

Biology 150 - Fall

Introductory Workshop Exercise (Scientific Method)

Part 1. Team Building Ice Breaker.

Welcome to Bil 150 and the Workshop model. Workshops are **PEER-LED** (that's an upper class-undergrad Bio major) group learning process, where problem-solving sessions in introductory biology are attempted by students. The workshops provide an **ACTIVE** learning experience for students. In our weekly one-hour-15-minute sessions, you will work together with your **LEARNING COMMUNITY** (that's your classmates) on challenging problems and data sets. Our hope is that you begin to realize that learning biology is an intensely human activity stuffed with fun, struggle, laughter, and even frustration.

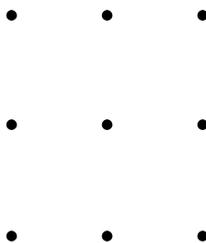
The first ice-breaker exercise is to work in groups of two or three and analyze how you approach problem solving. It is not so important that you solve the problem, as you assess how you approach the problem.

So what's the problem: Using a classical tic-tac-toe box **ARRANGE** the numbers 1,2,3,4,5,6,7,8, and 9, within the boxes, so that any row or column, when totaled equals the same value in all directions.

1	2	3
4	5	6
7	8	9

When you are done come back together as a group and discuss the manner in which you attempted to solve the problem. Was there a dominant leader; did everyone contribute, etc... Assess how effective you functioned as a group. Remember science is often a multi-authored process of cooperative action.

Let's try another problem, this time with everyone contributing in the attempt to solve the problem. Draw 4 straight lines through all 9 dots without raising your pencil from the page.



Part 2. Scientific Method

- A. Each of you should think and then answer - What is the scientific method?
- B. Have one member, each, of your learning community, in turn, arrange the following in the correct sequence: *prediction, hypothesis, observations, induction, deduction, experiment, facts*. (refer to chapter 1 of text book.).
- 1) Each member is to define the term, as they place it in the correct sequential order.
- C. Design a controlled experiment to test any one of the following:
The effect of
- 1) age on UM students GPA's
 - 2) height of political candidates on their political success in U.S.
 - 3) low doses of radiation on human fetal development
 - 4) Malathion spray on aphid populations in Homestead tomatoes
 - 5) saturated fats in the diet on the development of heart disease in adults
- D. Describe (step by step) how one follows the hypothetico-deductive method in one of your daily activities. Be explicit about induction and deduction in your description.
- E. The scientific method involves the construction of knowledge based upon observation, testing, and measurement. Non-science often involves a much different type of knowledge, which is based upon faith and can not be experimentally tested. Identify each statement below as empirically based (E) or non-empirically based (N). Give a brief explanation of your answers.
- 1) ___ Leonardo da Vinci is a better painter than Picasso.
 - 2) ___ Alcohol consumption by pregnant women causes retardation & other birth defects.
 - 3) ___ I know that there is a Supreme Being.
 - 4) ___ The sun rises in the East each morning.
 - 5) ___ Four out of 5 dentist's recommend Crest.
 - 6) ___ Ibuprofen taken before strenuous exercise can reduce muscle ache afterward.
 - 7) ___ People born between Aug 25 and Oct 1 should be concerned about failing the first test in Bil
150, however, people born between Oct 5 and Nov 19 will get an A on test 2.
 - 8) ___ Fetal tissue transplanted into the brains of patients with Parkinson's disease causes
improvement in brain function in these patients.
 - 9) ___ Tissue from fetuses should be harvested to cure Parkinson's patients.
 - 10) ___ Tylenol is a better pain reliever than ibuprofen.