

## Introductory Workshop Exercise and Scientific Method.

Welcome to Bil 150 and the Workshop model. Workshops are **PEER-LED** group learning process, where an upper class-undergrad Bio major serves as a moderator and where problem-solving sessions 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. One of the main purposes of the Workshops is to allow free exchange of knowledge by **having each member of the Workshop Learning Community, in turn, answer one part** of a question. As each student explains a term or gives a definition in their own words, it should allow for free verbal EXCHANGE and promote learning by interaction. Try to insure that everyone in your Learning Community does a question or two and the purpose of the exercise is that they must EXPLAIN THEIR ANSWERS to the rest of the community. Our hope is that you begin to realize that learning biology is an intensely human activity stuffed with fun, struggle, laughter, and even frustration.

Part 1. Team Building in Science.... An ice breaker

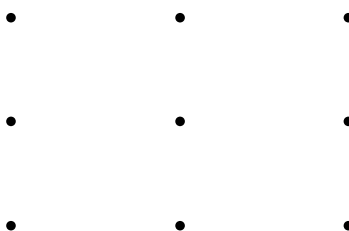
The first ice-breaker exercise is to work in groups of two or three and analyze how you approach problem solving. It is not so important that you solve the problem, as you assess how you approach the problem.

So what's the problem: Using a classical tic-tac-toe box **ARRANGE** the numbers 1,2,3,4,5,6,7,8, 9, 10, 11, 12, 13, 14, 15, & 16 within the boxes, so that any row or column, or diagonal when totaled equals the same value in all directions. Additionally, the four quadrants, the four center squares and even the four corner squares also add up to the same value.

<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>
<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>

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 one will volunteer to answer for the group...  
What is the scientific method?
- B. Have one member, each in turn, arrange the following in the correct sequence: ***prediction, hypothesis, observations, induction, deduction, experiment, facts.***  
(refer to chapter 1 of text book.)  
Each member is to also define the terms, 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 cannot 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.