

Name: _____ Period: _____

1.2: EXPERIMENTAL DESIGN

Control versus Experimental Groups

Control Group: The group that is NOT treated or changed using the independent variable.

This is often the "normal" or baseline level.

Experimental Group(s): The group or groups that are treated or changed using the independent variable.

This is compared to the control group to observe any change due to the independent variable.

Example: Hypothesis: If I increase the salt in a fish tank of a salt-water fish, then the fish will live longer because salt is a life-sustaining nutrient.

Independent Variable: amount of salt mixed into tank water; Dependent Variable: how long the fish live.

Control Group: Tank with fish that have the same salt concentration as ocean water (approximately 3%)

Experimental Groups: Tanks with 5% salt water, 10% salt water, and 20% salt water

PRACTICE PROBLEMS:

For each question, determine the independent, dependent, and two control variables, and then determine reasonable control and experimental groups.

1. Does tomato juice make hair grow faster?

Independent Variable: _____

Dependent Variable: _____

Two Controlled Variables: _____

Control Group: _____

Experimental Groups: _____

2. Do wounds heal faster when they are covered by Band-Aids?

Independent Variable: _____

Dependent Variable: _____

Two Controlled Variables: _____

Control Group: _____

Experimental Groups: _____

3. Do tanning beds cause skin cancer?

Independent Variable: _____

Dependent Variable: _____

Two Controlled Variables: _____

Control Group: _____

Experimental Groups: _____

CRITIQUING EXPERIMENTAL DESIGN

Given your knowledge about hypotheses, variables, and control/experimental groups. Read the following scenarios and determine the problem with the experimental design. Each scenario has one particular problem.

1. Squidward loves playing his clarinet and believes it attracts more jellyfish than any other instrument he has played. In order to test his hypothesis, Squidward played a song on his clarinet for a total of 5 minutes and counted the number of jellyfish he saw in his front yard. He played the song a total of three times on his clarinet. He then played another song that was also 5 minutes long on his flute and repeated it three times. And finally, he played his most favorite song on his guitar that was 7 minutes long and repeated it three times. He repeated the experiment using a flute and a guitar. He also recorded the number of jellyfish in his yard when he wasn't playing any music.

a. What is the independent variable?

b. What is the dependent variable?

c. What is the control group?

d. What is/are the experimental group(s)?

e. Is this experiment reliable? If not, how could it be improved?

Number of Jellyfish Per Instrument				
Trial	No Music	Clarinet	Flute	Guitar
1	5	15	5	12
2	3	10	8	18
3	2	12	9	7

2. SpongeBob loves to garden and wants to grow lots of pink flowers for his pal Sandy. He bought a special Flower Power fertilizer to see if it will help plants produce more flowers. He plants two plants of the same size in separate containers in the same amount of potting soil. He finds places in his pineapple hut that will fit the potted plants. One plant is placed on the windowsill and watered every day with fertilized water. The other plant he puts next to his front door outside and waters it every other day with plain water.

a. What is the independent variable?

b. What is the dependent variable?

c. Give at least three controlled variables.

d. What is the control group?

e. What is/are the experimental group(s)?

f. Is this experiment reliable? If not, how could it be improved?

