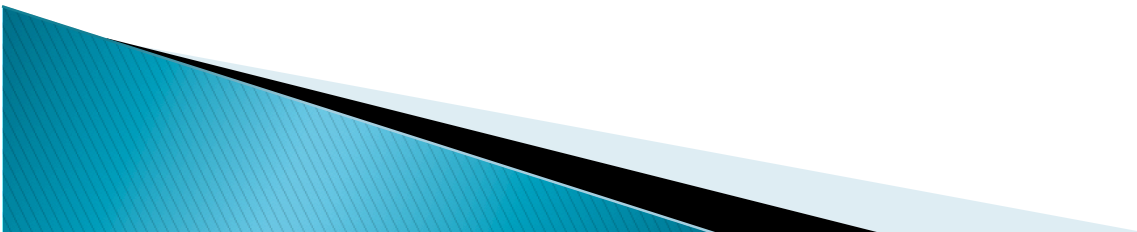


# Do Now (5 min)

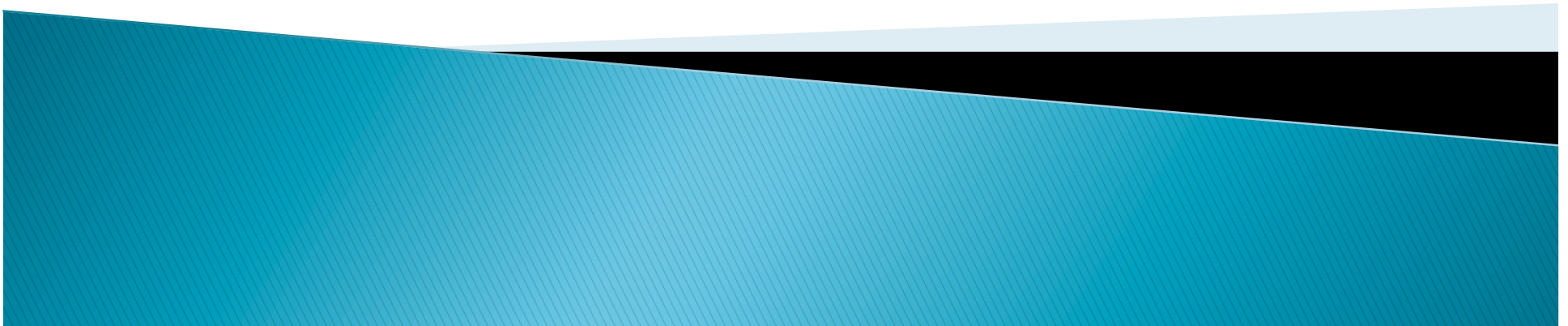
## 12-1-10

- ▶ List the elements of a hypothesis



# More Details on the Scientific Method: Experiment, Data Collection, Data Analysis

12-1-10



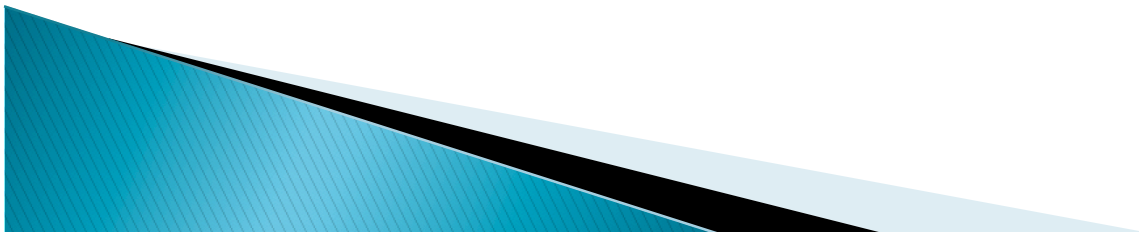
# Two-Day Agenda

12/1/10

1. Do Now (5 min)
2. Objectives (3 min)
3. Sci. Method: Step #3 Experiment (10 min)
4. Sci. Method: #3 Experiment: How to Make an Experiment Fair (5 min)
5. Sci. Method: #3 Experiment: Variables (15 min)
6. Sci. Method: #3 Experiment: Control Group (25 min)

12/2/10

1. Sci. Method: #3 Experiment(20 min)
2. Closing/**HW** (5 min)
3. Exit Slip (5 min)
4. Participation Grades (5 min)



# Objectives (3 min)

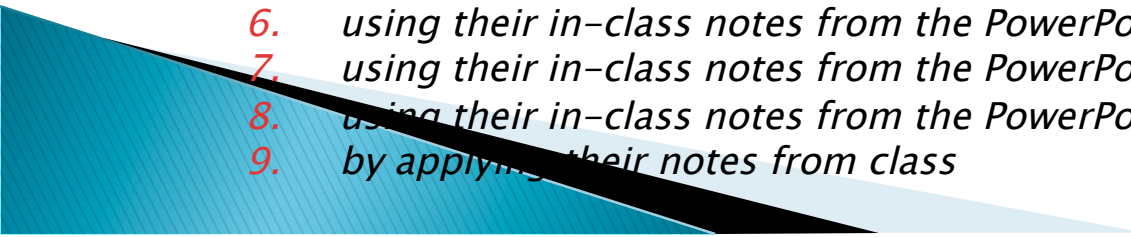
- ▶ Content (The objectives you'll master today)

- ▶ **SWBAT:**

1. *Explain the purpose of an experiment*
2. *List the elements of a good experiment*
3. *Explain how to make a fair experiment Create a scientific question*
4. *Define independent and dependent variable*
5. *Identify independent and dependent variable*
6. *Define control group and experimental group*
7. *Identify the control group*
8. *Explain why it is important to have a control group*
9. *Design an experiment and identify the independent and dependent variables as well as explain which group is the control group and experimental group*

- ▶ Language (How you will master the objectives)

- ▶ **By:**

1. *taking notes on the PowerPoint presentation*
  2. *taking notes on the PowerPoint.*
  3. *discussing the question with a partner and using notes on the PowerPoint*
  4. *using their in-class notes from the PowerPoint and discussing with a partner*
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  7. *using their in-class notes from the PowerPoint and discussing with a partner*
  8. *using their in-class notes from the PowerPoint and discussing with a partner.*
  9. *by applying their notes from class*
- 

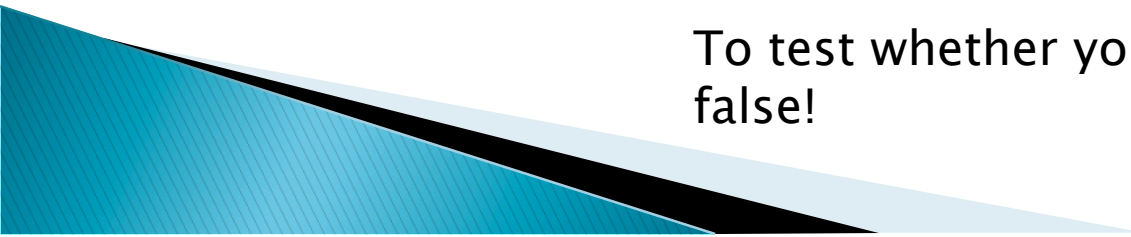
# Sci. Method: Step #3 Experiment (5 min)

Objective: SWBAT: *Explain the purpose of an experiment by taking notes on the PowerPoint presentation.*

- ▶ Step #1: Question (Does weight of an object affect the speed at which it falls?)
- ▶ Step #2: Hypothesis (If I drop a heavy object from a desk, than it will hit the ground faster than a lighter object)
- ▶ Step #3: Experiment

What is the purpose of an experiment?

To test whether your hypothesis was true or false!

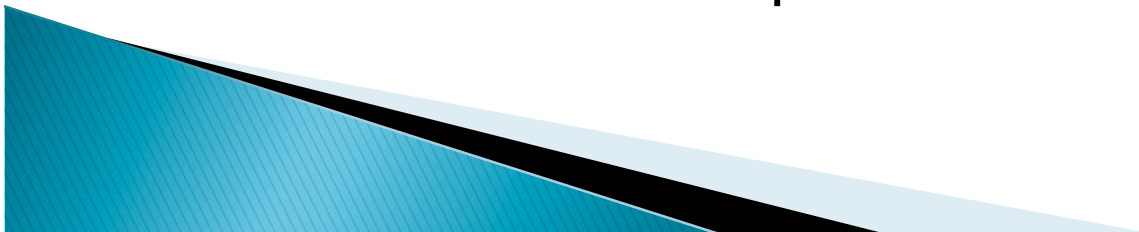


# Sci. Method: Step #3 Experiment (5 min)

Objective: SWBAT: *List the elements of a good experiment by taking notes on the PowerPoint.*

- ▶ A good experiment must:
  - Be a fair test
  - Keep all conditions the same and only change one detail (variable) at a time
  - Be conducted multiple times
  - Have a control group

Therefore a bad experiment would:....?



# Sci. Method: Step #3 Experiment: How to Make an Experiment Fair (5 min)

Objective: SWBAT: *Explain how to make a fair experiment by discussing the question with a partner and using notes on the PowerPoint*

- ▶ We know that a good experiment must be fair by:
  - *Keeping all conditions the same and only changing one detail (variable) at a time*
  - Being conducted multiple times
  - Having a control group

Lets think about our experiment with the heavier and lighter objects...

Hypothesis: *If I drop a heavy object from a desk, than it will hit the ground faster than a lighter object*

When we test this hypothesis, what detail (variable) will the scientist have to change?

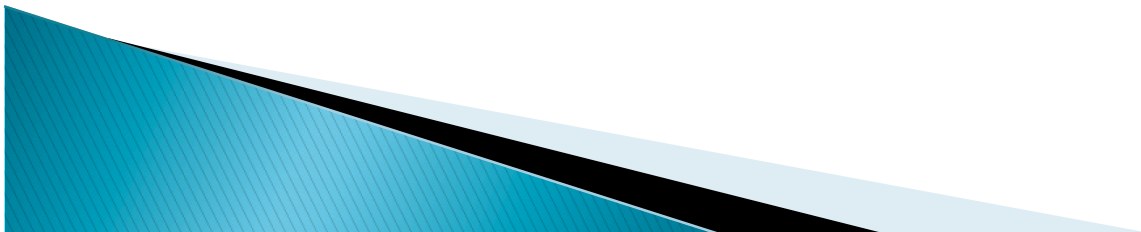




# Sci. Method: Step #3 Experiment: Variables (7 min)

Objective: SWBAT: *Define independent and dependent variable by using their in-class notes from the PowerPoint and discussing with a partner.*

- ▶ There are two types of variables:
  1. Independent Variable: (the detail in an experiment that the scientist changes)
  2. Dependent Variable: (the detail that is changed as a result of the scientists changes)





# Sci. Method: Step #3 Experiment: Variables (8 min)

Objective: SWBAT: *Identify independent and dependent variable by using their in-class notes from the PowerPoint and discussing with a partner.*

- ▶ There are two types of variables:
  1. Independent Variable: (the detail in an experiment that the scientist changes)
  2. Dependent Variable: (the detail that is changed as a result of the scientists changes)

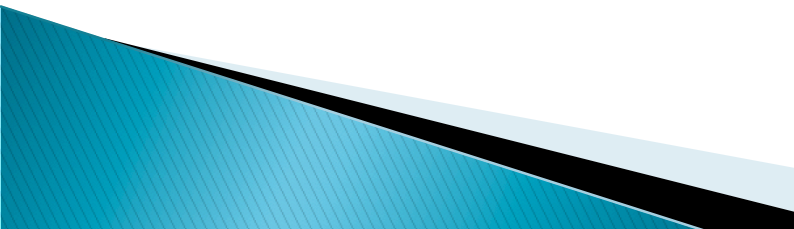
Lets consider the following experiments:

Step #1: Question: Does temperature affect the speed at which sugar dissolves?

Step #2: Hypothesis: If the temperature of a coffee is increased, then the speed at which the sugar dissolves will increase too.

Step #1: Question (Does weight of an object affect the speed at which it falls?)

Step #2: Hypothesis (If I drop a heavy object from a desk, than it will hit the ground faster than a lighter object)



In the above experiments, what are the independent variables and what are the dependent variables?

# Sci. Method: Step #3 Experiment: Control Group (7 min)

Objective: SWBAT: *Define control group and experimental group by using their in-class notes from the PowerPoint and discussing with a partner.*

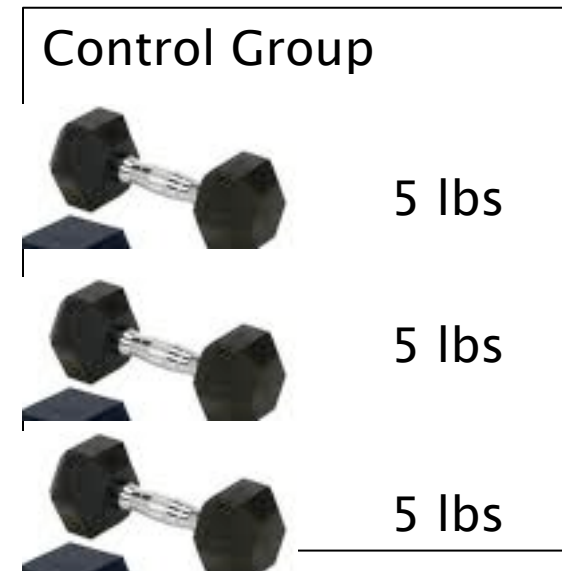
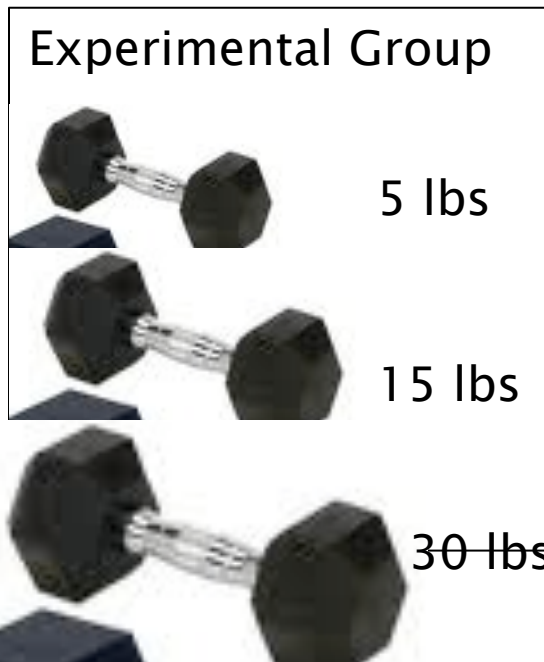
## All experiments have both groups

Experimental Group: (the group that receives the independent variable)

Control Group: (the group that does not receive the independent variable)

Lets think about our experiment with the heavier and lighter objects...

Hypothesis: *If I drop a heavy object from a desk, than it will hit the ground faster than a lighter object*



# Sci. Method: Step #3 Experiment: Control Group (8 min)

Objective: SWBAT: *Identify the control group by using their in-class notes from the PowerPoint and discussing with a partner.*

- ▶ There are two types of variables:
  1. Independent Variable: (the detail in an experiment that the scientist changes)
  2. Dependent Variable: (the detail that is changed as a result of the scientists changes)

Experimental Group: (the group that receives the independent variable)

Control Group: (the group that does not receive the independent variable)

Step #1: Question (Does weight of an object affect the speed at which it falls?)

Step #2: Hypothesis (If I drop a heavy object from a desk, than it will hit the ground faster than a lighter object)

Step #1: Question: Does temperature affect the speed at which sugar dissolves?

Step #2: Hypothesis: If the temperature of a coffee is increased, then the speed at which the sugar dissolves will increase too.

In the above experiments, what would be the control group?

# Sci. Method: Step #3 Experiment: Control Group (3 min)

Objective: SWBAT: *Identify the control group by using their in-class notes from the PowerPoint and discussing with a partner.*

## All experiments have both groups

Experimental Group: (the group that receives the independent variable)

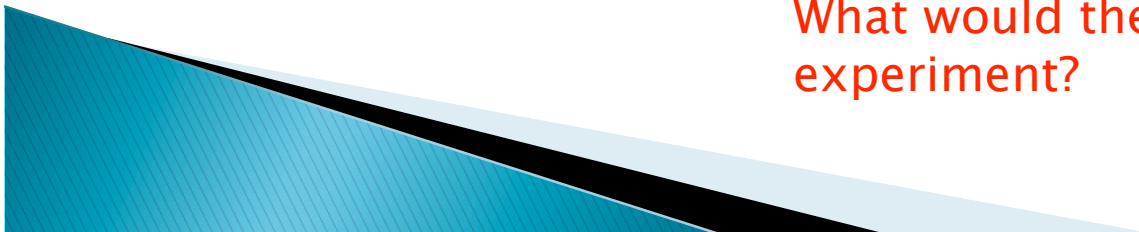
Control Group: (the group that does not receive the independent variable)

Another example:

Step #1: Question: Does Drug-x cure skin cancer?

Step #2: Hypothesis: If I give patients drug-x every day for three months, than they will be free of skin cancer.

What would the control group be in this experiment?



# Sci. Method: Step #3 Experiment: Control Group (7 min)

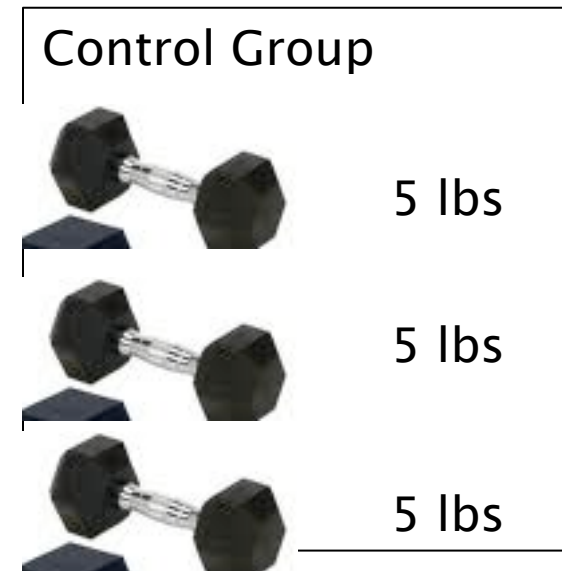
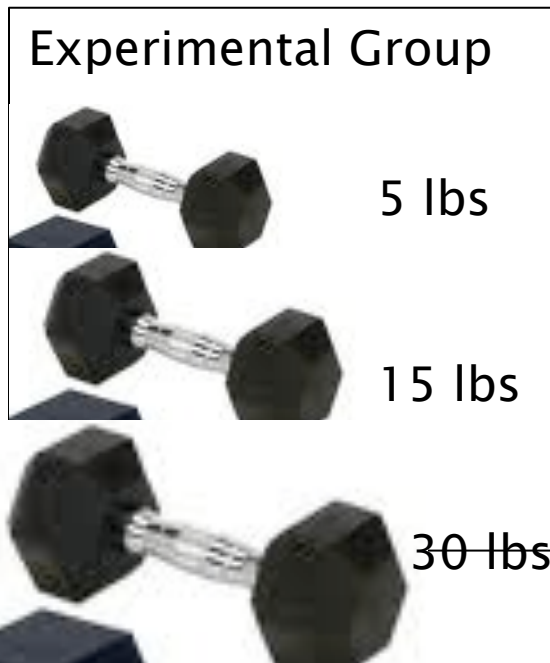
Objective: SWBAT: *Explain why it is important to have a control group by using their in-class notes from the PowerPoint and discussing with a partner.*

## All experiments have both groups

Experimental Group: (the group that receives the independent variable)

Control Group: (the group that does not receive the independent variable)

Why is it important for every experiment to have a control group?



# Sci. Method: Step #3 Experiment(20 min)

Objective: SWBAT: *Design an experiment and identify the independent and dependent variables as well as explain which group is the control group and experimental group by applying their notes from class.*

I have done steps 1 and 2 for you:

Step #1: Question (Does weight of an object affect the speed at which it falls?)

Step #2: Hypothesis (If I drop a heavy object from a desk, than it will hit the ground faster than a lighter object)

**\*Make this chart in your notes, and fill it in based on the above steps 1 and 2**

Experiment Procedures: (Be very detailed)	
	Explanation
Independent Variable	
Dependent Variable	
Control Group	
Experimental Group	



# Closing/**HW** (5 min)

## ► Did you master the following objectives?

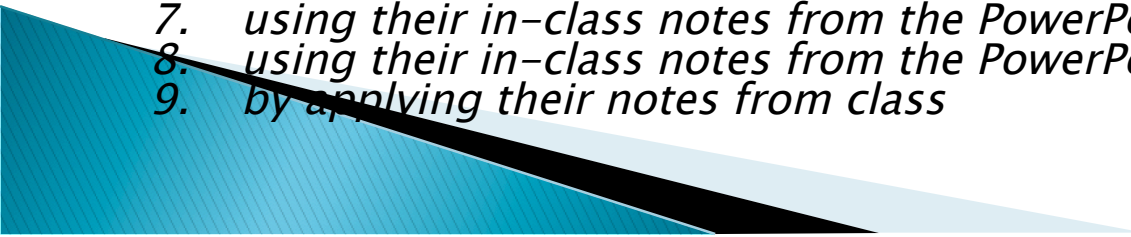
Content (The objectives you'll master today)

SWBAT:

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2. *List the elements of a good experiment*
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Language (How you will master the objectives)

By:

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  8. *using their in-class notes from the PowerPoint and discussing with a partner.*
  9. *by applying their notes from class*
- 



# Exit Slip (5 min)

- ▶ On a separate sheet of paper, write your **NAME, DATE, and BLOCK** at the top. Today is 11-30-10 ☺
- ▶ Then number your paper and write responses to the following questions.
  1. What are the elements of a good experiment?
  2. What is an independent variable?
  3. Why is it important to have a control group?



# Participation Grades (5 min)

- ▶ Each day YOU will decide the grade you deserve...Though, I reserve the right to change these.
- ▶ Your 5-point daily participation grade is based on CLA's core-values:
  - ▶ CLA Students are S.M.A.R.T.
    - ▶ S = Self-Controlled
    - ▶ M = Motivated
    - ▶ A = Accountable
    - ▶ R = Respectful
    - ▶ T = Timely
  - ▶ One point for each core-value
    - ▶ (5 points possible each day)
- ▶ What do you deserve today?

