**Variation**

**Learning Objectives:**

* Recognise that there is variation between animals including animals of the same type (species).
* Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.

**Prep Required**

* A3 paper for each table
* Print out the **Classification Worksheet** and cut out the animals from the first page
* Print out the **Cat Worksheet** for each pupil (better if printed in colour)

**Starter (15 minutes)**

*Aim: To highlight the vast number of different animals found around the world. To introduce the term variation and characteristic. To emphasise there is variation in characteristics amongst different types of animals.*

**Characteristic**

a feature or quality belonging to an organism

1. Hand out the **[Classification Worksheet]**. The children must split the animals and plants between the different circles on the worksheet. Explain that the circles represent the presence or absence of a ***characteristic***. Start on the “fur” vs “no fur” side then move onto the “photosynthesis” side.
2. The discussion should highlight that although animals are different, they also share common ***characteristics*** that make them similar. Explain how the name for these differences is ***variation***.
3. Ask the class how many animals they can think of and write them up on the board.
4. Emphasise how many different animals there are around the world and thus how much variation can be seen. Then explain that there are many more they have not thought of! For example, there are at least 900 thousand different types of insect in the world! And we are still counting…

**Variation**

Difference in the size, colour, presence etc of a trait/characteristic within a species/population.

1. Look at a lion and a rabbit and discuss which characteristics are the same and which are different i.e. they both have four limbs but lions are bigger, rabbits have bigger ears.

**Class Activity (30 minutes)**

*Aim: To highlight how there is variation between animals of the same type i.e. between cats. To highlight how there is variation between parents and offspring.*

1. Does every cat look the same? Emphasize that there is variation even among the same type of animal. Talk about differences in characteristics such as size, shape, fur colour, fur texture etc.
2. Give each child a copy of the **[Cat Worksheet]** and instruct them to match up the parent cat to its offspring. Are the offspring identical to their parents? They should find that although they are similar they are not identical to their parents. Emphasise how this shows that offspring inherit characteristics from parents but that variation exists even within a family.

**Mutation**

A rare, but random, change in the genetic material that affects the expression of a characteristic.

1. Mutations can occur when offspring are produced which cause changes in certain characteristics for example on the Persian cat the parent is all white whereas ***mutations*** may have caused the offspring to have patches of brown or black fur. Explain how variation in offspring can be positive (increase their survival), negative (decrease their survival) or neutral (have no effect on survival).
2. What kind of mutation would a change in colour be for a domestic cat? (neutral)

**Misconception!**

Highlight that mutations are random but selection of them is not. Advantageous traits are selected by environmental conditions – this is natural selection.

1. What if the change in colour was for a beetle to become bright yellow? (Likely negative, as it would be easier for birds to see it and eat it)
2. Certain characteristics are needed for different environments – that’s why we need variation!

**Plenary (10 minutes)**

Big thought question: if the world got 5 degrees warmer, which animals are likely to survive (those adapted to warmth e.g. camels, lizards, cacti)? Which animals might become extinct (those who need cold environments e.g. polar bears, penguins, seals…)?