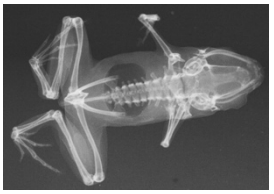
Animals - Bones

Name_____ **Class**_____

What you will need for this lesson: a plastic cup, mug or similar shaped plastic container, an egg **or** a chicken bone **or** a piece of chalk and some distilled vinegar which is available in most supermarkets.
You will also need a pen, a pencil and if you have it, access to a computer, tablet or iPad.

LESSON STARTER

Look at the X-rays of different animal skeletons below. Can you connect those bones in the different skeletons that look similar? Name them if you can.



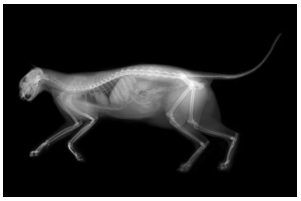
Similarity 1

Similarity 2

Similarity 3

Similarity 4

Similarity 5



When you've finished, watch the video to see how many you got right.

THE INVESTIGATION

Set up this investigation now. It will take a couple of days for you to see any results so ask an adult where would be a good place to leave your experiment to work. Remember to be patient!

After a couple of days check your egg, bone or chalk. How have they changed? Make a note here:

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Please remember to tip the vinegar down the sink when you have finished and wash your hands thoroughly!

What we learned!

Egg shells, bones and chalk have a large amount of calcium within them. The vinegar which you are using is a very dilute acid. It attacks the calcium and removes it from the eggshell, bone and chalk. This changes the structure of each one of them and makes them all less rigid.

WORKING SCIENTIFICALLY

Our next focus is about working scientifically. All scientists apply these principles whenever they are investigating anything, and we've divided them into different skill units.

Find the section your teacher has asked you to focus on and answer the questions in the relevant section.

A. Planning or

B. Presenting and analysing data or

C. Evaluation

A. PLANNING

Every scientist wants to solve a problem and so takes the following steps

1. **Decides on a question that needs answering.** e.g. will the temperature in which the experiment takes place affect the outcome?
2. **Decides what the independent variable (the thing that is changed) might be in order to work out the answer to the question** e.g. we will have 3 different parallel experiments and the thing we will change is the different temperature in which they take place
3. **Decides what the dependent variable might be (how to measure the differences in each different example**) e.g. how easily we can squash the egg or bend the bones.
4. **Last of all decide what elements have to stay the same in order to make it a fair test** e.g. we might keep the amount of vinegar used the same each time.

Now using this knowledge, see if you can answer the questions below!

Write below one or more examples of a question you might want to find the answers to.

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Year 3, 4, 5, and 6 pupils - What might be the independent variable you would use in your investigation, in other words what would be the things that you would change to investigate your question?

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Year 4, 5 and 6 pupils - What would be your dependent variable, in other words what would you measure to record the difference?

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Year 5 & 6 pupils - What was your control variable, in other words what did you keep the same to make sure that it was a fair test?

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Now go and carry out your investigation!

B. PRESENTING & ANALYSING DATA

When scientists carry out investigations, it is really important that they capture data to make sure they can then answer the questions that they have set themselves.
The scientist on the video has asked you to complete the following:

Year 3 & 4 pupils – You are carrying out experiments to answer the following question:

Does the type or brand of vinegar affect how quickly my egg, chicken bone or chalk changes?

What kind of data would you capture to show what happens and why?

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Year 5 & 6 pupils – You are carrying out experiments to answer the following question:

Does the concentration of vinegar affect the time taken for my egg, chicken bone or piece of chalk to change?

What kind of data would you capture to show what happens and why?

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Now carry out your investigation!

C. EVALUATION

Evaluating how an investigation went as well as the data that comes from a science experiment is a really important part of science. It may be that you feel your experiment could have been done better or more thoroughly and it is important to understand this.

Answer the question below and then explain why you came to this answer:

Year 3, 4, 5 & 6 pupils: Did your experiment work?

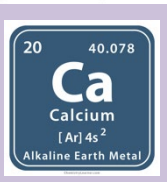
Year 3,4, 5 & 6 pupils: Why? Try and explain your answer using diagrams if it helps.

Year 5 & 6 pupils: Try and explain how you know it did or didn't work.

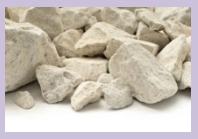
The science behind the investigation

Calcium, which you'll now know is in eggshell, bones and Chalk.

It is actually a metal and we can find it in the Periodic Table With the chemical symbol of Ca.



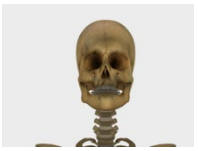
It is also in limestone.



This might explain why calcium adds a hardness when it is present in other Items, like our eggshell, bone and chalk. So, when it's removed items lose The hardness or rigidity.

Your challenge!

Our bodies have 206 bones by the time we become an adult. Below are the bones you saw in the video, can you write in the table what the function of the bone or group of bones is?

The Bone or group of bones				
Its name if you know it				
Its function or job				

Research opportunity

Find out whatever you can about Leonardo da Vinci and create a fact file about him.

Where was he born?
When was he born?
Where did he study?
What important scientific knowledge did he find out and how?
What else was he famous for?

What was your score?

QUIZ TIME!

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QUIZ TIME!