Notes

#_____ **Hour_____**

Unit 1 : Science in Agriculture

Upon completion of this unit, students will be able to:

1. Define basic terms associated with science;
2. Define the scientific method:
3. List & describe the steps of the scientific method:
4. Identify variables, constants, and controls in an experiment: and
5. Construct, label, and discern different types of graphs

Notes

Cube #1:		
OBSERVATIONS:	**PATTERNS:**	**INFERENCES:**

Notes

Cube #2:		
OBSERVATIONS:	**PATTERNS:**	**INFERENCES:**

Notes

Cube #3:		
OBSERVATIONS:	**PATTERNS:**	**INFERENCES:**
Describe <u>your</u> design	**Describe <u>your</u> design**	**Describe <u>your</u> design**
Cube's Owner_____ **OBSERVATIONS:**	**PATTERNS:**	**INFERENCES:**

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Science in Agriculture

A. Define basic terms associated with science

_____ - is a creative process that _____ and _____.

OBSERVATIONS: _____

PATTERNS:_____

HYPOTHESIS:_____

All areas of science involve posing _____ about nature.

Theory -- _____ patterns.
Example:
Facts -- Data or _____ that can be _____ repeatedly
Example:
Hypothesis -- An _____ guess – a _____ statement
Example:
Law -- _____what happens.
Example:
Superstition -- A _____ that is _____ based on evidence
Example:

B. Define the Scientific Method

C. List & describe the steps of the scientific method

1. **Stating a _____** - something is considered a problem if its solution is not obvious.
   - Solving the problem means finding this _____ information.

2. **_____ information about the problem** -- the more you know about the problem the more _____ you can state the problem and the less time you will waste looking for solutions.
3. **Making a _____-**
   a. _____ a solution and try it.
   b. Look for _____.
   c. Make a _____, or a representation, of what you're working with.
   d. Break the problem _____ into smaller, simpler problems.
4. _____ an experiment
5. Make a _____ - a solid conclusion is related to the hypothesis and based on _____ of a well designed experiment.

Notes

Draw a picture of the scientific method here:

Bubble Gum Lab

Problem: Does chewing effect the mass of the bubble gum?

Hypothesis:

Procedure:

1. Weigh one piece of bubble gum. Record the mass.
2. Chew the bubble gum for 30 seconds. Using the wrapper as a weigh paper, determine the mass of the bubble gum. Record the mass.
3. Repeat step #2 until the bubble gum has been chewed for 5 minutes.
4. Graph the results of your findings.
5. Evaluate your hypothesis to see if it was correct.

Data Collection:

Time	0:00	0:30	1:00	1:30	2:00	2:30	3:00	3:30	4:00	4:30	5:00
Mass											

Conclusion:

1. Was your hypothesis correct? Why or why not?

2. What is the dependent variable in this experiment?

3. What is the independent variable in this experiment?

4. What observations can you make as the chewer of your group chewed their gum?

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List reasons why science is so important to agriculture:

***** ***** ***** *****

D. Identify variables, constants, and controls in an experiment

EXPERIMENTAL DESIGN CONCEPTS

A science experiment is designed so that only _____ variable is being tested at a time.

A _____ is something that is changed to study how this change effects the thing being studied.

By changing only one variable, when you make your conclusion you can be assured that it is only that one variable that is causing the _____.

Variables

- **Independent variable - IV –**the variable that is purposely _____ –what's being tested)
- **Dependent variable (DV)-** the variable that _____ and is _____.

- **Control-**the item being tested with ____ _____–used to compare
- **Constant (C) -**all factors that are _____ _____ _____ during the experiment.

- **Repeated trials** – the _____ of objects/ organisms undergoing treatment for each IV…
  - or the number of _____ the experiment is repeated.

The following scenarios will give you practice in identifying the experimental design components:
SCENARIO ONE: The effect of fertilizer on plants.
DESCRIPTION: John's biology class was studying various ways to recycle materials, including the use of compost as fertilizer. Members of John's class investigates the effectiveness of various recycled materials in promoting plant growth. John and three members of his lab group decided to compare the effect of compost and commercial fertilizer on plant growth. Three flats of bean plants (25 plants per flat) were grown for five days. The plants were then fertilized as follows: Flat A received 10g of commercial fertilizer; Flat B received 10g of aged compost; and Flat C received no fertilizer. The plants received the same amount of sunlight and water each day. At the end of 20 days, the students recorded the height of the plants in centimeters.

IV:				
Treatment:				
Trials:				
DV:				
Constants:				

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SCENARIO TWO: The effectiveness of various metals in preventing rust of iron.

DESCRIPTION: Several weeks after Allen conducted a classroom experiment on the effectiveness of various metals in releasing hydrochloric acid, he read that the gas company was burying sheets of magnesium next to iron pipelines in order to prevent rusting. Allen wondered if other active metals would also be effective in preventing rust. To investigate, he placed each of the following into a separate test containing water: one iron nail; one iron nail wrapped with and aluminum strip; one iron nail wrapped with a magnesium strip; and one iron nail wrapped with a lead strip. He used the same amounts of water from the same source, equal amounts (mass) of the metal wraps, and the same type of iron nails. At the end of five days, he described the amount of rusting either as small, moderate, or large. He also recorded the color of the water.

IV:				
Treatment:				
Trials:				
DV:				
Constants:				

SCENARIO THREE: The effect of perfume on the behavior of bees.

DESCRIPTION: JoAnna read that certain perfume esters would cause bees to leave the hive and act in an agitated fashion. She decided to investigate the response to bees to four different perfumes-designated A, B, C, and D. She placed a saucer containing 25mL of perfume A 10m from a beehive. She then recorded the total number of bees that emerged from the hive during a 15 minute interval and made observations on their behavior. Using a 30 minute interval between tests to allow recovery time for the bees, she then repeated the procedure to test the remaining three samples. Each test was conducted on the same day with similar weather conditions (humidity, temperature, and wind were the same).

IV:				
Treatment:				
Trials:				
DV:				
Constants:				

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E. Construct, label, & discern different types of graphs

Why use graphs & tables in science??

1-

2-

Types of Graphs

A- Line Graphs
- 2 _____
- lots of #'s

Bar Graphs
- Easy to _____results
- Easy to see an average

Pie Charts
- Data usually equals _____%

How to Graph Data

Choose the best type of graph for each of the following sets of data. Sketch a graph representing the data.

1.

Most Common Eye Color	
# with **blue** eyes	
# with **green** eyes	
# with **brown** eyes	
# with **hazel** eyes	

2- Out of 100 students surveyed to find their favorite color, 28 liked purple, 52 liked blue, 20 liked green.

3- Julie conducted an experiment on plant fertilizer. She compared Star fertilizer, Wal-mart fertilizer and Miracle-gro fertilizer. She measured and recorded her results each day, on days 5-10. The following data table shows her results. Make a graph to compare the growth of the three different variables and the control.

Day	Star Fertilizer	Wal-mart Fertilizer	Miracle-Gro Fertilizer	Control
5	5 Inches	5 Inches	5 Inches	4 Inches
6	5 Inches	5 ½ inches	5 ½ inches	4 inches
7	5 ½ inches	6 inches	6 ½ inches	4 inches
8	5 ½ inches	6 ½ inches	7 inches	4 ½ inches
9	6 inches	7 inches	8 inches	4 ½ inches
10	6 ½ inches	7 ½ inches	9 inches	4 ½ inches

Notes

***Use statistics taken in class

4- What kind of animals to people have in this class?

Animals	
No animals	
Domestic Pets	
Some Livestock	
Many Livestock (farms)	

5- What type of plants/crops does this class grow?

Plants/Crops	
No garrden	
Garden	
Some crops	
25+ acres of crops	

6- What career areas do parents work in?

Career Areas	
Manufacturing, Building, Construction	
Production Agriculture	
Sales/Public Relations/Business	
Other	

7- How many Siblings to my classmates have?

Siblings	
0	
1-2	
3-5	
6+	