Research methods

Biological methods

This lesson addresses the learning outcome: Discuss how and why particular research methods are used at the biological level of analysis. This is a rather complex question. It is asking you to do quite a few things. First, you must be able to identify the method employed in a study. Only use studies that are excellent examples of a specific research method. Rather than say, "What is the research method used in this study?", focus on "what is a really good example of an experiment."

Secondly, the question is asking "how is the method used?" This means that you have to be able to discuss what happens when we use a research method. What does it mean to use an experiment rather than another research method? How do I recognize that a study is experimental? And how was the method applied to a specific study at this level of analysis?

Finally, the question is asking "why is this method used at this level of analysis?" This is the most difficult of the aspects of the question. The question is asking why would a researcher use this method instead of another one? And why at this level of analysis?

This lesson is best done at the end of the unit in order to revise the material that you have studied as well as focus in on the research methodology. I would limit the students to preparing two methods for each level of analysis and be sure that experimentation is the one method that is commonly applied in all three - although there are some key differences with how the experiment is applied in each of the levels of analysis.

Experimental method: how

When writing about the nature of experimental research, there are some key traits of the method that you should be able to discuss:

- **Hypothesis testing** - experiments propose a hypothesis and then create a situation in which to test whether or not that hypothesis can be supported.
- **Variables** - An experiment manipulates an independent variable and measures the effect on a dependent variable. Some experiments have more than one IV and DV. Other variables, called extraneous or confounding variables, are controlled - or at least there is an attempt at controlling them so that they do not affect the outcome of the experiment.
- **Random allocation** - it is important that participants are randomly allocated to conditions. When done in a large enough sample, random allocation is an effective way to reduce bias.
- **A representative sample must be obtained.** This means that the sample should be large enough and consist of participants who reflect the nature of the population being studied.
- **Experiments can be done in a laboratory or in a more natural environment.** When done in the "real world", these are called field experiments. Obviously, field experiments have less control over variables than lab experiments.
- **Experiments use designs - for example, a repeated measures or independent samples design.** In a repeated measures design, to make sure that the order of the conditions is not influencing the results, counter-balancing is often used - that is, some participants are given condition 1 first and then condition 2; other participants are given condition 2 and then condition 1.

Experiments at the biological level of analysis

- One principle of the BLOA is that animals may be used to give us insight into human behaviour. Of the three levels of analysis that we study, only the biologists use animals in their research. This, of course, leads to the problem of generalizability.