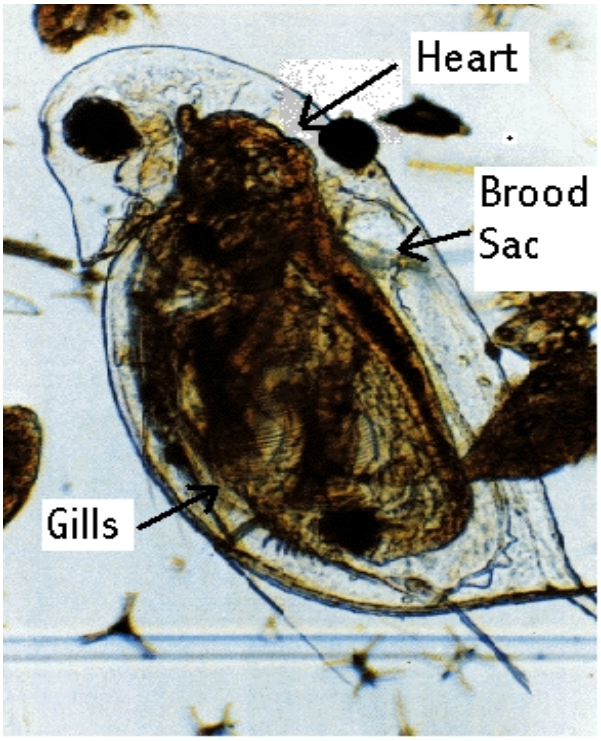
**EFFECTS of CAFFEINE and ALCOHOL on HEART RATE**
**Hypothesis Testing and Data Analysis**

Biology is more than the descriptions of life forms. It is a dynamic field whose aim is to unravel the mysteries of life itself. The **scientific method** is just a formalized version of the way we solve little problems every day, which we often do so quickly and automatically that we are not conscious of the methodology. In brief, the scientific method consists of observing natural phenomenon, predicting effects of changes to the conditions of the phenomenon, testing those predictions, and interpreting the data you collect.




**Procedure**:
1. Capture a living Daphnia from the stock jar and place it in a small drop of water on a microscope slide. **To confine the movement of the Daphnia remove some of the water by placing the edge of a tissue or paper towel to it. Leave enough water on it such that it is covered or it will dry out and die.** Using the microscope at the lowest power, observe the organism closely. Identify the body parts, especially the heart.

2. To get the baseline heart rate count the number of heartbeats for 15 seconds. Multiplying the beats counted in 15 seconds by 4 will give you the number of beats per minute. Record your data on the table on the back.

3. Test the different solutions on the daphnia, starting with the lowest concentration and working your way up on the same type of solution. For example…to test the effect of the alcohol series, place one drop of 2% alcohol on the *Daphnia*. Wait one minute and then count the heartbeats. Remove the solution with a paper towel and add the next solution the 4% alcohol, but be quick as to not let the daphnia dry out and die. Wait one minute and count the heartbeats again, record you data and then use the 6% alcohol solution using the same procedure. Then switch to the caffeine solutions on the same daphnia, starting with the lowest concentration first and working your way up. Record your results on the table on the back.

5. Return it to the recovery tank after you have completed both the alcohol series and the caffeine series. Try to get complete data for at least three daphnia. If they die, start over with a new daphnia.

**Data Collection**

| %Drug | Daphnia #1 beats/min | Daphnia #2 beats/min | Daphnia #3 beats/min | Daphnia #4 beats/min | Average heart rate beats/min |
|---|---|---|---|---|---|
| plain water | | | | | |
| 2% Alcohol | | | | | |
| 4% Alcohol | | | | | |
| 6% Alcohol | | | | | |
| 0.5% Caffeine | | | | | |
| 1.0% Caffeine | | | | | |
| [ ] Caffeine | | | | | |

**Conclusions**

This is the place to say whether or not your hypotheses were accepted or rejected. What could have affected the results that could be changed in the future?