Table of Contents

INTRODUCTION TO SCIENCE

- *deals with and assesses natural evidence*
- *about prediction*
- *generalisations are made*
- *subjective arguments have no place in science*
- *must be free from cultural bias, tradition etc if they are not rational*

A Scientific Method

- *a useful approach to solving problems; examining cause-and-effect*
    - *observations are made - both qualitative and quantitative (from which scientific questions usually arise)*
    - *hypotheses are suggested - questions posed as result of possible explanations*
    - *one hypothesis is selected for testing*
    - *if there are a number of alternative explanations, the simplest is tested for pragmatic reasons (Occam's Razor - simplest explanation is the most likely)*
    - *experiment is designed to test explanation*
- *e.g. Theory of Evolution:*
    - *Observation - all organisms have many things in common*
    - *Tentative explanation (theory) - may have come about through common ancestry*
    - *Prediction (hypothesis) - ancestors should have evidence of DNA homology*
    - *Tests are conducted many times!!!*

ASSUMPTIONS AND THEORIES OF SCIENCE

Assumptions:

- *the world can be understood through our senses*
- *all effects have natural causes*
- *uniformity of phenomena: for practical purposes the laws of physics are constant (e.g. every action has an equal and opposite reaction)*
- *simplicity of explanation (parsimony - the unwillingness to spend money, Occam's Razor)*

Theories:

- *Explanatory: offer explanations that follow logically from observations*
- *Tentative: open to revision in the event of observations that conflict with predictions of the theory*
- *Testable: potentially falsifiable making it possible to conceive of something that if observed would cause the theory to be rejected*