

# EXPERIMENTAL DESIGN REVIEW SHEET

## A] STEPS OF THE SCIENTIFIC METHOD

- Observations
- Hypothesis
- Experiment
- Conclusion

## B] OBSERVATIONS

- First step of any scientific investigation
- Consist of factual statements - does not include explanations
- Are considered to be true, unless proven otherwise

## C] HYPOTHESIS

- **Hypothesis** - a tentative explanation of observations
- **Inductive logic** (going from specific observations to a general statement of explanation) is used to come up with the hypothesis
- Must be testable - worded in such a way that it can be shown to be true or false by means of experimentation
  - hypotheses should never be worded as a question
- A hypothesis is not intrinsically true or false, but it is considered conditionally true if it is not proved false through experimentation
- There can be many possible hypotheses for a single group of observations

## D] EXPERIMENTATION

- Experiments are used to support or refute a hypothesis
- To set up experiments to test a hypothesis, deductive logic is used
- **Deductive logic** - going from a general statement to specific examples (often worded as an “if ... then ...” statement)
- **The goal of a good experiment is to control all variables except one, the one under study**
- Experiments are designed to prove the hypothesis false.
  - if scientists do everything they can to prove a hypothesis false and it keeps coming up true, then we have much more confidence in the hypothesis
  - if scientists try to prove their hypothesis true, we must be skeptical of the results and worry that bias has affected the outcome of the experiments or the design of the experiments

## E] CONCLUSION

- **Consists of accepting or rejecting the hypothesis** after the data has been analyzed
- Recommendations and insights are not considered as conclusions

## F] PULSE RATE & BLOOD PRESSURE

- **Pulse rate** - the number of times the heart beats per minute
  - at rest this normally averages between 70 and 90
- **Blood pressure** - the force being exerted against the sides of the arterial walls of your blood vessels
  - **systolic pressure** - the amount of force against the vessels during contraction of the heart
  - **diastolic pressure** - the amount of force against the vessels during relaxation of the heart
  - normal resting systolic/diastolic readings are  $< 120/80$