**Review Worksheet ANSWERS: Inquiry Skills**

1: List the four ethical principles involved in conducting experiments involving human participants and briefly describe the meaning of each.

(10 marks)

*Voluntary Participation (1): subjects should not be pressured to take part (1).*

*Informed Consent (1): subjects should be fully informed (1) about the objectives of the research, the procedures to be followed and risks and benefits of the research (1), and be aware that they can withdraw participation at any time (1).*

*No risk of harm (1): risks of physical or psychological harm should be minimised or eliminated (1).*

*Confidentiality (1): identities of participants will not be revealed (1), except to people directly involved in the study.*

2: When using animals in research for human health, what four guidelines must be followed?

(4 marks)

*The research must be valid (1), humane (1), justifiable (1), considerate (1).*

3: What things need to be considered in determining whether an experiment is valid?

(3 marks)

*Does it test the hypothesis? (1)*

*Are other variables in the experiment that could affect the results controlled? (1)*

*Can clear cause and effect can be established between the independent and dependent variables? (1)*

4: What is a Control Sample in an experiment and why is it important? Give an example to explain your answer.

(5 marks)

*A control sample is a sample (or set of samples) that are identical in every way to the experimental sample (1), but without the independent variable being tested (1). For example, if a tablet medication dose is being tested as the independent variable, the experimental samples will include the medication. The control samples will include all the other ingredients (same colour, same size, same binding ingredients) but will not contain the medication. (1)  
  
The purpose is to be able to compare (1) the control samples to the experimental samples to ensure that any changes to the dependent variable are the result of the medication, rather than other factors. (1)*

5: What is reliability in an experiment? Explain why it is important and what factors increase reliability.

(6 marks)

*Reliability is the level of confidence that the results will show the same trends and conclusions each time the experiment is run (1). It helps experimenters and people reading the research be sure that the results are not due to coincidence (1).   
  
It can also help overcome problems with variables that can’t be controlled (1), and identifying outliers in the results (1).*

*Reliability can be increased by ensuring large sample sizes (1) of both experimental and control groups, and repeating the experiment multiple times (1).*

6: What is the placebo effect?

(2 marks)

*The placebo effect can occur in experiment participants and/or the scientists designing the experiment. It’s a form of bias (1) where a belief in the results unconsciously causes participants or scientists to observe and report an effect (1).*

7: How can the placebo effect be avoided?

(6 marks)

*The placebo effect can be avoided by “blinding” (1). This means that participants don’t know whether they are in the experimental group or the control group (1), so unconscious bias won’t affect the results (1). The treatment that the control group get does not contain the medication but is identical in every other way. It is sometimes called a “placebo” (1)  
  
Double blinding means that the participants and the scientist who is running the experiment do not know who is in the experimental group and who is in the control group until after results have been analysed (1). This avoids both the participants and the scientists from unconsciously introducing bias into the results (1).*

8: Describe how the myelin sheath increases the speed of transmission of impulses along an axon.

(7 marks)

*The myelin sheath is made of Schwann cells, with gaps between called Nodes of Ranvier. The myelin sheath covers the membrane channels (1), so the only channels available for ion exchange are at the Nodes of Ranvier (1).  
  
Depolarisation occurs at these nodes (1).*

*There is then rapid diffusion of Na+ (1) down the inside of the axon to the next node, rather than the slower process of each section of membrane being stimulated in turn (1). The depolarisation “jumps” rapidly from node to node (1). The process is called salutatory conduction (1).*