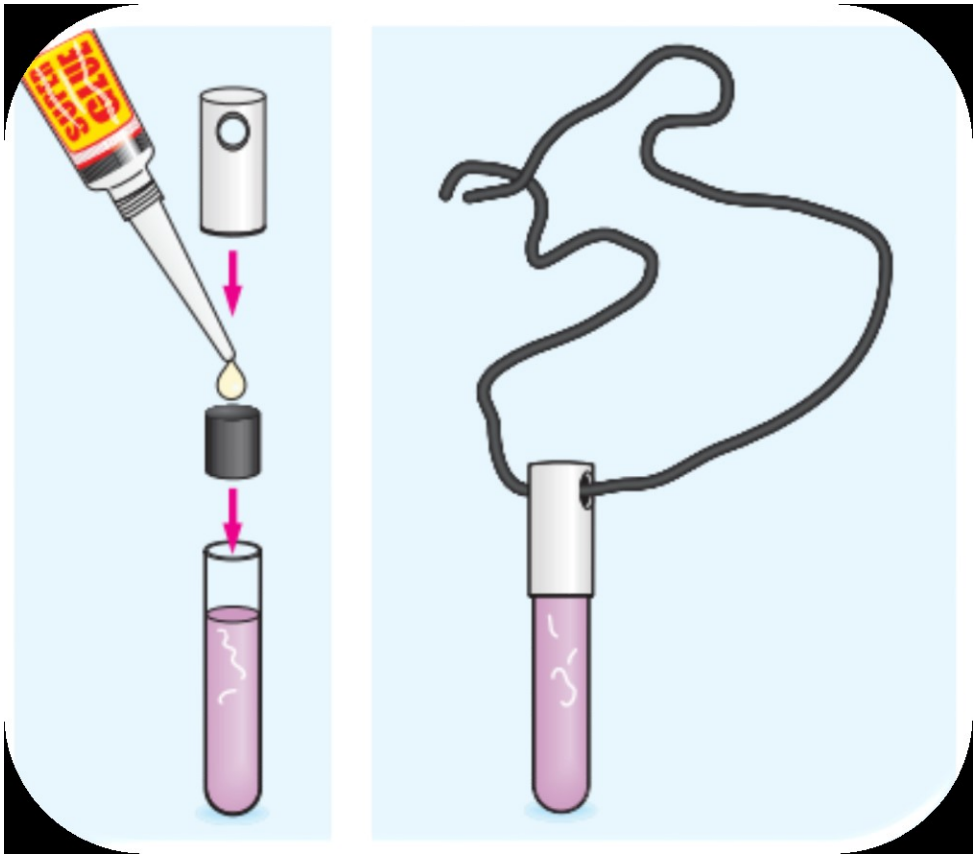
1) Write your lab number on a plastic bag.

2) Carefully transfer your DNA to a glass tube.

3) Put the glass tube in behind your lab number.



Behind the scenes we will…



Meet the Scientists

BREAK

LUNCH

What does DNA do?

Why are we all different?

Different DNA

Different characteristics

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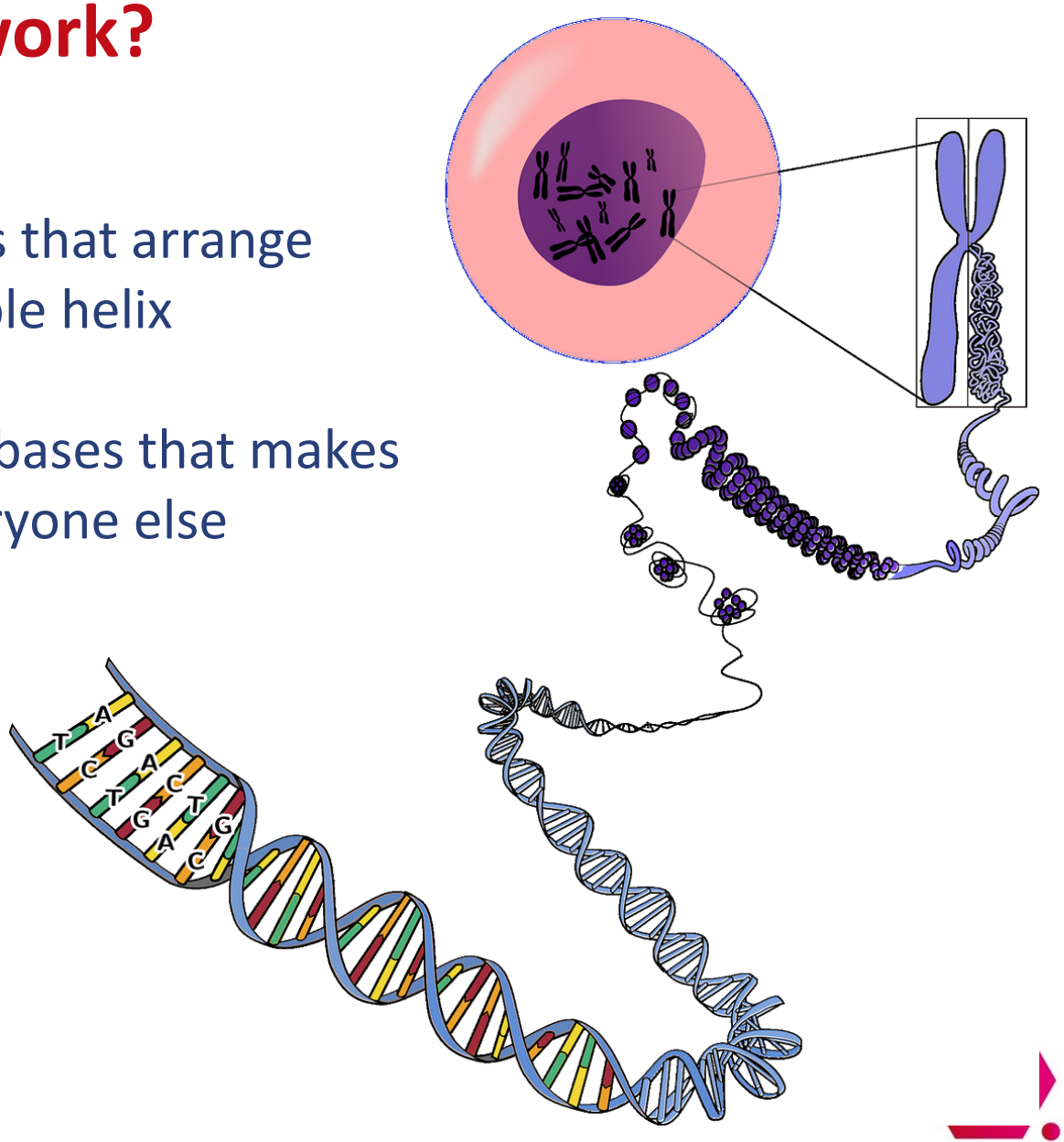
How does DNA work?

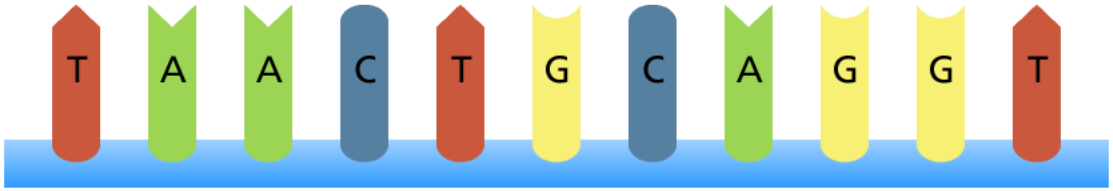
DNA is made of 4 bases that arrange themselves into a double helix

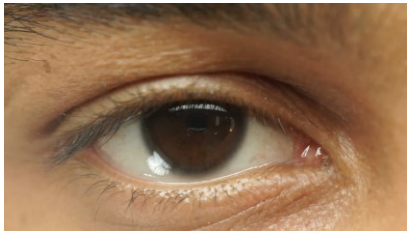
It is the order of these bases that makes you different from everyone else



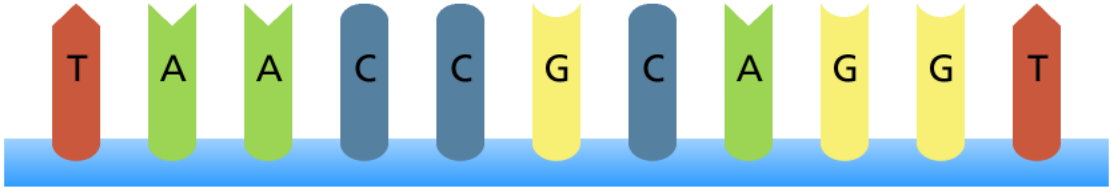
Spot the difference!

Brown eyes



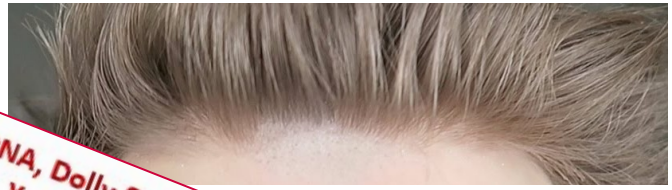


Blue eyes



How are you different?

Hitchhiker's Thumb



ight hairline

peak hairline

Can tongue roll

umb on-top

Right thumb on-top

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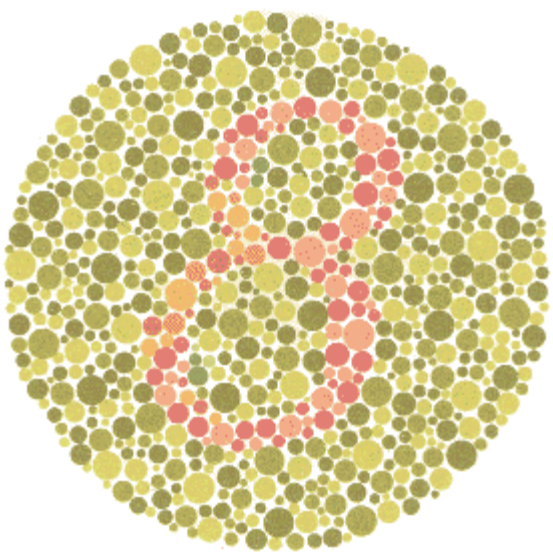
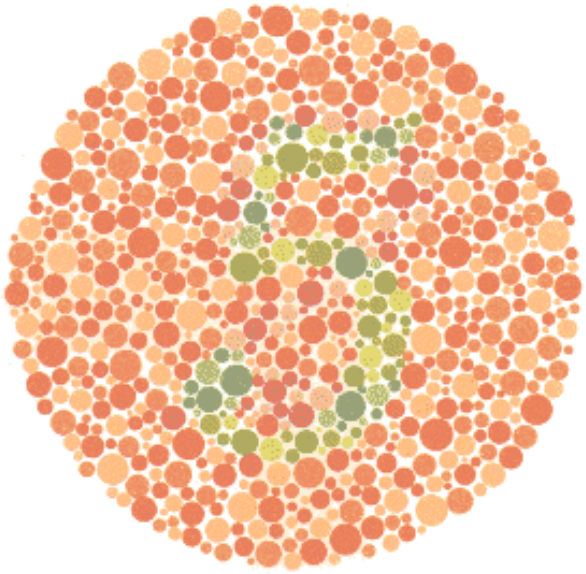
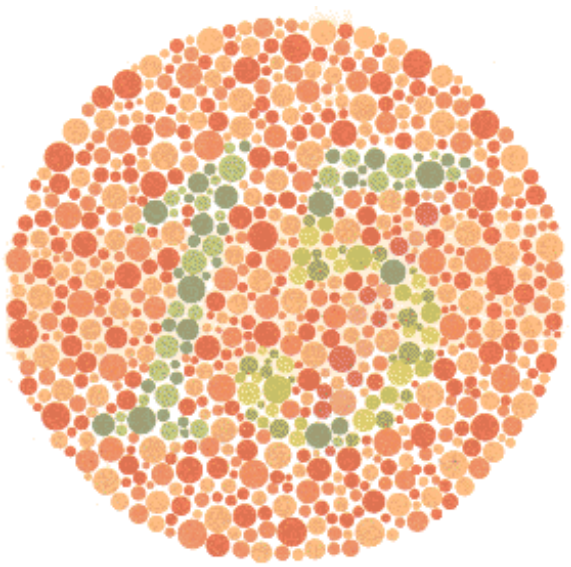
What hidden differences do you have?



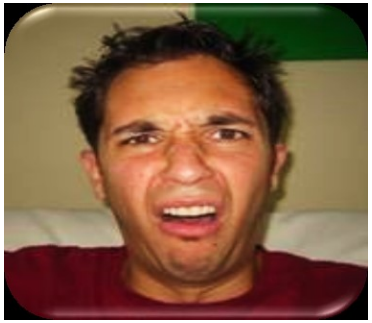




Are you red-green colour blind?

What hidden differences do you have?

Can you taste it?



Strong taster

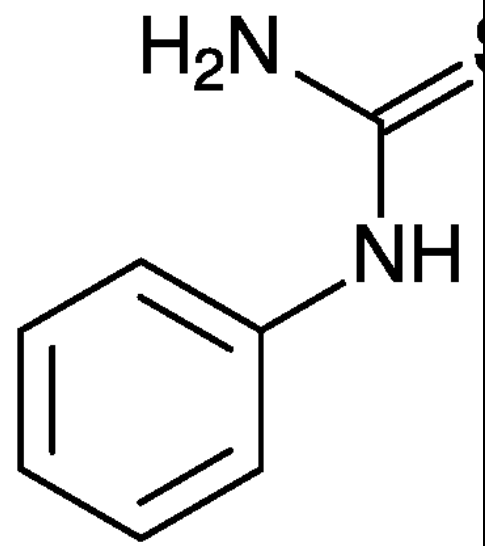
Weak taster

Non-taster

Write your result on your sheet

What are you tasting?

PTC



Phenylthiocarbamide

Why can only some of you taste it?

Where did Dolly's DNA come from?

How to make a clone

Cell donor

Egg cell

Remove egg cell DNA

Fuse egg cell and adult DNA together

Pregnant sheep "surrogate mother"

Dolly!

DNA donor

Adult cell

Remove DNA from adult cell

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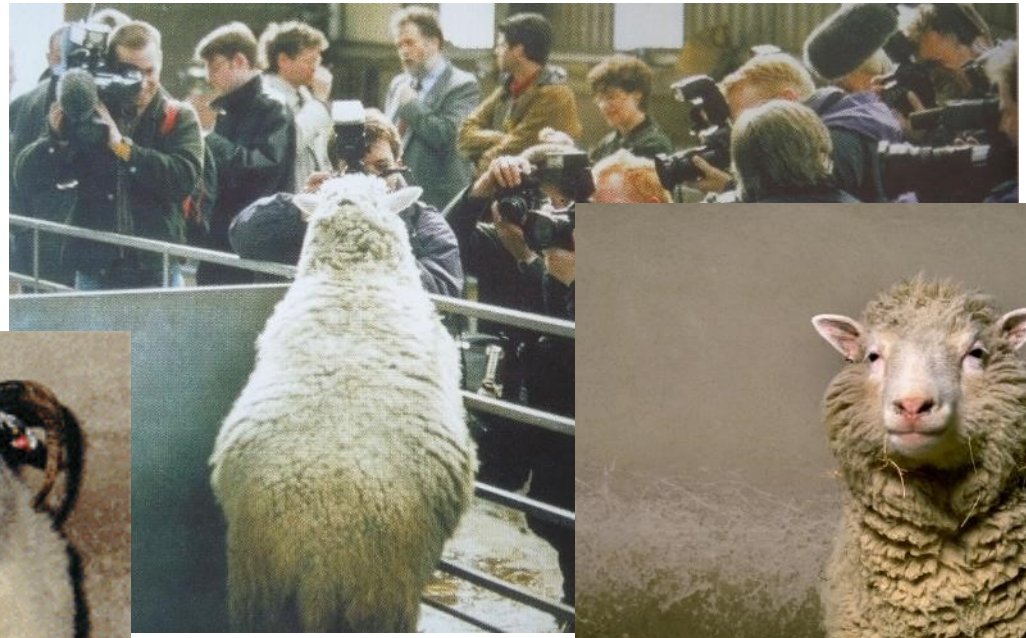
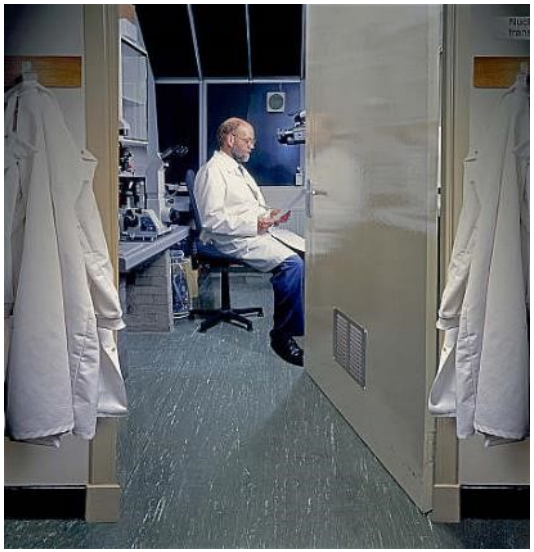
Dolly the Sheep



Team Dolly



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Where's Dolly now?

Where did it all lead?

Who are these sheep?

Dolly's traits: Are these traits inherited or not?


Not inherited
(learned)


Inherited


Not inherited
(learned)


Inherited


Not inherited
(changed by
environment)

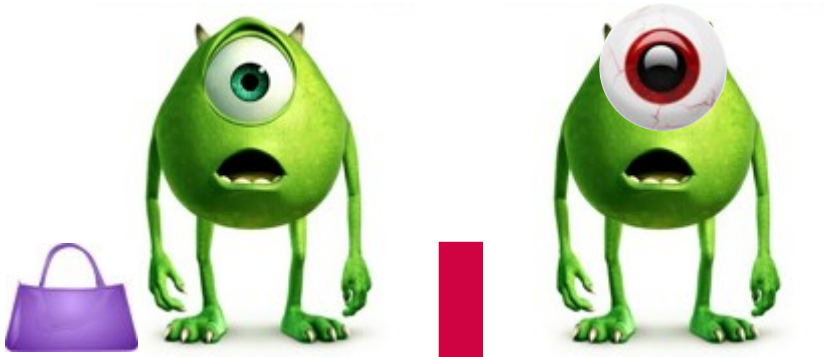
Where does your DNA come from?

Where does the boy's red hair come from?

This is an example of an **inherited trait**!

Trait = characteristics

Where did this baby monster get his brown eye from?



cc

Cc

C= brown eye colour
c = not brown eye colour

Cc

This is an example of an inherited trait!

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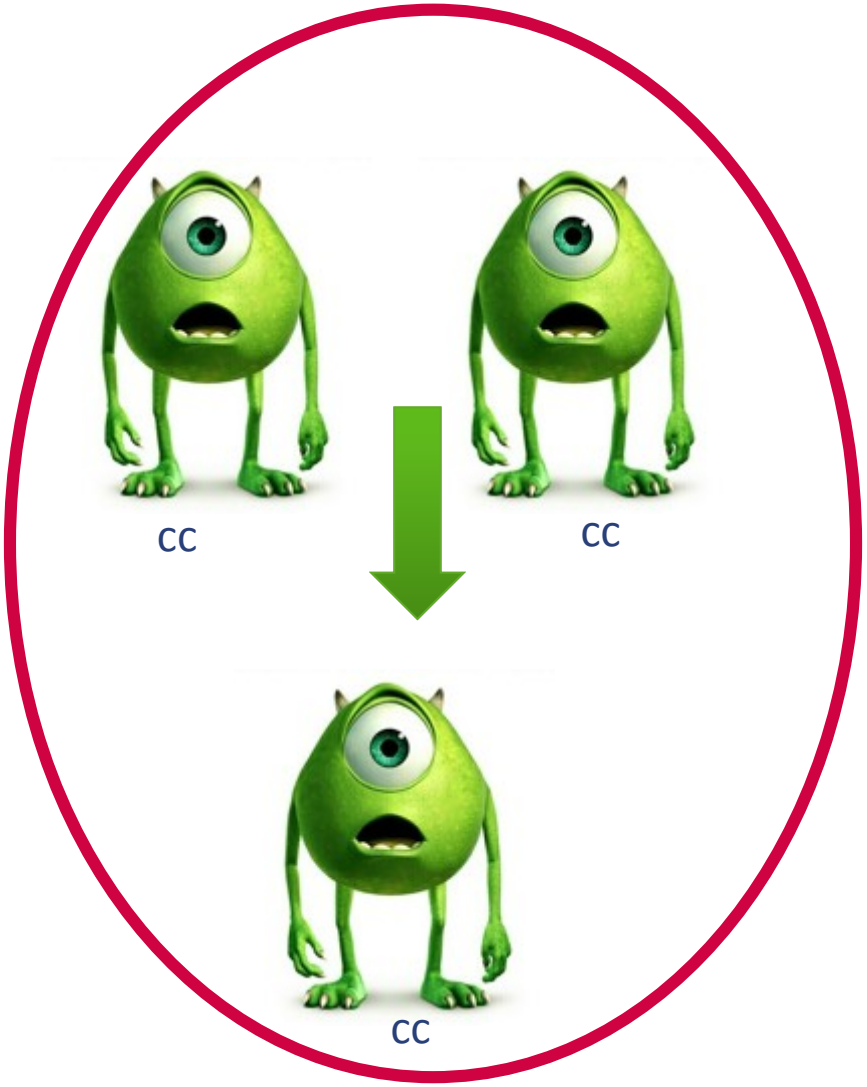
Which is correct?



OR

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C= brown eye colour
c = not brown eye colour

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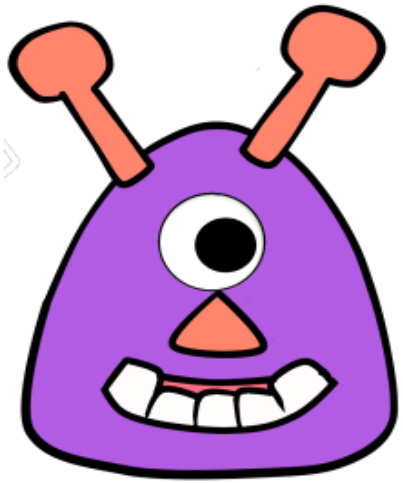
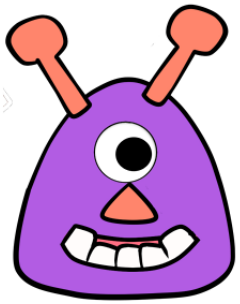
Alien Babies



Zacron

Kharlan



	Zarcon 's genes		Khrelan's genes	
	Head	Tail	Head	Tail
Skin	S	s	s	s
Face shape	f	f	f	F
Blue spots	b	b	B	b
Antenna	A	a	A	a
Eye number	e	e	e	E
Nose	N	N	n	n
Mouth	m	M	M	m

1) Put the circled result from  in the table below.

2) Put the circled result from  in the table below.

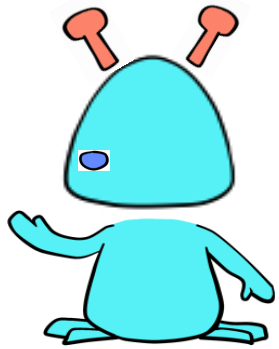
Make sure you have transferred the BIG and small letters correctly.

Gene from Zarcon 	Gene from Khrelan 

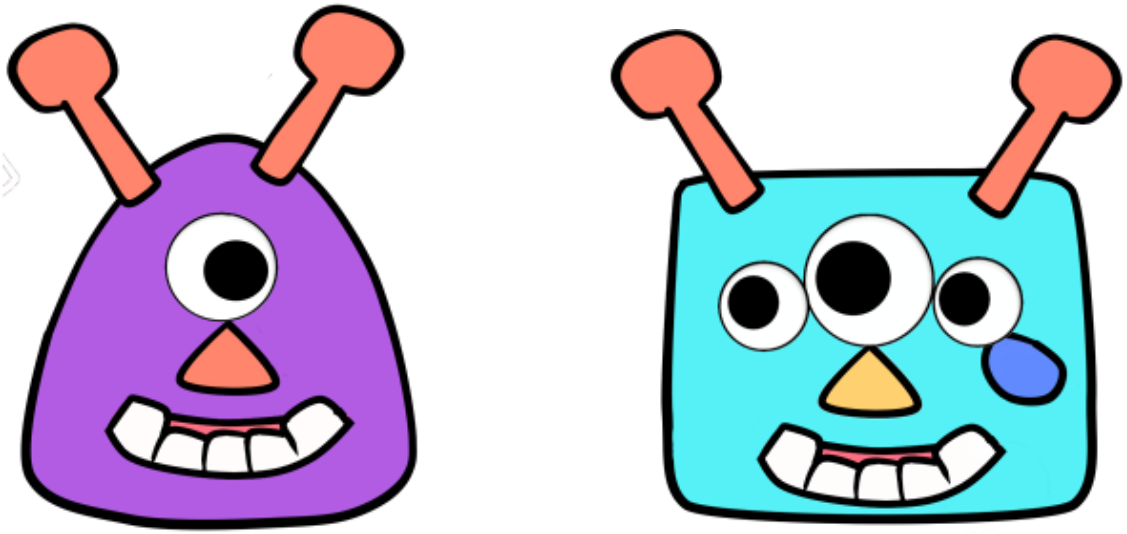
What will their babies look like?

Gene from Zarcon	Gene from Khrelan
s	s
f	f
B	b
A	A

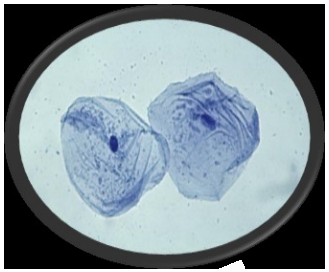
	Dominant	Recessive
Skin	SS Ss	ss
Face shape	FF Ff	ff
Blue spots	BB Bb	bb
Antenna	AA Aa	aa
Eye number	EE Ee	ee
Nose	NN Nn	nn
Mouth	MM Mm	mm



What could their babies look like?

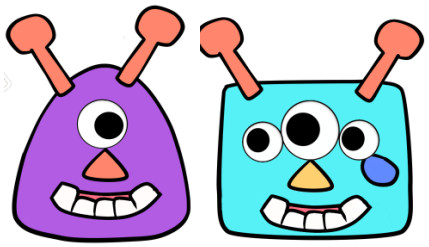


Summary of the day



- Learned the basic structure of animal cells and looked at your own cells.

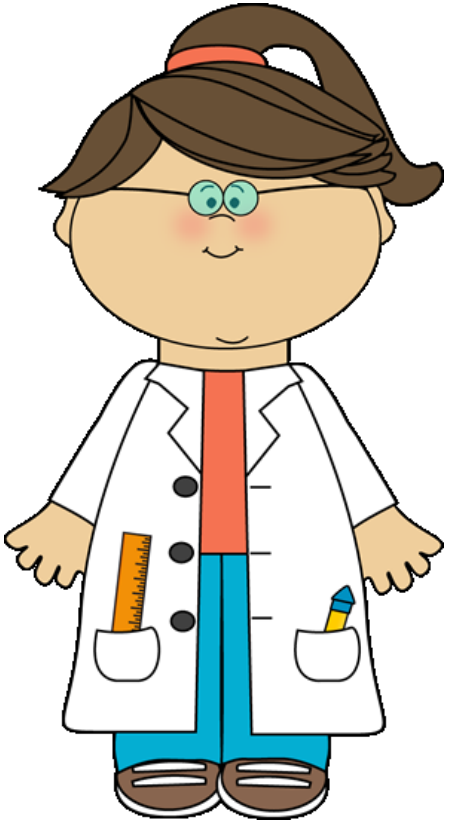
- Extracted your own DNA



- Learned about what DNA does, how it is passed on to children and about the types of traits that can be inherited.

Feedback

Please write down three words on our wall that describe your experience today!



Fun

Boring

Informative

Inspiring

Rewarding

Uninteresting

Interesting

Confusing

Enjoyable

Difficult

Thought-provoking

Frustrating

Dull

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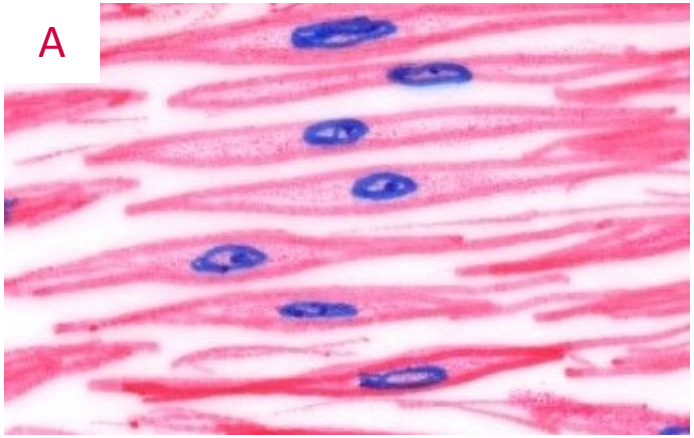
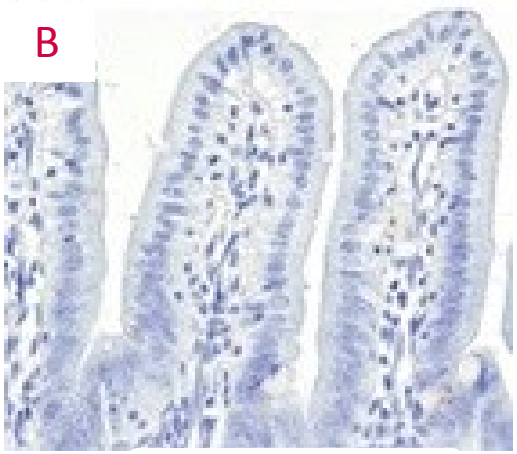
Where do you find these cells in your body?

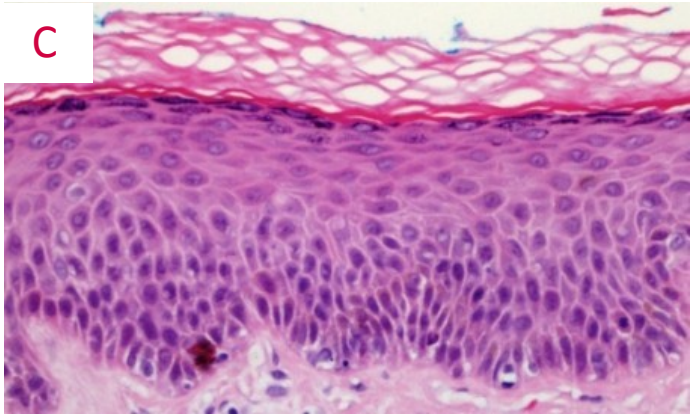
A



B



C



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