



What kind of mind?





Lesson 3



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Last time
we thought
about:






REMEMBER: You should use your hypothesis to make a definite prediction about the experiment!


THE THEORY OF EVOLUTION

[BY NATURAL SELECTION]



CHARLES DARWIN

MONKEY



This slide recaps the information from Lesson 2.

Meet Your Family!

Woolly Spider Monkey



By learning about primate minds,
we can also try to learn about
human minds.



Ring Tailed
Lemurs



Tarsier



Humans are part of the primate family. These are all primates.

Meet Your Family!



Chimpanzee



Baboon

Chimpanzees are our closest living relatives, sharing 98% of our DNA.

Meet Your Family!



Gorilla



Bonobo

By learning about some of our nearest primate relatives, we may also learn something about our own minds.

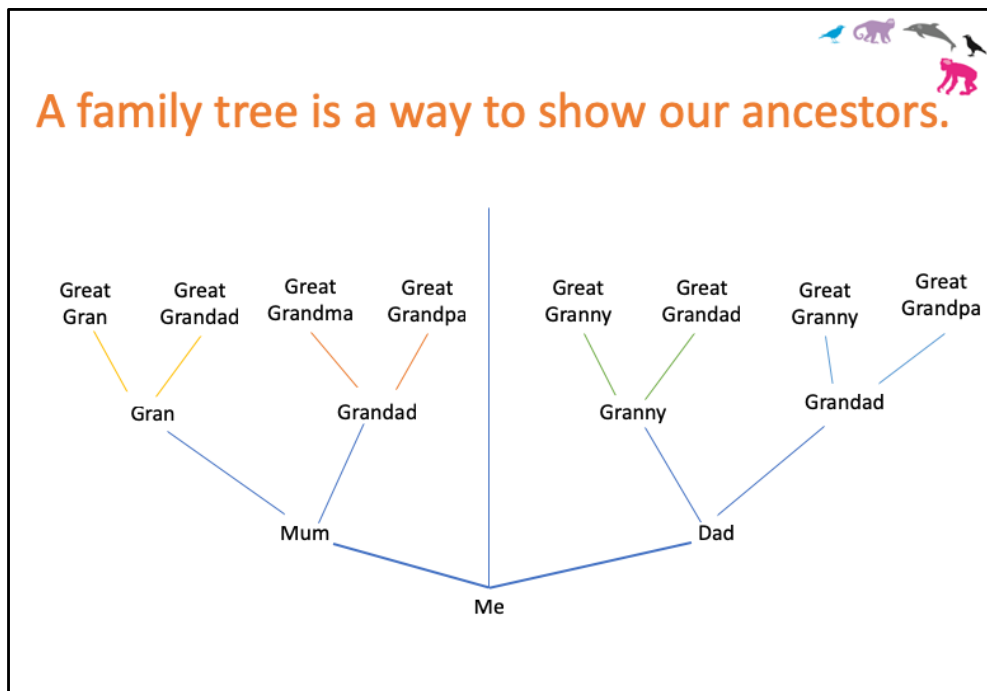


These primates are apes, just like chimpanzees and humans.

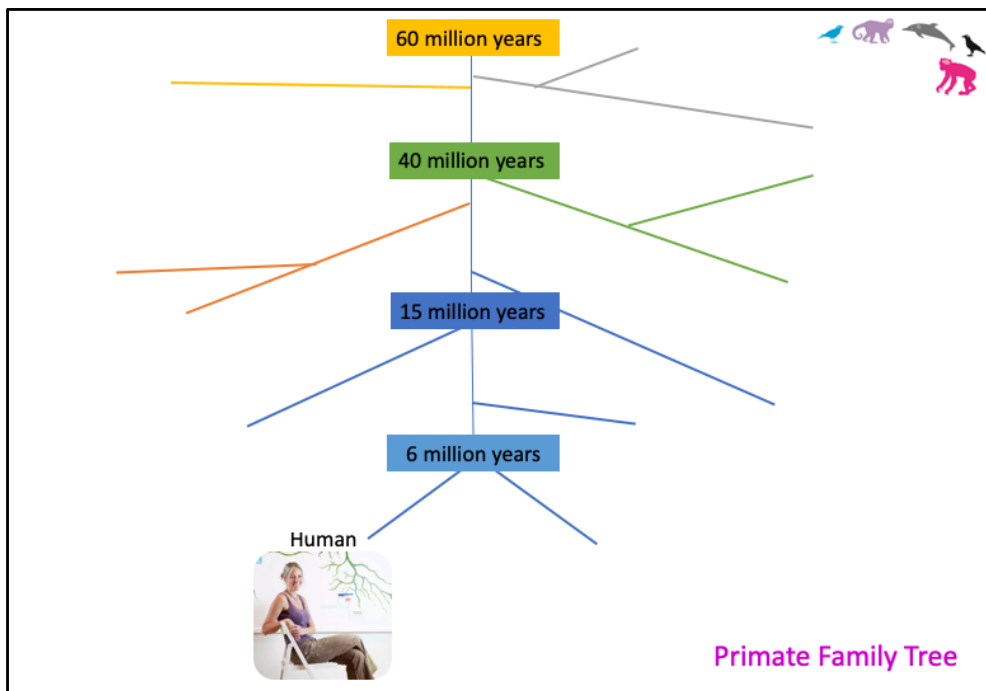
One group of animals that researchers have worked on a lot is the primates. This is OUR family. Lemurs, lorises, tarsiers, New World monkeys, Old World monkeys and apes, including humans, are all primates. Primates are mammals which have nails on the hands and feet, a short snout and a large brain.

Researchers are trying to create a more detailed idea of human evolutionary history by examining our relations to other species. Our closest ancestors are the chimpanzees; researchers think that chimpanzees and humans had a common ancestor about five or six million years ago. This means that chimpanzees are our closest living relatives: our cousins.

Just as the hands and bodies of different species can be similar in some respects and different in others, so might our minds. **Our minds are also the products of evolution.**



This family tree gives an example of how we can look back at our predecessors to see who they were.



Small Group Exercise: PPS Slide 7 - 8; posters of blank Primate Family Tree; accompanying cards with primate images

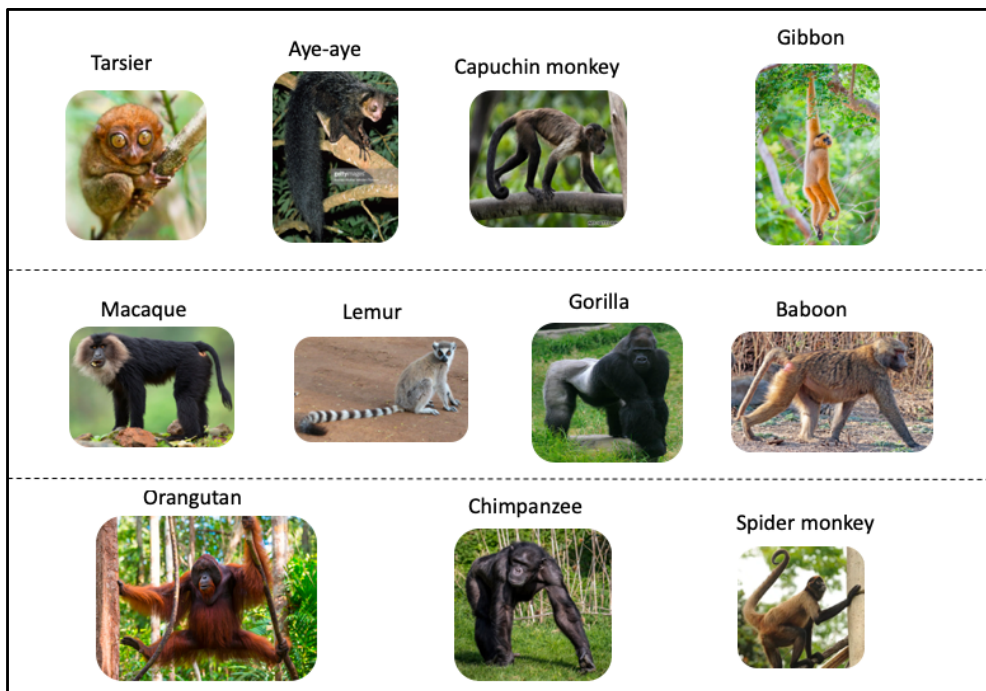
The object of this exercise is to ask the children to consider where the primate might go on the family tree and it is not essential to have it correct.

Show PP Slide 7. In small groups, using the posters and the accompanying cards with primate images, ask the children to put the primates on the family tree, so that our oldest primate relatives are at the top of the page. Then show **PP Slide 8** to give the correct layout of the tree for comparison.

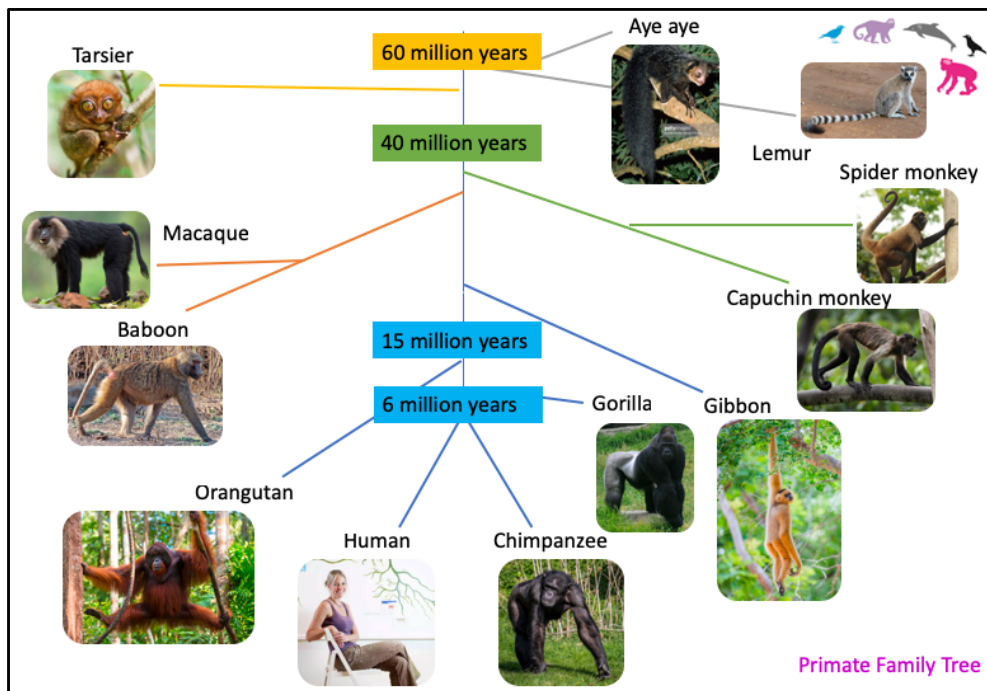
Where do your relatives go? Can you add them to the tree? Ask them to say what differences and similarities they notice between the primates and themselves. For example: Which parts of our bodies are alike? Which parts are different? Why does the Woolly Spider Monkey have long arms? (to swing from trees more easily) Why does the Tarsier have such huge eyes? (to see better in the dark, because it is nocturnal). Our human bodies have also evolved to suit our environment, just as these other primates have evolved to suit their environments.

We are trying to get a more detailed idea of our evolutionary history by examining our relations to other species. Our closest ancestors are the chimpanzees; researchers think that chimpanzees and humans have a common ancestor about six

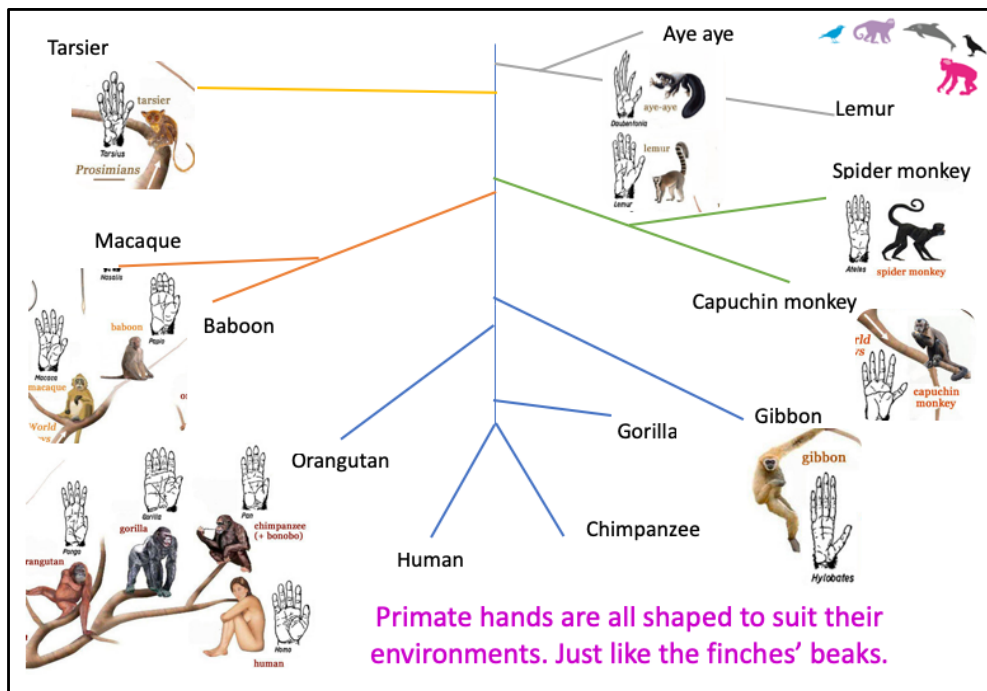
million years ago. This means that chimpanzees are our cousins.



These are the card images which the children should place on the primate family tree.



This slide gives the correct placement of the primates on the family tree.



Show **Slide 10**: images of primate hands for comparisons.

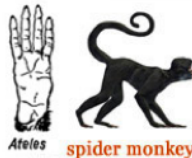
Just as the hands and bodies of different species can be similar in some respects and different in others, so might our minds. Discuss how the hands have evolved to suit the primates' different environments. For example, the gibbon's fingers are elongated to help them grab branches as they swing from tree to tree. The aye-aye has one very long finger to dig in tree bark for grubs in much the same way as the woodpecker finch.

Primate Hands


Draw round your hand. What **similarities** and **differences** do you see when you compare your hand with these other primate hands?

My hand


What do I notice?



Ateles spider monkey



tarsier
Tarsius
Prosimians




gibbon
Hylabates

Show **Slide 11** and give out individual worksheets on primate hands.

Ask the children to draw around their own hand and then write down some of the similarities and differences they notice between their hands and those of the primates in the images. They can then share what they have noticed with their group or the whole class.

Chimpanzees use tools



Like the woodpecker finches - and like humans - some other primates use tools.

https://www.youtube.com/watch?v=5Cp7_In7f88

Whole Group Discussion: Chimpanzees use tools

Like the woodpecker finches -- and like humans -- some other primates use tools. Historically, many thinkers believed that tool use was uniquely human. But many non-human animals use tools. The clip may prompt **group discussion** of a number of issues: are all the creatures that use tools doing essentially the same thing, or is there something importantly distinctive about human tool use? Does tool use require intelligence? What does a creature have to understand about the world in order to use a tool?

These are fairly open-ended questions about which researchers may disagree; many legitimate answers are possible.



How sensitive are your primate hands?



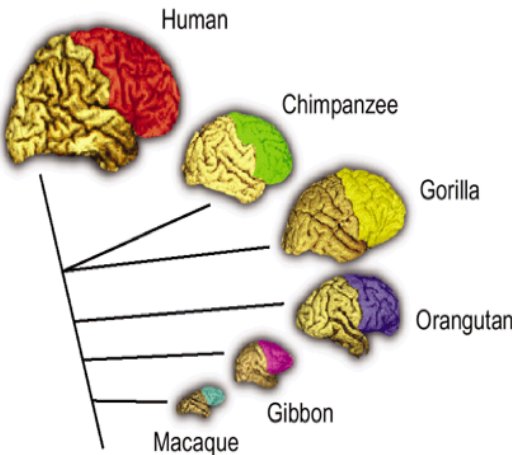
- Primate hands are important to the way they understand the world.
- This is Frek, a male chimp at Edinburgh Zoo.
- He is using his hands to check the food he has found.
- **Can you tell what an object is just by feeling it?**

Paired Activity – How sensitive are your primate hands?

This activity is designed to help the children think about how just as their hands have evolved, so have their minds. Our minds can interpret the information from our hands and help us to navigate our environments. The ways in which our bodies interact with our world has had an effect on the way we think about that world: our experience has shaped our minds and our thinking.

Instructions: Primate hands are important to the way they understand the world. How sensitive are your hands? Students are divided into small groups, with one participant at a time blindfolded and presented with an object (a pencil, a pen, a rubber, a book, etc.). Can they identify it using only touch? Can we tell what the object is even though we can't see it? Do you think a monkey, or a chimpanzee could?

Brain Similarities and Differences



- We saw that primate hands have evolved in response to their different environments.
- Primate brains have also evolved in response to their environments.
- What similarities and differences do you notice about these primate brains?

This slide presents a comparison of primate brains and children are asked to comment on the differences and similarities.

We can note that the brains are all of a similar construction and roughly the same shape. However, the differences include that the human brain is the largest, and this is especially apparent when we consider the size of some of the non-human primates, such as the gorilla and that their brain to body size ratio is very different.

What about other minds?

- How can we find out about other animals' minds?
- How can we find out about babies' minds when they cannot tell us what they think?



This slide raises questions about how scientists can design experiments to find out about other minds.

The image is of a Capuchin monkey at Edinburgh Zoo's Living Links exhibit, where visitors can see the researchers carrying out experiments with the monkeys.

Human babies and Capuchin Monkeys

Do human babies and Capuchin monkeys think about objects in a similar way?



<https://www.dropbox.com/sh/ae2l6t4wb6vusbr/AAC0Y4FYJN-Nc0z8I-efsc45la?dl=0&preview=Capuchin.mp4>

When we study human infants or non-human animals, we can't just talk to them to ask them how they think. We need to look at what they *do*. What do human babies do? What might this tell us about how they think?

Much research has relied on measuring how long babies *look* at different things. Babies will look longer at some things than others; this suggests that they find these things interesting or surprising. And if they find something surprising, we can conclude that it wasn't what they were expecting or predicting. This can tell us about how they think about the world. The experiment in the film clip that follows is an example.

Pause the film at the initial question to take a class poll. Then ask again at the end.

Pupils may raise an important question about the experiment: how do you know the monkeys looked again because they thought another object was there? Maybe they would always look again? This is a good place to introduce the notion of a *control condition*. We want to know whether the capuchins act notice when the food that goes in the box is different from the food that goes out; and we hope that this will be reflected in something they do (reaching into the box). But we need a baseline for comparison; we need to know how often they reach in the ordinary case (where what goes into the box is the same as what goes out). This is called the *control condition*. In any experiment, you are trying to compare two different situations: one

in which you've manipulated or changed something (the experimental condition), the other exactly similar except without the change (the control condition -- the baseline that we are comparing the experimental condition to). The difference between these conditions is the crucial result.



Human babies and Capuchin Monkeys







Human Babies and Capuchin Monkeys Worksheet

Individual Exercise – Children should answer the questions which are based on what they saw in the film.

Answers are as follows:

1. How many objects did the babies see at the start?

The babies saw two different objects.

2. How many objects were behind the screen when the researcher moved it?

There was only one object behind the screen when the researcher removed it.

3. How did the researchers know that the baby was surprised at this?

The baby looked for a longer time at the object, which suggests it was surprised only to see one object there.

4. What did the researchers drop into the box for the capuchin monkey?

The researcher dropped a date into the box.

5. What did the capuchin monkey find in the box?

The capuchin monkey found a grape in the box.

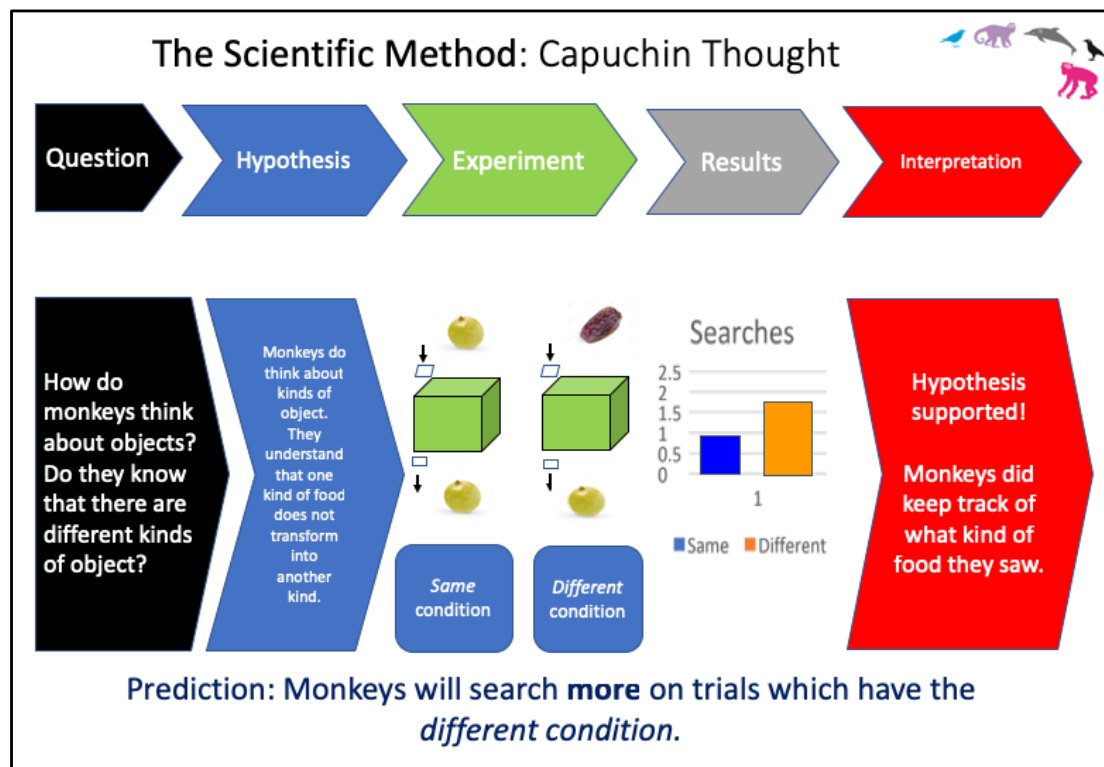
6. How did the researchers know that the capuchin monkey was expecting something else?

The capuchin monkey searched in the box again, after it took out the grape. It

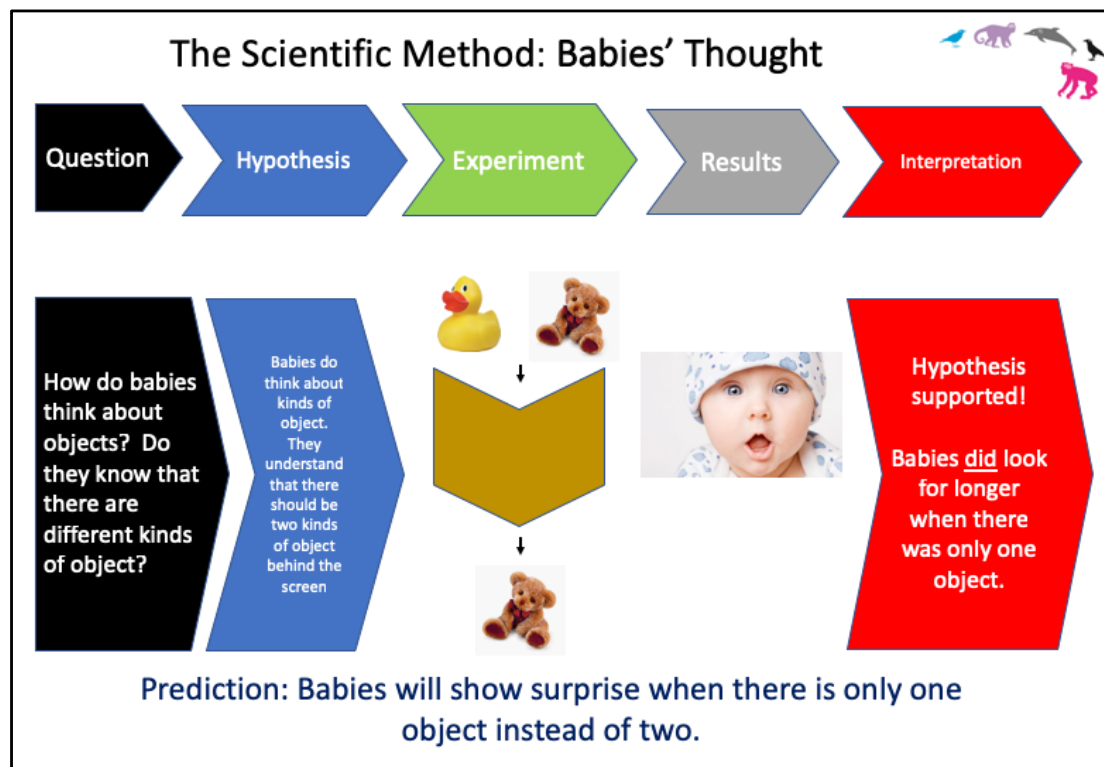
seemed to be searching for something other than the grape.

7. The babies and the capuchin monkeys were expecting something else in the experiments. Do you think that babies and capuchin monkeys think about objects in a similar way? Give a reason for your answer.

Babies and capuchin monkeys might well think about objects in a similar way. The experiments showed that they could know that two objects are different, separate things. The babies were surprised when there was only one object behind the screen. The capuchin monkey searched again, as if looking for the date and so it expected a different object to be there.



This slides demonstrates how the capuchin experiment can be mapped onto the scientific method.

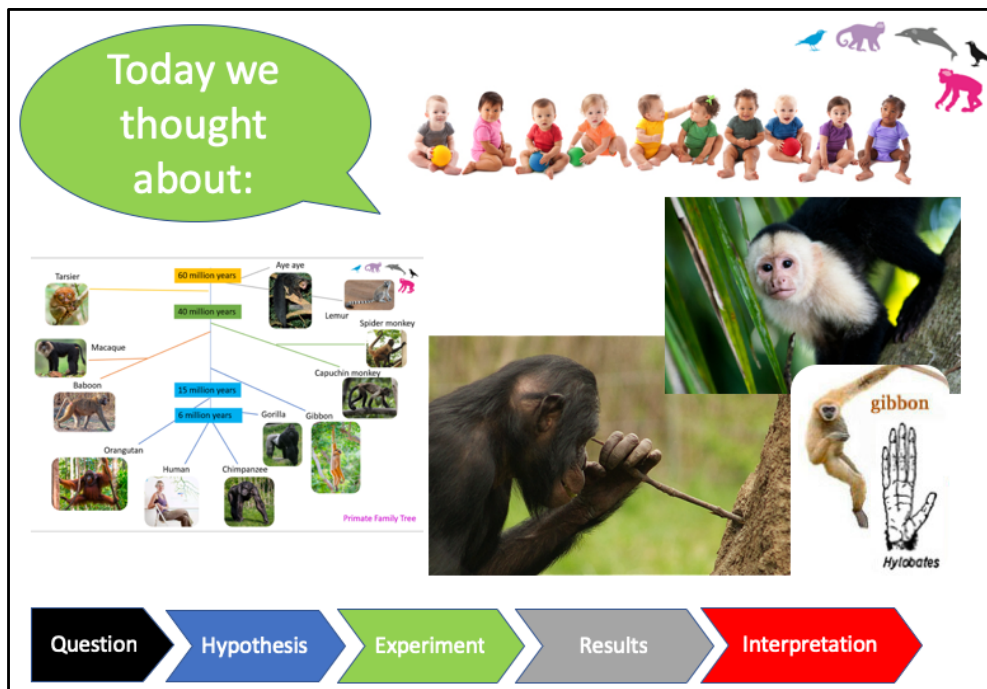


This slide demonstrates how the babies experiment can be mapped onto the scientific method. It gives the hypothesis which the researchers tested with the babies.

The researchers wanted to test whether the babies would show surprise when there was only one object behind the screen instead of the two they were shown. If the babies demonstrated surprise, by looking longer at the object, then this could indicate that they are able to reason that they were shown two different objects. Researchers tested babies of different ages. The hypothesis:

The babies were indeed able to reason and looked for longer when there was only one object behind the screen, after they had been shown two. This means that the hypothesis was supported.

Capuchin Monkeys and Babies Worksheet – individual activity – The questions are designed to embed the key aspects of the research film and encourage the children to think about the results.



This slides gives a recap of the whole lesson. Recap the main points of the lesson as follows:

We thought about our primate family and placed them on a family tree. We thought about different primate hands and how chimps can use tools. We thought about how our hands and brains have evolved and how interacting with our environment has shaped human minds. We then thought about whether human babies and Capuchin monkeys might think about objects in the same way.