

# Observation, Inference and Hypothesis

**OBSERVATION:** Is the gathering of information through the five senses (sight, sound, touch, smell, taste). This information can be in the form of:

- **Quantitative** information use numbers. It involves counting and measuring.
- **Qualitative** information use describing words. It involves observing and describing the observations through careful documentation.

**INFERENCE:** Using background knowledge and observation to reach a conclusion. An inference cannot be tested. It is based on interpreting information to make a statement. Some examples:

- Peter has 2 dogs, 4 cats and a bird cage full of native birds. From the observations just mentioned we can infer that Peter is a pet lover or a person selling animals illegally. But since we cannot question Peter this statement cannot be tested. It may also be that Peter has rescued animals trapped in a bushfire and is helping feed and house these animals.
- The grass on the school oval was observed to be dry and dying. It is turning yellow. We infer that the grass has not being watered for a long time. Our prior experience tells us that not watering the grass causes it to turn yellow and brown. So we conclude that the gardener did not water the grass over the holidays. The reason why the grass is dying however could be due to lack of water or in fact overwatering that can cause a fungal or insect infestation which has now past. Since we are reaching a conclusion based on prior knowledge and are unable to test our conclusion it is an inference.
- It is written that a Roman Lord gave food and water to people stranded by the roadside. It can be inferred that he was a kind person, however it could also be that they were his slaves who were temporarily stranded. Since we cannot test this it is an inference.

**HYPOTHESIS:** Using observation and or background knowledge to predict the outcome about something that has not yet happened. Unlike an inference, a hypothesis can be tested. A hypothesis can be developed from an inference, based on observation that leads to a pattern and can never be proven, it can only be supported by evidence or rejected. A **hypothesis** based on the pattern is then made and tested. A hypothesis is sometimes, but not always, written in the form If ..... then..... Because. Examples include:

- Lithium car batteries get better mileage than lead batteries. This can be tested and so can be written as a hypothesis. ***“if the lead car battery is replaced with a lithium battery then the car will increase its mileage because lithium batteries store more charge”***
- Plants that grow in nutrient rich soil grow faster and look healthier. This statement can also be tested and so can be written as a hypothesis ***“If the soil is fertilized with fertilizer then plants will grow at a faster rate because it is observed that plants in nutrient rich, black soil grow larger and appear to have greener leafs.”***

Complete the following by filling in the blank boxes using any of the words below and give a reason for your choice.

***hypothesis, observation, inference.***

- 1) A nest of dinosaur eggs was unearthed with a velociraptor skeleton close by.  
a) The nest had 22 eggs arranged in a circular manner with little bones clearly visible.



- b) The velociraptor looked after and protected its nest.



- c) Velociraptors lived in a community.

- d) One student was asked to give their hypothesis of the parental nature of velociraptors from the evidence unearthed. ***“If a velociraptor nest is discovered then a skeleton will also be found nearby because velociraptors were gentle caring parents that looked after their young and protected their nests.”*** Is this a plausible hypothesis? Explain.

- e) In an area, close by, another nest was found with a similar nest formation and two skeletons of velociraptors. Does this support the hypothesis of the student in question d) above? Explain

- 2) Whale bones were discovered on an isolated beach. Scientists believe healthy whales became disoriented and hence stranded themselves on the beach. Other scientists believe the whales were malnourished and lacked essential elements in their bones that eventually caused their death.
- a) The spine and several rib bones were found in a wind swept beach.



Is this an *hypothesis, observation or inference*? Explain

What type of information is presented? Explain

- b) The bones were bleached and brittle.

- c) The whales became stranded and disoriented and so beached themselves on this isolated beach. This is a phenomenon that happens regularly so it is likely that this is the cause.

- d) One scientist put forward a view that the death of the whale was due to poor health and strength in bone structure. Is this a plausible hypothesis? Explain.

e) Many more whale skeletons were found further down the beach with obvious signs of deformed bones. What does this finding suggest about the hypothesis, in d) above?

- 3) Consider the picture on the right taken at 8 am. It is of a set of prints left in the sand by people and their pets walking by the beach. Identify the following statements as either observations, inferences or hypotheses. Give an explanation for your choice.



- a) There was one person and a dog walking on the beach at 8 am.
- b) The dog was taken for a walk by its owner.
- c) Both the dog and the person walked in the same direction.
- d) The dog walked next to its owner all the way along the beach.