7

DepED
DEPARTMENT OF EDUCATION

Lesson Exemplar for Science

Quarter 1

Week

5

DepED MATATAG
BAGONG PILIPINAS
ONE NCR STRONGER TOGETHER

Lesson Exemplar for Science Grade 7
Quarter 1: Week 5

This material is intended exclusively for the use of teachers in the implementation of the MATATAG K to 10 Curriculum. It aims to assist in delivering the curriculum content, standards, and lesson competencies.

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MATATAG **K to 10 Curriculum** **Weekly Lesson Log**	School		Grade Level	7
	Name of Teacher		Learning Area	Science
	Teaching Dates and Time		Quarter	1: Week 5

	DAY 1	**DAY 2**	**DAY 3**	**DAY 4**
I. CURRICULUM CONTENT, STANDARDS, AND LESSON COMPETENCIES				
A. *Content Standards*	Learners learn that there are specific processes for planning, conducting, and recording scientific investigations.			
B. *Performance Standards*	By the end of the Quarter, learners recognize that scientists use models to describe the particle model of matter. They use diagrams and illustrations to explain the motion and arrangement of particles during changes of state. They demonstrate an understanding of the role of solute and solvent in solutions and the factors that affect solubility. They demonstrate skills to plan and conduct a scientific investigation making accurate measurements and using standard units.			
C. *Learning Competencies*	The learners should follow the appropriate steps of a scientific investigation which includes: a. aim or problem; b. materials and equipment; c. method or procedures; d. results including data; and, e. conclusions.			
D. *Learning Objectives*	At the end of the lesson, the learners should be able to: 1. define variable; 2. distinguish among controlled, dependent and independent variables; and 3. recognize the importance of controlling and manipulating variables in the testing of hypotheses.	At the end of the lesson, the learners should be able to: 1. differentiate qualitative and quantitative data; 2. organize experimental data and results using table; and 3. express and analyze the formulated and recorded data scientifically.	At the end of the lesson, the learners should be able to: 1. define a conclusion; 2. draw a conclusion based on a given experimental result; and 3. recognize when conclusions are consistent with the aim or problem of the experiment.	At the end of the lesson, the learners should be able to: 1. apply the scientific method in solving a given problem; 2. control and manipulate variables effectively throughout the execution of an experiment; and 3. manifest objectivity in gathering and reporting data during experimentation.

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<table>
<tr><td>E. Instructional Design Framework (IDF)</td><td>ideational, engage, explore, context, collaboration</td><td>ideational, engage, explore, context, collaboration</td><td>ideational, engage, explore, context, collaboration</td><td>ideational, innovative, engage, explore, experience, context, collaboration</td></tr>
<tr><td>F. 21st Century Skills</td><td>visual literacy, critical thinking, teamwork, collaboration</td><td>information literacy, Interactive communication, interpersonal skills, critical thinking</td><td>interactive communication, information literacy, visual literacy, teamwork, interpersonal skills, collaboration</td><td>technology literacy, interactive communication, interpersonal skills, critical thinking, teamwork, collaboration</td></tr>
<tr><td>II. CONTENT</td><td>Planning, following, and recording scientific investigations: Types of Variables</td><td>Planning, Following, and Recording Scientific Investigations: Types of Data; Analyzing and Communicating Data</td><td>Planning, Following, and Recording Scientific Investigations: Drawing Conclusions</td><td>Planning, following, and recording scientific investigations: Making Simple Scientific Investigation</td></tr>
<tr><td colspan="5">III. LEARNING RESOURCES</td></tr>
<tr><td>A. References</td><td>CLMD4A_ScienceG7.pdf Pivot Material</td><td>CLMD4A_ScienceG7.pdf Pilot Material</td><td>CLMD4A_ScienceG7.pdf Pilot Material</td><td>CLMD4A_ScienceG7.pdf Pilot Material</td></tr>
<tr><td>B. Other Learning Resources</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="5">IV. TEACHING AND LEARNING PROCEDURES</td></tr>
<tr><td colspan="5">Before/Pre-Lesson Proper</td></tr>
<tr><td>Activating Prior Knowledge</td><td>Let's Hypothesize!
Let the learners formulate a hypothesis for each problem below.
<table><tr><td>Problem</td><td>Hypothesis</td></tr><tr><td>In which soil will seeds germinate faster, moist soil or dry soil?</td><td>The seeds will germinate faster in moist soil than in dry soil.</td></tr></table></td><td>Complete Me!
Let the learners fill out the table below.
Let them identify the dependent (DV) and independent (IV) variables for each situation.
<table><tr><td>Problem:</td></tr><tr><td>A student wants to study the effect of sunlight on plant growth. In his</td></tr></table></td><td>Sweet and Sour Daisy Experiment
Let the learners review the data provided from a hypothetical experiment; collect and gather the data, then analyze them to answer the questions provided. This can be done by group or by pair.

Experimental design:
You conducted an experiment to test if</td><td>Fact or Bluff
Let the learners identify if the given statement is correct or incorrect. They will answer FACT if the statement is correct and BLUFF if it is incorrect.

1. During the drawing of conclusions, the hypothesis is either rejected or accepted. (Fact)</td></tr>
</table>

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	Does the size of a magnet affect its strength in attracting paper clips?	*The size of a magnet does not affect its strength in attracting paper clips.*	experiment, 12 plants receive normal amounts of sunlight, but half of them are kept under bright sun lamps all night long. After 6 weeks, the plants' heights are measured.	daisies will have a longer vase life when placed in a solution of water with added sugar and vinegar compared to water alone. Three set-ups of vases were prepared, each containing one daisy stem. Set-up A served as the control and contained plain water. Set-up B contained water with added sugar (2 tablespoons of sugar per quart of water), while Set-up C contained water with both sugar and vinegar (2 tablespoons of sugar and 1 tablespoon of vinegar per quart of water). Each daisy stem was cut at an angle and immediately placed into its designated vase filled with the assigned solution. The vases were then placed in a well-lit area away from direct sunlight simulating a typical indoor condition. ***Observation and Data Collection:*** Daily observations were conducted to monitor the	2. Controlled variables include the elements that are being manipulated to test the effect. (Bluff) 3. A hypothesis is formulated to provide an answer to the problem. (Bluff) 4. Experimentation is a process of testing the hypothesis. (Fact) 5. Dependent variables are measurable, independent variables are not. (Bluff)
	Does the type of light (natural or artificial) affect plant growth?	*The type of light does not affect plant growth.*	Controlled variables: Independent Variable Dependent variable *Sample Answers:* *Controlled variable:* *Type of plants* *Normal amounts of sunlight during the day* *Duration of the experiment (six weeks)* *Possibly the amount of water and soil type (if they are kept constant, though not explicitly mentioned)*		

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		Independent variable: *Exposure to bright sun lamps during the night (plants either receive additional light at night or do not)* *Dependent variable:* *Height of the plants after six weeks*	vase life and condition of the daisies for a duration of 10 days. The start time was recorded when the daisies were initially placed in the vases. The following data were collected and recorded: Vase life: The number of days until the first signs of wilting or petal loss were observed. Appearance: Changes in appearance, including color, petal firmness, and overall freshness. ***Data Collected:*** Set-up A (Water - Control): The daisy started to show signs of wilting on day 4 and is fully wilted on day 6 Set-up B (Water + Sugar): The daisy started to show signs of wilting on day 5 and is fully wilted at day 7 Set-up C (Water + Sugar + Vinegar): The daisy started to show signs of wilting on day 8 and is fully wilted on day 10.	

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			GROUP 1- IDENTIFICATION OF THE PROBLEM AND VARIABLES 1. What is the purpose of conducting this experiment? 2. What is the independent variable in this experiment? 3. What is the dependent variable in this experiment? 4. What are the controlled variables? **GROUP 2 – DATA GATHERING AND PRESENTATION** Present the data gathered in tabular form. **GROUP 3 – DATA ANALYSIS** 1. Based on the data, how is the vase life of daisies compared in groups A, B, and C? 2. Did the experiment provide evidence to support or contradict the	

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			hypothesis that adding sugar and vinegar prolongs the vase life of daisies? Why do you say so? *Sample Answers:* *Group 1. Identification of Problem and Variables* *1. The purpose of this experiment is to determine whether adding sugar and vinegar to water can extend the vase life of daisies compared to water alone.* *2. The independent variable in this experiment is the type of solution in which the daisies are placed:* *Group 1: Plain water (control)* *Group 2: Water with added sugar* *Group 3: Water with added sugar and vinegar* *3. The dependent variable is the vase life of the daisies, measured by* ● *the number of days until the first signs of*	

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wilting or petal loss are observed, and
- *the number of days until the daisies are fully wilted.*

4. The controlled variables are:
- *the type of flower (daisy)*
- *the cutting of stems at an angle*
- *the immediate placement of the stems into their designated vases*
- *the amount of water in each vase*
- *the well-lit area for placement, away from direct sunlight and drafts*
- *the indoor conditions to simulate a typical environment*

Group 2: Data Gathering

Data Gathered:

Group	*Day of first wilting*	*Day fully wilted*
1 (water)	*Day 4*	*Day 6*
2 (water + sugar)	*Day 5*	*Day 7*
3 (water + sugar +vinegar)	*Day 8*	*Day 10*

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			Group 3: Data Analysis *1. Group C (Water + Sugar + Vinegar) had the longest vase life, followed by Group B (Water + Sugar), and Group A (Control) had the shortest vase life.* *2. The experiment provides evidence to support the hypothesis that adding sugar and vinegar prolongs the vase life of daisies.* *Reasoning:* *The daisies in Group C (Water + Sugar + Vinegar) showed the first signs of wilting on Day 8 and were fully wilted by Day 10, which is the longest vase life among the three groups.* *The daisies in Group B (Water + Sugar) also had a longer vase life compared to the control group, showing first signs of wilting on Day 5 and being fully wilted by Day 7.* *In contrast, the daisies in Group A (Control) showed the first signs of wilting on Day 4 and were fully wilted by Day 6, indicating the shortest vase life.*	

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			This progression indicates that both the addition of sugar alone and the combination of sugar and vinegar helped to extend the vase life of the daisies compared to water alone, with the combination of sugar and vinegar having the most significant effect.	
Lesson Purpose/Intention	Present the following lesson objectives to the learners. ● define variable; ● distinguish among controlled, dependent, and independent variables; and ● recognize the importance of controlling and manipulating variables in the testing the hypothesis.	Present the following lesson objectives to the learners: ● differentiate qualitative from quantitative data; ● organize experimental data and results using table; and ● express and analyze formulated and recorded data scientifically.	Present the lesson objectives to the learners. ● define a conclusion; ● draw a conclusion based on a given experimental result; and ● recognize when conclusions are consistent with the aim or problem of the experiment.	Present the lesson objectives to the learners. ● apply the scientific method in solving a given problem; ● conduct a simple scientific investigation; and manifest objectivity in gathering and reporting data during experimentation.
Lesson Language Practice	**Match Me!** Match the type of the variable with its description: **I. Types of variables:** 1. controlled 2. dependent 3. independent **II. Description** A. a variable that is controlled, or changed based on the experiment; it is also	**Jumbled Letters** The learners will arrange the jumbled letters. They will read each definition/description in order to arrive at the correct answer. A D T A – (**DATA**) refers to information such as facts and numbers used to analyze something. O E G A R I N Z – (**ORGANIZE**) - to make	**Four Pics One Word** Let the learners identify the word that is connected to the four pictures presented in each number. Let them provide sample meaning of these words.	**Word Pool** Let the students identify the word being defined by choosing the correct term from the word pool below. A. constant B. objective C. procedure D. accurate

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	referred to as the manipulated variable B. a variable that is not changed throughout an experiment because its unchanging state allows a better understanding of the relationship between the other variables being tested C. a variable resulting in the effect of the manipulated variable; also referred to as the responding variable *Answers:* *1. B* *2. C* *3. A*	separate parts into one united whole A L N AZ Y E – (**ANALYZE**) - to study or determine the nature and relationship of the parts of something by analysis. U Q A I L A I T V T E – (**QUALITATIVE**) - are descriptive data and involve characteristics that cannot usually be counted. UQANAITVTEAT (**QUANTITATIVE**) are data obtained by counting or measuring	1.  Image source: canva.com T D A A (**DATA**) 2.  Image source: canva.com E N I D E C E V **EVIDENCE**)	1. not influenced by personal feelings or opinions 2. correct in all details; exact 3. set of instructions 4. remains the same; kept unchanged *Answers:* *1. B* *2. D* *3. C* *4. A*

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			3.  Image source: canva.com N O V S B T R A O E I (**OBSERVATION**) 4.  Image source: canva.com M X T E N P I E R E (**EXPERIMENT**)	

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<table>
<tr><th colspan="5">During/Lesson Proper</th></tr>
<tr>
<td>Reading the Key Idea/ Stem</td>
<td>Let the learners read the passage below silently. Afterwards, the teacher will provide guide questions to help the students better understand the passage.

Variable Analysis
Katrina wanted to see how different amounts of light affect plant growth. She prepared three set-ups and labeled them A, B, and C. She used the same type of plant and soil for each set-up and made sure to water them all the same every day with the same amount of water and at the same time of the day. She then placed set-up A under direct sunlight, set-up B in a shady place, and set-up C in a darkened room. Every five days, Katrina checked on the plants to see how tall they grew, how many leaves they had, and if they looked healthy. She wanted to see if the plants grew differently because of the different amounts of light they received.</td>
<td>Let the learners read the passage below about organizing and analyzing data.

Gathering and Analyzing Data

Katrina, after designing an experiment investigating how different amounts of light affect the growth of a mung bean plant, observed the growth of the plants in three set ups.

She recorded the initial status of the plants.
<table>
<tr><th>Set-up</th><th>No of leaves</th><th>Height (cm)</th><th>Leaf condition</th></tr>
<tr><td>A</td><td>9</td><td>17</td><td>Leaves are green.</td></tr>
<tr><td>B</td><td>9</td><td>17</td><td>Leaves are green.</td></tr>
<tr><td>C</td><td>9</td><td>17</td><td>Leaves are green.</td></tr>
</table>
After 5 days, these are the sets of data she gathered.
<table>
<tr><th>Set-up</th><th>No of leaves</th><th>Height (cm)</th><th>Leaf condition</th></tr>
<tr><td>A</td><td>9</td><td>17</td><td>Leaves are green, leaf shoots are evident.</td></tr>
<tr><td>B</td><td>8</td><td>17</td><td>Some leaves fell.</td></tr>
<tr><td>C</td><td>8</td><td>17</td><td>Some leaves are turning</td></tr>
</table>
</td>
<td>Let the learners read aloud the material below:

CONCLUSION OR CONFUSION: A Tale of Troubleshooting a Silent Radio
Suppose that you have a portable radio with headphones. One day you turn the radio on, but you don’t hear any sound from your favorite station. You try other stations and still get no sound. You think that the batteries must be dead, so you put in new ones. Still, there is no sound. You replace your headphones with ones from your sister’s radio. Your favorite music is back! You conclude that there was something wrong with your headphones.

In everyday language, the word “conclusion” means an explanation or interpretation of an observation or a statement. In science, the word “conclusion” usually</td>
<td>Let the learners read the given situation and apply the scientific method in answering the problem

Maria is a grade 7 student like you. She is curious if the temperature of water will affect the solubility of instant coffee granules. She hypothesized that the temperature of water does not affect solubility. Your task is to help her conduct a simple experiment to test her hypothesis.</td>
</tr>
</table>

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	Facilitate a discussion using the guide questions below: Q1. What is the hypothesis *of* this experiment? Q2. What are the controlled variables *in this experiment*? Q3. What is the independent or manipulated variable in this experiment? Q4. What is the dependent variable in *this* experiment? *Sample Answers:* • *Hypothesis: The amount of light a plant receives will influence its height, the number of leaves, and overall health.* • *Controlled variable: type of plant, type and amount of soil, amount of water, frequency of watering, time of day the plants are watered* • *Independent variable: amount of light each set up receives* • *Dependent variable: growth of plant in terms of height,*	<table><tr><td></td><td></td><td></td><td>yellow, some fell.</td></tr></table> After 10 days, these are the sets of data she gathered. <table><tr><td>Set-up</td><td>No of leaves</td><td>Height (cm)</td><td>Leaf condition</td></tr><tr><td>A</td><td>11</td><td>18</td><td>Leaves are green, and some leaf shoots are evident.</td></tr><tr><td>B</td><td>7</td><td>17</td><td>Some leaves turned yellow and fell.</td></tr><tr><td>C</td><td>4</td><td>17</td><td>Most of its leaves turned yellow and fell.</td></tr></table> In this experiment, Katrina gathered two types of data, namely quantitative data and qualitative data. Quantitative data are numbers obtained by counting or measuring. Qualitative data are descriptive and involve characteristics that cannot usually be counted. Scientists choose appropriate tools for collecting and analyzing data. Scientists organize their data in different ways, such as using tables, charts and graphs.	has a more limited meaning. Drawing a conclusion means making a statement summing up what you have learned from an experiment. The conclusion of an experiment is usually related to the hypothesis. You may recall that a hypothesis is an "If... then..." prediction made about the outcome of an experiment. After you have carried out the procedure, made and recorded observations, and interpreted the data, you can finally determine whether your experiment showed your hypothesis to be true or false. The teacher will facilitate the discussion by asking: Q1. What does the word “conclusion” mean in everyday language? Q2. What is its scientific meaning? Q3. How is a conclusion related to a hypothesis?	

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	number of leaves, and general appearance.	Facilitate a discussion using the following guide questions: Q1. Which among the data gathered by Katrina are quantitative? Which ones are qualitative? Q2. How did Katrina gather quantitative data? How about the qualitative data? Q3. How did Katrina present her data? Q4. How does organizing data into graphs and charts help in analyzing them? *Sample Answers* *1. The quantitative data that Katrina gathered are the number of leaves and height of the mung bean plant, while the qualitative one she gathered is leaf condition.* *2. Katrina gathered quantitative data by counting the leaves and by measuring the height of the plant. She gathered qualitative data by describing the changes in*	*Sample Answers:* *1. In everyday language, the word "conclusion" means an explanation or interpretation of an observation or a statement.* *2. In science, conclusion is the summary of what we have learned from the experiment.* *3. In formulating a conclusion, we usually go back to our hypothesis and check whether the results of the experiment support the hypothesis. We either reject or accept the hypothesis during the drawing of conclusion.*	

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<table>
<tr>
<td></td>
<td></td>
<td>the condition of the leaves (color, leaves fell off).

3. Katrina presented her data using a table.

4. Organizing data into graphs and charts helps in analyzing data by turning numbers into visual pictures. This makes it easier to see patterns, trends, and relationships in the data. Moreover, you can quickly compare different sets of data.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Developing Understanding of the Key Idea/ Stem</td>
<td>Variables Sorting
Allow the learners to work in small groups to identify the controlled, independent, and dependent variables in each of the following situations
.
<table>
<tr><th>SITUATION</th><th>VARIABLES</th></tr>
<tr><td>Source: creative commons
 
A study was done to find if different tire treads affect the braking distance of a car.</td><td></td></tr>
</table></td>
<td>Think-Pair-Share
Task 1. Let the learners categorize the provided statements into either qualitative or quantitative and place them in the designated columns.

The cup has a mass of 454 grams.

The temperature outside is 25°C.

It is warm outside.

The tree is 30 feet tall.

The building has 25 stories.

The building is taller than the tree.</td>
<td>Think-Pair-Share
Let the learners find a partner, read the selection below and collaboratively answer the provided guide questions.

Sunny Summer Days
Suppose Alfred and Sarah each hypothesize about the summer temperatures where they live.

Example1: Alfred writes, “If I measure the temperature on sunny summer days in this location, then the warmest air temperatures will occur between 11 A.M. and 1 P.M.”</td>
<td>Dissolving Coffee
Let the learners conduct the guided investigation and answer the guide questions found in Activity 4.1 of Worksheet Week 5.</td>
</tr>
</table>

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Source: creative commons

The time it takes to run a mile depends on the person's running speed.

Source: creative commons

The higher the temperature of the air in the oven, the faster a cake will bake.

Source: canva.com

A grade 7 student conducts an

The sidewalk is long.

The sidewalk is 100 meters long.

The race was over quickly.
The race was over in 10 minutes.

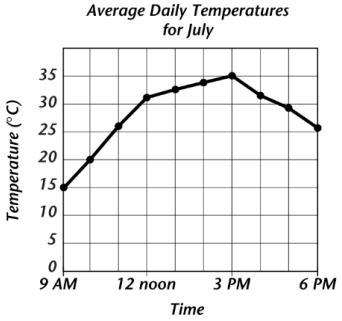
Qualitative	Quantitative

Answers:
Qualitative:
It is warm outside.
The building is taller than the tree.
The sidewalk is long.
The race was over quickly.

Quantitative:
The cup has a mass of 454 grams
The temperature outside is 25°C.

Example 2: Sarah writes, "If the day is sunny, then the hottest time of the day will be about 3 o'clock in the afternoon."

Then, they test their hypotheses by measuring the outdoor temperature several times a day for July. They average data and graph the data as shown below:



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	experiment to investigate how the length of a pendulum affects the time it takes for one full swing. He wants to determine if longer or shorter pendulum lengths result in a faster swing time.		*The building has 25 stories.* *The sidewalk is 100 meters long.* *The race was over in 10 minutes.* **Task 2.** Make a table to organize and analyze data given in the situation below: Maggie read that some plants grow better if the soil is acidic. She can't believe that a plant can grow when exposed to acid. Maggie decides to test if the plants will grow better when acid is added to the soil. She puts potting soil in two planting containers and transplants two of her geraniums of the same size into the pots. She puts the pots in the same location so that they both get the same sunlight each day and are at the same temperature. She makes sure they get the same amount of water. However, Maggie puts a tablespoon of vinegar in the water she gives to one of the plants. She measures the growth of the plants every week for five weeks and records the results in data: (1st week – The height of plants with		

Sample Answers:

1. Controlled Variables:
the type of car used in the test
the speed at which the car is traveling before the brakes are applied
the road surface and its condition (e.g., dry, wet, asphalt, concrete)
the brake system and condition of the car

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	the environmental conditions (e.g., temperature, weather) the driver or method used to apply the brakes (if manually done) *Independent Variable: the type of tread being tested.* *Dependent variable: braking distance of the car* *2. Controlled Variables: the distance being run (one mile) the terrain or track where the running takes place (e.g., a standard running track, flat surface) environmental conditions (e.g., weather, temperature) the runner's preparation (e.g., warm-up routine, running attire)* *Independent variable: person's running speed* *Dependent variable: the time it takes to run a mile* *3. Controlled variables: The type and amount of cake*	vinegar is 10.0 cm while without vinegar is 10.0 cm; 2nd week - with vinegar 12.4 cm. without vinegar 11.5 cm.; 3rd week with vinegar – 14.8 cm, without vinegar – 13.0 cm; 4th week 18.0 cm, without vinegar 15.7 cm; 5th week with vinegar – 21.4 cm. without vinegar is 17.8 cm.) 1.State Maggie's hypothesis. 2. Identify the controlled, dependent, and independent variables. 3. Use the table below to organize the data gathered by Maggie. **Week Number** / **Height of plant growth in cm.** (**with vinegar (cm)**, **without vinegar (cm)**)		

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	batter *The size and type of the baking pan* *The initial temperature of the batter before baking* *The position of the cake in the oven* *The oven itself (ensuring the same oven is used for all tests)* *Humidity levels in the oven* *Independent Variable: the temperature of air in the oven* *Dependent Variable: the time it* *takes for the cake to bake* *4. Controlled variables;* *the mass of the pendulum bob.* *the angle from which the pendulum is released.* *the environment (e.g., air resistance, room temperature).* *Independent Variable: the length of the pendulum* *Dependent Variable: the time it* *takes for one full swing*	*Answers:* *1. Hypothesis: Plants will grow better when acid (vinegar) is added to the soil.* *2. Controlled variables:* *Type of plants (geraniums)* *Size of the plants at the start* *type of soil (potting soil)* *location of the pots (same sunlight and temperature)* *amount of water (same for both plants)* *duration of the experiment (five weeks)* *3. Independent variable: addition of vinegar to the water (one plant receives water with vinegar, the other receives plain water)* *4. Dependent variable: growth of the plants (measured by height every week for five weeks)*		

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		<table><tr><th rowspan="2">Week Number</th><th colspan="2">Height of plant growth in cm.</th></tr><tr><th>with vinegar (cm)</th><th>without vinegar (cm)</th></tr><tr><td>1</td><td>10</td><td>10</td></tr><tr><td>2</td><td>12.4</td><td>11.5</td></tr><tr><td>3</td><td>14.8</td><td>13.0</td></tr><tr><td>4</td><td>18.0</td><td>15.7</td></tr><tr><td>5</td><td>21.4</td><td>17.8</td></tr></table>		
Deepening Understanding of the Key Idea/ Stem	**Output Presentation** Each group will present their outputs in the class. The teacher may provide supplemental discussion by asking the following questions. Q1. What distinguishes a dependent from an independent variable? Q2. Why do you think it is important for us to identify the dependent and independent variables, especially when designing an experiment? *Sample Answers:* *1. A dependent variable is the variable that is being tested and measured in an experiment. It is called*	**Output Presentation** Let the learners present their output and facilitate the answering of these guide questions Q1. How did you organize the collected data of Maggie? How does this help in analyzing the data? Q2. From the collected data of Maggie, what is the relationship between plant growth and the presence or absence of vinegar among plants. *Sample Answers:* *1. The collected data of Maggie is organized in a table format, showing the height of the plants with and without vinegar over the five-week period. The table*	**Guide Questions:** Facilitate a discussion of the answers to the provided guide questions. Q1. Based on the graph, whose hypothesis is supported by the result of the investigation? Explain your answer. Q2. Why is it important for Alfred and Sarah to measure the outdoor temperature several times a day for the entire month of July, rather than just once or twice, to test their hypotheses? Q3. What conclusion can be drawn from the result of their experiment?	**Guide Questions:** Let the learners present their work and facilitate the discussion of these guide questions: Q1. What are the controlled, independent, and dependent variables in this experiment? Q2. Why do we need to make sure that the controlled variables are kept constant or the same in all the set-ups? Q3. In which set up did the coffee granules dissolve the fastest? Q4. Which variable affects the solubility of the coffee granules in water?

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	"dependent" because its value depends on changes in the independent variable. The dependent variable is the outcome that is observed and recorded during the experiment. *An independent variable, on the other hand, is the variable that is changed or manipulated by the researcher to observe its effect on the dependent variable. It is called "independent" because it is not affected by other variables in the experiment; instead, it influences the dependent variable.* *2. Identifying the dependent and independent variables:* *a. helps in formulating a precise hypothesis. It provides clarity on what is being tested and measured, ensuring the experiment is focused and directed towards a specific goal.* *b. aids in designing the experiment properly. It allows one conducting the experiment to control other*	*allows for easy comparison of the growth rates between the two plants over the course of the experiment.* *2. The plant with vinegar added to its water grew taller than the plant without vinegar, suggesting that the addition of vinegar (and thereby increased soil acidity) had a positive effect on the growth of the rose plants in this experiment.*	Q4. How can you recognize when conclusions are consistent with given experimental results? Q5. What will a researcher do if his/her hypothesis is not supported by the result of the experiment conducted? *Sample Answers:* *1. Based on the graph, Sarah's hypothesis is supported by the result of the investigation. The highest average temperature measured is 35°C taken at 3pm.* *2. It is important for Sarah and Alfred to measure the outdoor temperature several times a day for the entire month of July, rather than just once or twice, to* test their hypotheses because: ● *temperatures can vary significantly throughout the day and from day to day. Multiple measurements provide a comprehensive dataset that accounts for this variability.*	Q5. Suggest ways to improve the investigation conducted for more accurate results. *Sample Answers:* *1. The controlled variables are:* ● *Amount of water (200mL in each beaker)* ● *Amount of instant coffee granules (1/8 teaspoon in each beaker)* ● *size and type of beaker/jar* ● *the height from which coffee granules are dropped* ● *no stirring in any setup* *The independent variable is the temperature of the water (cold, tap, hot).* *The dependent variable is the time it takes for the coffee granules to completely dissolve.* *2. We need to keep the controlled variables constant to ensure that any differences in the dissolution time of the coffee granules are solely due to the independent*

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	variables that might influence the results (controlled variables), ensuring that any observed effects are due to changes in the independent variable. *c. is essential in analyzing the data correctly. It helps in understanding the relationship between the variables, making it easier to draw valid conclusions from the experiment.*		• *frequent measurements improve the accuracy of the data by reducing the impact of any unusual or unexpected results.* *3. Based on the graph, it could be concluded that on sunny summer days, the peak temperature tends to occur at 3 P.M.* *4. Conclusions are consistent with experimental results when:* • *the data collected supports the predictions made in the hypothesis.* • *the observed patterns or trends align with the expected outcomes outlined in the hypothesis.* • *there is a clear and logical correlation between the experimental results and the hypothesis.* 5. *If the hypothesis is not supported by the results of the experiment, scientists usually repeat the experiment. If the*	*variable (temperature of the water). This eliminates other potential factors that could affect the results, providing a fair and accurate test of the hypothesis.* *3. The coffee granules will dissolve the fastest in the hot water setup (Beaker C).* *4. The temperature of the water affects the solubility of the coffee granules.* *5. These are some of the ways to improve the investigation conducted for more accurate results:* • *Use a thermometer to ensure the exact temperatures of the water (e.g., 5°C for cold, 25°C for tap, 80°C for hot).* • *Repeat the experiment multiple times and take the average dissolution time for more accurate results.* • *Use a digital stopwatch for precise measurement of the dissolution time.* • *Ensure that all beakers are made of the same*

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			repeated experiments yield the same results, this indicates that the hypothesis is likely incorrect and is rejected **Helpful Tips for Drawing Conclusions** ◆ Refer to the hypothesis for your experiment. ◆ Review the observations in your experiment. Analyze the data, completing whatever calculations or graphs will help you identify trends or patterns in your results. ◆Write a statement summing up what your results show. ◆ Determine whether your data supports your hypothesis or suggests that it is false. ◆ Consider whether you might plan other experiments to support your conclusion or compare your work with that done by other researchers.	*material and have the same shape to avoid variations in heat retention.* ● *Conduct the experiment in a controlled environment to minimize external factors such as air currents or room temperature variations.* ● *Ensure that the coffee granules are of uniform size and quality for each trial.*

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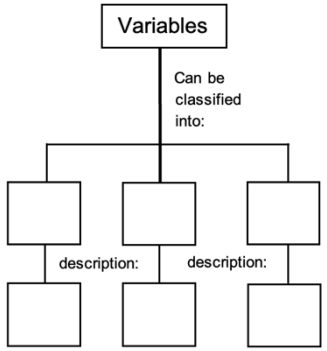
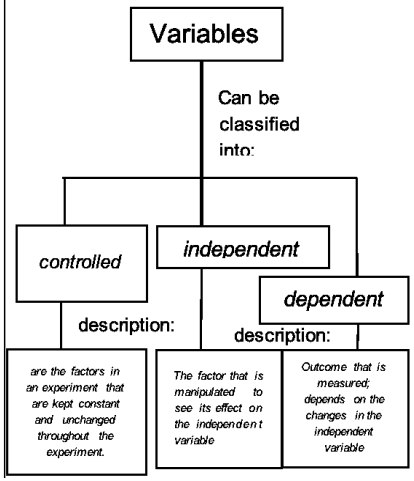
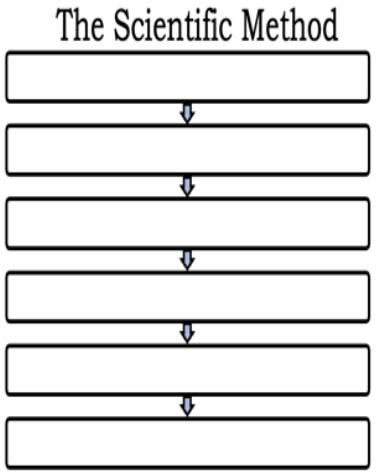
After/Post-Lesson Proper				
Making Generalizations and Abstractions	**Let's Summarize!** Let the learners summarize the lesson by completing the concept map below:  Answers:  	**Let's Summarize!** The learners will be asked to read out and answer the following questions: Q1. What is the difference between qualitative data and quantitative data? Q2. Give examples of qualitative data and quantitative data. Q3. How can we organize and analyze data in an experiment?	**Fill Me Up!** Let the learners summarize the lesson by completing the scientific method flowchart by choosing the correct word/s from the word bank below: **WORD BANK** Formulate a hypothesis Gather data. Define the problem. Analyze the data. Draw a conclusion. Test the hypothesis through experimentation  	

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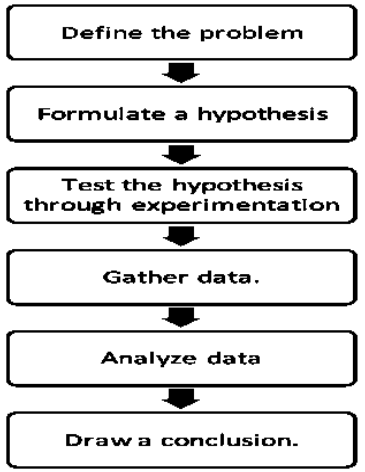
			Answers: *The Scientific Method* 	
Evaluating Learning	**Check Your Understanding** Consider this scenario:  Maria wants to study the effect of different soil types on plant growth. She plants the same type of seeds in three pots with different types of soil (clay, sand, and	**Check Your Understanding** The learners will be instructed to read, analyze the given situation, and answer the following guide questions below. Jenny loves to play Sipa. She has been practicing her Sipa routines, perfecting her kicks and tricks. She tries out for the Sipa team, but the coach won't let her join until she can show him a range of her scores from her practice sessions and must reach an average score of at least 9.0. The scores Jenny obtained are the following:	**Complete the Table** The learners will be instructed to read and analyze the situation below and then provide the required information in the table provided. George conducted an experiment to investigate the effect of different types of fertilizer on the growth of tomato plants. He used two types of fertilizer: Fertilizer A (an organic fertilizer) and Fertilizer B (an inorganic fertilizer). ***Hypothesis:*** Tomato plants treated with Fertilizer A, an	Use the scoring rubric found In Activity 4.1 of Worksheet Week 5 in evaluating how well the learners conducted the simple investigation and accomplished the activity sheet.

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<table>
<tr>
<td></td>
<td>loam). She waters each pot with the same amount of water and measures the height of the plants after four weeks.

Which is/are the:
A. controlled variables
B. independent variable
C. dependent variable

Sample Answers:
Controlled variables:
type of seeds
number of seeds
amount of water given to each pot
duration of the experiment (four weeks)

Independent variable:
Type of soil (clay, sand, and loam)

Dependent variable:
Height of the plants after four weeks</td>
<td>Score 1 – 9.2; Score 2 – 8.4; Score 3 – 8.9; Score 4 – 9.5

1. Make a table to present Jenny’s scores.

2. Which of Jenny’s scores is the highest/ lowest?

3. What is Jenny’s average score?

Answers:
1. Jenny’s Scores
<table>
<tr><td>Score 1</td><td>9.2</td></tr>
<tr><td>Score 2</td><td>8.4</td></tr>
<tr><td>Score 3</td><td>8.9</td></tr>
<tr><td>Score 4</td><td>9.5</td></tr>
</table>
2. Score 4 (9.5) is the highest score Jenny achieved.
Score 2 (8.4) is the lowest score Jenny achieved.

3. Jenny’s average score is 9.0.
Ave = (sum of scores) / Number of scores</td>
<td>organic fertilizer, will grow taller than those treated with Fertilizer B, an inorganic fertilizer.

Results:
<table>
<tr><td>Set-Ups</td><td>Average tomato plant height</td></tr>
<tr><td>With Fertilizer A</td><td>40cm</td></tr>
<tr><td>With Fertilizer B</td><td>35cm</td></tr>
</table>
<table>
<tr><td>Is George’s hypothesis supported by the evidences/ data he gathered?</td><td>Conclusion</td></tr>
<tr><td>Yes</td><td>The hypothesis is accepted. Tomato plants treated with Fertilizer A (an organic fertilizer) grow taller than those treated with Fertilizer B (an inorganic fertilizer)</td></tr>
</table></td>
<td></td>
</tr>
<tr><td>Additional Activities for Application or Remediation (if applicable)</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Remarks</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Reflection</td><td></td><td></td><td></td><td></td></tr>
</table>

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