

SPI 3210.Inq.1 – Select a description or scenario that reevaluates and/or extends a scientific finding

1. What are possible reasons why a scientist might repeat an experiment?
2. What is the value in using one experiment to determine the next experiment?

SPI 3210.Inq.2 – Analyze the components of a properly designed scientific investigation

3. What is a hypothesis?
4. What is a scientific theory?
5. What is meant by the phrase "scientific questions must both be testable and verifiable"?
6. What is the independent variable in an experiment?
7. What is the dependent variable in an experiment?
8. What is the purpose of the control in an experiment?

SPI 3210.Inq.3 – Determine the appropriate tools to gather precise and accurate data

9. Review tools used in the laboratory and their possible uses
 - a. Examples of things used in our laboratory: light microscope, dissecting microscope, pipette, graduated pipette, slide, coverslip, flask, beaker, graduated cylinder, funnel, Bunsen burner, forceps, scalpel, scissors, probe, water bath, electrophoresis chamber, ruler, calipers, petri dishes, glass jars, etc. . . .
 - b. Examples of things used in more expensive laboratories: Scanning electron microscope, transmitting electron microscope.

SPI 3210.Inq.4 – Evaluate the accuracy and precision of data

10. What is the difference between accuracy and precision?
11. Explain a situation in which the results may be precise, but not accurate
12. How might you design an experiment to be both more accurate and more precise in your measurements?
13. What does sample size do for accuracy of data?
14. What is the purpose of repeating an experiment?

SPI 3210.Inq.5 – Defend a conclusion based on scientific evidence

15. What is bias?
16. How can a researcher avoid bias in an experiment?

SPI 3210.Inq.7 – Compare conclusions that offer different, but acceptable explanations for the same set of experimental data

17. Give an example of data that might be explained using two different explanations.

SPI 3210.TIE.1 – Distinguish among tools and procedures best suited to conduct a specified scientific inquiry

18. Review tools used in the laboratory
19. If you create a graph, where do you put the dependent variable? The independent?

SPI 3210.1.1 - Organelles – Identify the cellular organelles associated with major cell processes

20. For the below organelles, draw a picture and state the main function of that organelle

- a. mitochondrion
- b. rough endoplasmic reticulum
- c. smooth endoplasmic reticulum
- d. cell wall
- e. ribosome
- f. centriole
- g. lysosome
- h. golgi apparatus
- i. chloroplast
- j. vacuole
- k. central vacuole
- l. nucleus
- m. nucleolus
- n. centrosome
- o. microtubules
- p. peroxisome

SPI 3210.1.2 – Distinguish between prokaryotic and eukaryotic organisms

21. What types of organisms are prokaryotic?
22. What types of organism are eukaryotic?
23. How do prokaryotic and eukaryotic cells differ in terms of DNA?
24. How do prokaryotic and eukaryotic cells differ in terms of structures in the cell?

SPI 3210.1.3 – Distinguish among proteins, carbohydrates, lipids, and nucleic acids

25. What are the monomers of each of the following: proteins, carbohydrates, nucleic acids? Draw and label an example of each of the monomers.
26. What are the polymers of proteins, carbohydrates and nucleic acids? Give, draw and label examples of each.
27. Lipids are not polymers but are macromolecules
 - a. What are the components of a triglyceride?
 - b. What are the components of a phospholipid?
 - c. How do saturated and unsaturated fats differ in structure?
 - d. What do saturated and unsaturated fats look like at room temperature?
 - e. Give examples of saturated and unsaturated fats.
 - f. What type of fat leads to atherosclerosis?

SPI 3210.1.4 – Identify positive tests for carbohydrates, lipids, and proteins

28. Which reagent is used to test for simple sugars? What color is this reagent prior to reaction? What color does it turn in the presence of simple sugars?
29. Which reagent is used to test for complex carbohydrates such as starch (there are two names for this reagent: name them both)? What color is this reagent prior to reaction? What color does it turn in the presence of starches?
30. Which reagent is used to test for lipids? What color is this reagent prior to reaction? What happens in a positive test for lipids?