Statistical Reasoning Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Notes 6.1b: Experiments: Good and Bad Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Day: \_\_\_\_\_\_

Vocabulary:

Statistically Significant –

If we want to conduct and experiment, what steps do we need to take:

4.

**Example 1:** Studying frustration.

A psychologist wants to study the effects of failure and frustration on the relationships among members of a work team. She forms a team of students, brings them to the psychology lab, and had them play a game that requires teamwork. The game is rigged so that they lose regularly. The psychologist observes the students through a one-way window and notes the changes in their behavior.

Does the behavior of the students in the lab tell us much about the behavior of a team in a work environment? Why/Why not?

Subjects:

Treatment:

Environment:

**Example 2:** Center brake lights

Cars sold in the U.S. since 1986 have been required to have a high center brake light in addition to the usual two brake lights at the rear of the vehicle. This safety requirement was justified by a randomized comparative experiment with fleets of rental and business cars. The experiments showed that the 3rd brake light reduced rear-end collisions by 50%. In 1997 the Insurance Institute did another experiment on 3rd break lights and found that only 5% reduced rear-end collisions. What happened?

**Example 3:** Doctors are testing a new diet pill to help female patients lose weight. They selected 350 females of similar height and weight and split them into 3 groups. One group received the new diet pill, the second group received an already poplar diet pill on the market, and the third group received the placebo. The study was conducted over a 6 month period. Females that took the new diet pill showed a 30% reduction in weight loss over the patients that took the on the market pill and a 50% reduction over the patients that took the placebo. Can we expect these same results if this diet pill was available for the general public to buy?

Why or why not?

**Interaction** – when an experiment can have combinations of explanatory variables that explain the response variable.

**Example 4 (two treatment design):** Durability of fabric after repeated washings.

Many things can affect the durability of a fabric. A researcher decides to test the effects of water temperature and type of detergent. Variable A has 3 water temperatures: HOT (145), WARM (100), COLD (50). Variable B is the type of detergent: Regular Tide, Low-phosphate Tide, Ivory Liquid. A treatments consists of washing a piece of fabric 50 times in a regular home washer with a specific combination of water temp and detergent. After 50 washes, the fabric is put through a machine that forces a steel ball through the fabric and records the fabrics resistance to breaking.

1. Create a diagram to describe all the treatments that can take place.