



Republic of the Philippines  
**SULTAN KUDARAT STATE UNIVERSITY**  
ACCESS Campus, EJC Montilla, Tacurong City  
**COLLEGE OF TEACHER EDUCATION**



# **PRACTICE TEACHING PORTFOLIO (Physical Science)**

**Grade 12 – HUMSS**  
Second Semester, Academic Year 2023-2024

**SKSU-LABORATORY HIGH SCHOOL**  
Cooperating School

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Pre-Service Teacher

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# **Chapter 1**

## **NEWTON'S LAWS OF MOTION**





7 E'S SEMI-DETAILED LESSON PLAN FOR GRADE 12 HUMSS PHYSICAL SCIENCE  
Newton's Laws of Motion

<b>I. OBJECTIVES</b>	At the end of the lesson the student can: a. discuss the three Newton's laws of motion; b. differentiate Newton's laws of motion's application and experiment; and c. perform a role play showing three of Newton's laws of motion in real-life scenarios.
<b>II. SUBJECT MATTER</b>	Newton's Laws of Motion
<b>III. LEARNING RESOURCES</b>	
<b>A. References</b>	
1. Teacher's Guide Pages	
2. Learner's Materials Pages	<a href="https://online-learning-college.com/knowledge-hub/gcses/gcse-physics-help/forces-movement/">https://online-learning-college.com/knowledge-hub/gcses/gcse-physics-help/forces-movement/</a> <a href="https://www.studocu.com/ph/document/central-philippines-state-university/bsed-science/law-of-motion-lesson-plan/57333592">https://www.studocu.com/ph/document/central-philippines-state-university/bsed-science/law-of-motion-lesson-plan/57333592</a> <a href="https://www.youtube.com/watch?v=JGO_zDWmkvk">https://www.youtube.com/watch?v=JGO_zDWmkvk</a>
3. Textbook pages	
4. Additional Materials	<a href="https://www.tes.com/teaching-resource/role-play-assessment-rubric-11931659">https://www.tes.com/teaching-resource/role-play-assessment-rubric-11931659</a>
<b>B. Other Learning Resources</b>	
Skills	Analyzing, Observing, Listening, Communicating, Problem-Solving, and Making Interference
Science Concept	<b>Newton's Laws of Motion</b> <b>1. Newton's First Law: Inertia</b> An object at rest remains at rest, and an object in motion remains in motion at constant speed and in a straight line unless acted on by an unbalanced force. (If $\Sigma F = 0$ , then $v = \text{constant}$ ) <b>2. Newton's Second Law: Acceleration</b> The force acting on an object is equal to the mass of that object times its acceleration. ( $\Sigma F = ma$ ) <b>3. Newton's Third Law: Action-Reaction</b> Whenever one object exerts a force on a second object, the second object exerts an equal and opposite force on the first. ( $F_{1-2} = -F_{2-1}$ )
<b>IV. PROCEDURES</b>	
Preliminary Activities	<ul style="list-style-type: none"> <li>• Prayer</li> <li>• Greetings</li> <li>• Checking of attendance</li> <li>• Classroom rules</li> </ul>
A. ELICIT	<b>"CHARADES"</b> The class will select players to act out the word or phrase and others will guess it. A player can say pass if it finds difficult. They can use gestures, facial expressions, and body movements to convey the meaning. No verbal communication is allowed. A 3-minute time will be given.

	<p><b>“KWL CHART”</b></p> <p>The students are tasked to answer the KWL chart on ½ crosswise sheet of paper by filling in each column about <b>MOTION</b> (K – What I KNOW, W – What I WANT to know, and L – What I have LEARNED). Afterward, student volunteers will present their answers in front of the class.</p>
<p>B. ENGAGE</p>	<p><b>“LABORATORY WALK”</b></p> <p>The students will be divided into three groups, each group is assigned to their respective stations prepared by the teacher. There will be three (3) lab stations inside the classroom, each group will go to the next station after a 5-minute timer and is expected to do an experiment and answer the prepared questions on their worksheets. Furthermore, each group will present their takeaways and observations about the experiment. The lab procedures and guide questions are available on their worksheets. Materials are provided by the teacher.</p> <p style="text-align: center;">Newton's Laws of Motion Worksheet Grade 12 – HUMSS “LABORATORY WALK”</p> <p>Name: _____ Group: _____ Score: _____</p> <p><b>General Instruction:</b> Start at a lab station according to your group number then move from station to station until you have completed a total of three lab stations. A 5-minute time is given to each group by lab stations. Perform the lab procedures as directed.</p> <p><b>STATION 1:</b> Lab Procedures:  <ol style="list-style-type: none"> <li>Place the note card on top of the cup.</li> <li>Place the coin on the card, above the cup.</li> <li>Predict what happens when the card is rapidly removed.</li> <li>Pull the card out as rapidly as you can.</li> <li>Observe the motion of the coin.</li> </ol> </p> <p>Guide Questions:  <ol style="list-style-type: none"> <li>What law of motion by Newton is portrayed? Explain.</li> </ol> </p> <p><b>STATION 2:</b> Lab Procedures:  <ol style="list-style-type: none"> <li>At the same time, drop the flat piece of paper &amp; the wadded-up piece of paper onto the table.</li> <li>Observe the motion of the flat piece of paper and the wadded-up piece of paper.</li> </ol> </p> <p>Guide Questions:  <ol style="list-style-type: none"> <li>What law of motion by Newton is portrayed? Explain.</li> </ol> </p> <p><b>STATION 3:</b> Lab Procedures:  <ol style="list-style-type: none"> <li>Start with each of your feet on a separate sheet of paper.</li> <li>Start to run.</li> <li>Observe the paper.</li> </ol> </p> <p>Guide Questions:  <ol style="list-style-type: none"> <li>What law of motion by Newton is portrayed? Explain.</li> </ol> </p> <p style="text-align: right; font-size: small;">PHYSICAL SCIENCE   PREPARED BY: JUNE NELLI S. SARMIENTO</p>
<p>C. EXPLORE</p>	<p><b>“VIDEO ANALYSIS”</b></p> <p>Watch the video presentation about Newton's 3 Laws, with a bicycle - Joshua Manley (TED Ed), and the teacher will ask the students about their takeaways.</p> <p>Video Presentation link: <a href="https://www.youtube.com/watch?v=JGO_zDWmkvk">https://www.youtube.com/watch?v=JGO_zDWmkvk</a></p> <p>Guide Questions:  <ol style="list-style-type: none"> <li>What are the three Newton’s Laws of Motion?</li> <li>How would you overcome inertia?</li> <li>Why is it important to understand Newton’s Laws of Motion in our everyday life?</li> </ol> </p>
<p>D. EXPLAIN</p>	<p><b>“SHARE SOMETHING”</b></p> <p>The students will share their insights and understanding of the subject matter and the teacher will discuss further the topic.</p> <p>Newton's Law of Motion</p> <ul style="list-style-type: none"> <li>compiled by Sir Isaac Newton in his work <i>Philosophiae Naturalis Principia Mathematica</i> published on July 5, 1687.</li> <li></li> </ul> <p>Newton's First Law of Motion (Law of Inertia)  → states that if the net force of on an object is zero, an object at rest will remain at rest, and an object in motion remains in motion in a straight line with constant velocity, unless acted upon by an external force. (If <math>\Sigma F = 0</math>, then <math>v = \text{constant}</math>)</p> <ul style="list-style-type: none"> <li>Inertia is the tendency of the body to resist a change in state of motion.</li> </ul>

- Mass is a measure of the inertia of a body. (the greater the mass, the greater the inertia)
- Weight is the force of gravity on a body:  $F_g=mg$ .

Newton's Second Law of Motion (Law of Acceleration)

→ that the acceleration of a body is directly proportional to the net force acting on it, and inversely proportional to its mass: ( $\Sigma F=ma$ )

(Force is an action capable of giving rise to acceleration)

Let's Try This!

1. An object with a mass of 2000 g accelerates 8.3 m/s<sup>2</sup> when an unknown force is applied to it. What is the amount of the force?

Newton's Third Law of Motion (Law of Action-Reaction)

→ states that whenever one body exerts a force on a second body, the second body always exerts a force on the first body with equal magnitude but opposite in direction: ( $F_{1-2}=-F_{2-1}$ )

Applying Newton's third law: Objects at rest

An apple sits at rest on a table, in equilibrium. What forces act on the apple?

What is the reaction force to each of the forces acting on the apple? What are the action-reaction pairs?

E. ELABORATE

“ROLE PLAY”

In the same group during the laboratory walk, the students will perform a role play showing three of Newton's laws of motion in real-life scenarios. They will be given a 3-minute preparation and a 5-minute presentation including their explanation. The rubric will be presented before the presentation.

ROLE PLAY RUBRIC				
	A	B	C	D
Criteria	Excellent (4)	Good (3)	Adequate (2)	Needs Improvement (1)
Working well in a team	Always willing and focused during assigned tasks and presentation	Usually willing and focused during assigned tasks and presentation	Sometimes willing and focused during assigned tasks and presentation	Rarely willing and focused during assigned tasks and presentation
Collaboration	Always willing and focused during assigned tasks and presentation	Usually willing and focused during assigned tasks and presentation	Sometimes willing and focused during assigned tasks and presentation	Rarely willing and focused during assigned tasks and presentation
Speaking with conviction	Convincing communication of character's role, feelings, and motives	Competent communication of character's role, feelings, and motives	Adequate communication of character's role, feelings, and motives	Limited communication of character's role, feelings, and motives
Presentation of Perspective	Convincing communication of character's role, feelings, and motives	Competent communication of character's role, feelings, and motives	Adequate communication of character's role, feelings, and motives	Limited communication of character's role, feelings, and motives
Use of non-verbal cues	An impressive variety of non-verbal cues were used in an exemplary way	A good variety (3 or more) non-verbal cues were used in a competent way	An acceptable variety of non-verbal cues were used in an adequate way	Limited variety of non-verbal cues were used in a developing way
Use of non-verbal cues	An impressive variety of non-verbal cues were used in an exemplary way	A good variety (3 or more) non-verbal cues were used in a competent way	An acceptable variety of non-verbal cues were used in an adequate way	Limited variety of non-verbal cues were used in a developing way
Grade	12	11	8	5
A Grade:	12			
B Grade:	9 to 11			
C Grade:	6 to 8			
D Grade:	1 to 5			
Grade	GRADE: <input type="text"/>		TOTAL SCORE: <input type="text"/>	

F. EVALUATE

“STORY MAKING”

Directions: Create a story that differentiates Newton's laws of motion. Underline words or phrases for the Law of Inertia, encircle for the Law of Acceleration, and box for the Law of Action-Reaction. The rubric is presented below.

Features	Excellent 20	Above Average 15	Average 10	Below Average 5
Quality of Writing	Piece was written in an extraordinary style and voice  Very informative and well-organized	Piece was written in an interesting style and voice  Somewhat informative and organized	Piece had little style or voice  Gives some new information but poorly organized	Piece had no style or voice  Gives no new information and very poorly organized
Grammar, Usage & Mechanics	Virtually no spelling, punctuation or grammatical errors	Few spelling and punctuation errors, minor grammatical errors	A number of spelling, punctuation or grammatical errors	So many spelling, punctuation and grammatical errors that it interferes with the meaning

G. EXTEND

“MY NEWTON'S LIFE”

Directions: List down the application of Newton's laws of motion in your 1-day experience, as much as you can.

	Law of Inertia:  Law of Acceleration:  Law of Action-Reaction:
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Prepared by:

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Pre-Service Teacher

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Science Resource Teacher



## NARRATIVE REPORT

According to William Arthur Ward, “Teaching is more than imparting knowledge; it is inspiring change. Learning is more than absorbing facts; it is acquiring understanding.” A teaching practice indeed embodies inspiration and understanding in the four corners of the classroom. Thus, a science pre-service teacher of SKSU-Laboratory High School made explicit what truly science meaningfully contributes to the growth and intelligence of the Grade 12 – HUMSS. It aimed to appreciate science activities and experiments using 7E’s semi-detailed lesson plan for Grade 12-HUMSS Physical Science.

On the warm afternoon of Thursday, February 21, 2024, at exactly 2:30 was the start of an exciting and interesting class demonstration. The class started with a prayer volunteered by Mark Angelo O. Dolar and facilitated by the science pre-service teacher – June Neil J. Sarmiento. He greeted the class with a warm smile and modulated voice to build trust and authority. He also asked the class mayor who was absent for the day and he applauded the class for having perfect attendance. Moreover, the teacher reminded the students that the classroom and outside rules are not only for that specific class demonstration but within 360 hours of duty of the science pre-service teacher.

The first part of the prepared lesson plan was the ELICIT, this was relevant to reviewing the prior knowledge and presenting the new lesson through an activity called Charades, wherein the class chose players to act out the phrase given by the teacher and others guessed it. A 3-minute time was given and they accumulated a total of 13 points/correct phrases. The said activity provided the eagerness for the student’s active learning and tested the knowledge of the students. The teacher presented a KWL chart that was filled out by the students individually about Motion. This includes (What I KNOW, What I WANT to know, and What I have LEARNED after the class discussion). Consequently, the teacher presented the subject matter which was Newton’s Laws of Motion.

Thereafter, the teacher presented the second part of the lesson plan which was the ENGAGE. The title of the activity was the Laboratory Walk, wherein the students were divided into three groups, and each group was assigned to their respective lab stations inside the classroom. The teacher gave the worksheets by group and each student was expected to answer individually. The teacher provided materials. Their tasks were to complete the three lab stations and each group went to the next station after a 5-minute time. Since science learning requires inquiry-based and **culture-based learning**, the teacher allowed the students to explore and come up with observations and conclusions with the experiments and real-life applications. Lastly, the teacher collected the worksheets and provided an assignment to think of a situation wherein the three of Newton’s Laws of Motion were executed.

In 21<sup>st</sup>-century education, it is empirical to use technological tools in the educative process as students are very keen on learning when technology is integrated into the lesson. Hence, the EXPLORE

part highlights the use of video presentation that would cultivate students' interest in learning Newton's laws of motion because as part of understanding physics, there is a need for the student to watch and see some examples that would help them to grasp the concept. In the EXPLAIN, the teacher facilitated the discussion with the use of a PowerPoint presentation so that students could visualize the concept as well as the words that were described in the lesson. As part of the application of the lesson, the students are tasked to show the real-life application of Newton's laws of motion through a role-play presentation. This was guided by the rubrics and discussed before the presentation for the student's performance task. Moreover, EVALUATE emphasizes the arts of creating stories as Humanities and Social Science (HUMSS) students' strengths. With their unique outputs, they were able to create relevant stories with the use of Newton's laws of motion concepts. As part of their homework (EXTEND), the teacher gave them a task to list down all the examples of Newton's laws of motion that they did on a specific day.

As the lesson drew to a close, a sense of accomplishment filled the air. Students emerged from the expedition transformed, their minds expanded by the discoveries they had made and the challenges they had overcome. With newfound confidence and curiosity, they departed the classroom, eager to continue their journey of exploration in the world beyond.

## Documentation





## Student's Output & Activities

YouTube Link:

- <https://youtu.be/yAqV2k8rI0k>
- [https://www.youtube.com/watch?v=JGO\\_zDWmkvk](https://www.youtube.com/watch?v=JGO_zDWmkvk)

Gerald C. Sales		12 - HUMSS	02/21/24
Topic: Motion			
KWL Chart			
Know	Want	Learned	
<ul style="list-style-type: none"> <li>• Motion is when two things collide with each other, it can be a person holding an apple and more.</li> </ul>	<ul style="list-style-type: none"> <li>• I want to learn how motion works.</li> <li>• I want to know where does motion begin.</li> <li>• I am curious about who discovers motion, and how did he/she discovered it.</li> </ul>	<ul style="list-style-type: none"> <li>• I have learned that there are three laws of motion by Newton: the Law of Inertia, Acceleration, and action-reaction. That in every reaction or situation, these three laws react.</li> </ul>	

### Newton's Laws of Motion Worksheet Grade 12 - HUMSS "LABORATORY WALK"

Name: Gerald C. Sales Group: 2 Score: 90/90  
**General Instruction:** Start at a lab station according to your group number then move from station to station until you have completed a total of three lab stations. A 5-minute time is given to each group by lab stations. Perform the lab procedures as directed.

#### STATION 1:

Lab Procedures:

1. Place the note card on top of the cup.
2. Place the coin on the card, above the cup.
3. Predict what happens when the card is rapidly removed.
4. Pull the card out as rapidly as you can.
5. Observe the motion of the coin.

Guide Questions:

1. What law of motion by Newton is portrayed? Explain.

The law of motion by Newton that is being portrayed in the experiment is Inertia because an object at rest will remain at rest unless acted upon by a new motion. So, when a new motion is applied when you pull the paper the coin at the top of it remains.

#### STATION 2:

Lab Procedures:

1. At the same time, drop the flat piece of paper & the wadded-up piece of paper onto the table.
2. Observe the motion of the flat piece of paper and the wadded-up piece of paper.

Guide Questions:

1. What law of motion by Newton is portrayed? Explain.

~~Acceleration~~ because they have different masses and the two objects do not get the same air resistance. So when we drop them at the same time and at the same height the crumpled paper dropped faster than a piece of paper.

#### STATION 3:

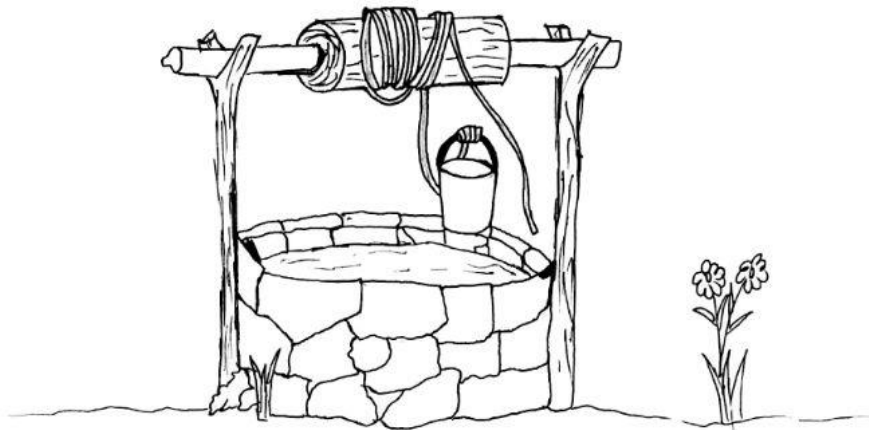
Lab Procedures:

1. Start with each of your feet on a separate sheet of paper.
2. Start to run.
3. Observe the paper.

Guide Questions:

1. What law of motion by Newton is portrayed? Explain.

Interaction, because in every action there is an equal and opposite reaction. When Marc, one of our groupmates started running, his feet touched the paper, and the friction started reacting by destroying some of them.



In a scorching hot weather on the high mountains of Italy, where there are one family living on top. They consist of a father, mother, with three children; 2 boys that are elders, and the youngest is a girl. They are living happily and contented with their daily lifestyle. As a routine, the three children went to the water well to fetch water for their supply.

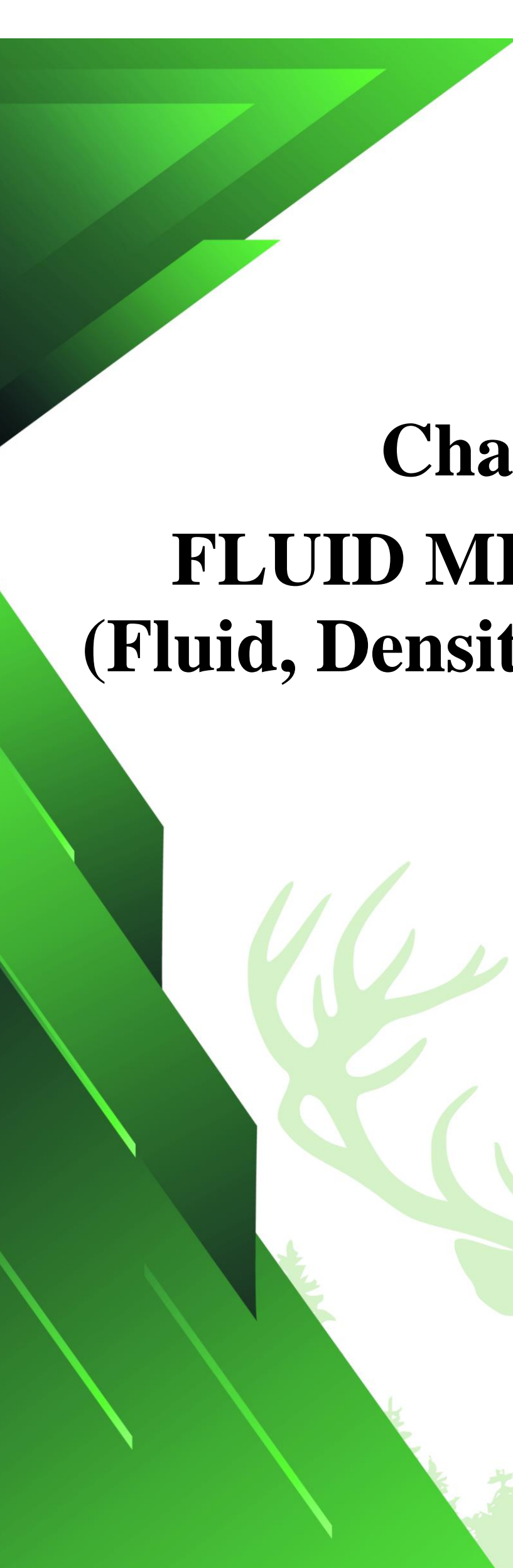
Then, as they arrived at the location, the eldest one grab the rope and throw the pail down the well as he was going to pull it up with the use of the rope tied on it. Since the pail was a bit too large, it became too heavy to pull because of its mass. In order to successfully pull the water up, the other two siblings gave assistance to their elder, for them to create more force in pulling the water up. As they unite and put their strengths in pulling that rope, they victoriously pulled the water together.

In the situation accordance with how they overcome in fetching the water down the well, we can observe the three Newton's laws of motion. First was the law of inertia, the object at rest was the rope, if the eldest didn't touch it, it will just remain at rest. Well, the eldest used the rope as a tool to pull the water up the well.

And then second, the law of acceleration, we can observe this Newton's law at the moment that the other two siblings helped the eldest one in pulling the rope. There in, the force became greater and stronger, so as the acceleration of the water pail also became greater. It was certainly the opposite, when the eldest was the only one pulling into the rope. Considering that the force or strength applied was lesser, hence, the acceleration of the pail was also lesser or longer compared the time that they wait as one.

Third, the law of action-reaction, we can see this law of motion as the rope was being pulled by the three children and the rope was circulating while they are pulling the pail, that's what we call the action. And as for the reaction from that activity, it was obviously noticeable that as they pulled the rope together, the water pail came up as a result. That just justified that, every action has an opposite or equal reaction. Thus, we can see how all of Isaac Newton's laws of motion can be applied or observed in a simple situation in our lives.

Excellent!  
• The story was remarkable!  
• comprehensively explained.  
• Creatively done!



**Chapter 2**  
**FLUID MECHANICS**  
**(Fluid, Density, & Pressure)**

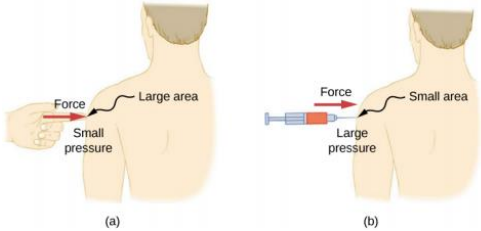




7 E'S SEMI-DETAILED LESSON PLAN FOR GRADE 12 HUMSS PHYSICAL SCIENCE  
Fluid Mechanics (Fluid, Density, & Pressure)

<b>I. OBJECTIVES</b>	At the end of the lesson the student can: a. describe the characteristics of fluid and density; b. explain the relationship between pressure and force; and c. demonstrate the concept of density through experimentation.
<b>II. SUBJECT MATTER</b>	Fluid Mechanics (Fluid, Density, & Pressure)
<b>III. LEARNING RESOURCES</b>	
<b>A. References</b>	
1. Teacher's Guide Pages	
2. Learner's Materials Pages	<a href="https://phys.libretexts.org/Bookshelves/University_Physics/University_Physics_(OpenStax)/Book%3A_University_Physics_I_-_Mechanics_Sound_Oscillations_and_Waves_(OpenStax)/14%3A_Fluid_Mechanics">https://phys.libretexts.org/Bookshelves/University_Physics/University_Physics_(OpenStax)/Book%3A_University_Physics_I_-_Mechanics_Sound_Oscillations_and_Waves_(OpenStax)/14%3A_Fluid_Mechanics</a> <a href="https://www.teacherspayteachers.com/Product/Stacking-Rainbow-Liquids-Science-Experiment-3070227?st=eb4fe51bf233a8cb1946265dbec3fa3c">https://www.teacherspayteachers.com/Product/Stacking-Rainbow-Liquids-Science-Experiment-3070227?st=eb4fe51bf233a8cb1946265dbec3fa3c</a>
3. Textbook pages	
4. Additional Materials	<a href="https://www.youtube.com/watch?v=XZC-D7WnLDM">https://www.youtube.com/watch?v=XZC-D7WnLDM</a> <a href="https://www.youtube.com/watch?v=zILpKzPz84Q&amp;list=PLmdFyQYShrjeBWFnHcLXkS9oVwy_mhsnx">https://www.youtube.com/watch?v=zILpKzPz84Q&amp;list=PLmdFyQYShrjeBWFnHcLXkS9oVwy_mhsnx</a>
<b>B. Other Learning Resources</b>	
Skills	Analyzing, Observing, Listening, Communicating, Problem-Solving, and Making Inference
Science Concept	Liquids and gases are considered to be <b>fluids</b> because they yield to shearing forces, whereas solids resist them. The average <b>density</b> of a substance or object is defined as its mass per unit volume. <b>Pressure</b> (p) is defined as the normal force <b>F</b> per unit area <b>A</b> over which the force is applied
<b>IV. PROCEDURES</b>	
Preliminary Activities	<ul style="list-style-type: none"> <li>• Prayer</li> <li>• Greetings</li> <li>• Checking of attendance</li> <li>• Classroom rules</li> </ul>
A. ELICIT	<b>“BOTTLE FLIP CHALLENGE”</b> The students will be divided into two groups, each group will be given a 5-minute bottle flip challenge simultaneously. Students are expected to play a game by flipping the water bottle in a standing position. After a player lands the water bottle successfully, he/she will choose a piece of paper and paste it on their respective group's table chart to classify the given picture or words whether it is a SOLID, LIQUID, or GAS.
B. ENGAGE	<b>“WATCH ME”</b> The students will watch a digital story created by the teacher about fluid and density that presents concepts, examples, and applications. The teacher will then ask the students about their takeaways.  YouTube presentation: <a href="https://www.youtube.com/watch?v=XZC-D7WnLDM">https://www.youtube.com/watch?v=XZC-D7WnLDM</a>

	<p>Guide Questions:</p> <ol style="list-style-type: none"> <li>1. What are the characteristics of the phases of matter at a molecular or atomic level?</li> <li>2. What is fluid and density?</li> <li>3. What are some examples of density that you can observe?</li> <li>4. How does density relate to our everyday life?</li> </ol>
C. EXPLORE	<p><b>“POINT TO POINT”</b></p> <p>Each student is required to have a pencil or ballpen with them. The teacher will present the procedure of the simple observation about <b>PRESSURE</b> and <b>FORCE</b>. The students will then share what are their observations on the activity.</p> <p>Procedures (Individual):</p> <ol style="list-style-type: none"> <li>1. Find a pencil or ballpen.</li> <li>2. Open the cap of the ballpen, if necessary.</li> <li>3. Hold it using your both point fingers.</li> <li>4. One is on the tip of the pencil or ballpen and the end of it.</li> <li>5. Exert the same force with your point fingers.</li> <li>6. Take a picture.</li> </ol> <p>Guide Questions:</p> <ol style="list-style-type: none"> <li>1. What have you observed in the activity?</li> <li>2. What science concepts are involved in the activity?</li> <li>3. What is the relationship between pressure and force?</li> <li>4. How does the force affect your both point fingers?</li> </ol>
D. EXPLAIN	<p><b>“VIDEO ANALYSIS”</b></p> <p>The teacher will present a video about the relationship between pressure and force. Students will be asked about their takeaways.</p> <p>YouTube presentation:  <a href="https://www.youtube.com/watch?v=zILpKzPz84Q&amp;list=PLmdFyQYShrjeBWFnHcLXkS9oVwy_mhsnx">https://www.youtube.com/watch?v=zILpKzPz84Q&amp;list=PLmdFyQYShrjeBWFnHcLXkS9oVwy_mhsnx</a></p> <p>Guide Questions:</p> <ol style="list-style-type: none"> <li>1. What is pressure and force?</li> <li>2. What would you infer between pressure and force?</li> <li>3. Why is it important to learn the concepts of pressure and force?</li> </ol>
E. ELABORATE	<p><b>“STACKING RAINBOW LIQUIDS”</b></p> <p>The class will be divided into two groups, each group will demonstrate the concept of density through experimentation. The teacher will administer the lab worksheets by group. They will be given 10 minutes to finish the experiment. The lab worksheet is presented below.</p> <p style="text-align: center;">Name: _____</p> <p style="text-align: center;"><b>Title: Stacking Rainbow Liquids</b></p> <p><b>Question:</b> How can you stack different liquids in a rainbow of layers, without causing them to mix together?</p> <p><b>Hypothesis:</b> I think that the liquids will _____.</p> <p><b>Experiment:</b></p> <ol style="list-style-type: none"> <li>1) Gather all of the necessary supplies: 5 plastic cups, honey, water, vegetable oil, dish soap, rubbing alcohol, food coloring, funnel, and a cylinder or vase.</li> <li>2) First, measure 5 ounces of each liquid into a labeled plastic cup. You should have 5 different cups of liquids.</li> <li>3) Dye the cup of water with 2 drops of red food coloring.</li> <li>4) Dye the cup of rubbing alcohol with 2 drops of green food coloring.</li> <li>5) Pour the cup of honey into the cylinder. Wait at least a minute for it to settle.</li> <li>6) Then, pour the cup of dish soap into the center of the cylinder next. Wait at least a minute for it to settle.</li> <li>7) Use the food baster to pour the cup of red water down the side of the cylinder. Wait at least a minute for it to settle.</li> <li>8) Use the food baster to pour the vegetable oil down the side of the cylinder next. Wait at least a minute for it to settle.</li> <li>9) Last, use the food baster to pour the green rubbing alcohol down the side of the cylinder. Let the final liquid settle.</li> </ol> <p><b>Observe and Record:</b> What happened to the liquids?    _____</p> <p><b>Analyze &amp; Share:</b> Was your hypothesis correct?    _____</p>

<p>F. EVALUATE</p>	<p><b>“ASSESSMENT”</b></p> <p><b>A. Multiple Choice</b></p> <p>Instructions: Choose the LETTER that corresponds to your answer and write it on your ¼ sheet of paper. A minute will be given for each item. Strictly no erasures.</p> <ol style="list-style-type: none"> <li>What is the amount of space it takes up in comparison to the amount of matter it contains? <ul style="list-style-type: none"> <li>A. Fluid</li> <li>B. Force</li> <li><b>C. Density</b></li> <li>D. Pressure</li> </ul> </li> <li>Which of the following pair is an immiscible liquid? <ul style="list-style-type: none"> <li><b>A. Oil and water</b></li> <li>B. Milk and water</li> <li>C. Ethanol and water</li> <li>D. Orange juice and water</li> </ul> </li> <li>Which of the following statements is CORRECT about the picture below? <div style="text-align: center;">  </div> <ul style="list-style-type: none"> <li>A. A given area can have a significantly different effect, depending on the pressure over which the force is exerted.</li> <li><b>B. A given force can have a significantly different effect, depending on the area over which the force is exerted.</b></li> <li>C. The same force applied to an area the size of the sharp end of a needle is not enough to poke the skin.</li> <li>D. The same force applied with a finger might irritate the skin, but the force has a long-lasting effect.</li> </ul> </li> <li>What force (F) is used in pressure? <ul style="list-style-type: none"> <li>A. Applied force</li> <li>B. Tension force</li> <li>C. Pressure force</li> <li><b>D. Normal force</b></li> </ul> </li> <li>Which of the following phases of matter is fluids? <ul style="list-style-type: none"> <li>A. Gas only</li> <li>B. Liquid only</li> <li><b>C. Liquid and Gas</b></li> <li>D. Solid, Liquid, and Gas</li> </ul> </li> </ol>								
<p>G. EXTEND</p>	<p><b>“TAKE ME HOME”</b></p> <p>The students will demonstrate the concept of density in their homes by taking pictures with a caption to be sent in the class group chat. The rubric is presented below.</p> <p>Rubric for grading:</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td>Correctness/appropriateness of the concept</td> <td style="text-align: right;">= 50%</td> </tr> <tr> <td>Originality/Uniqueness</td> <td style="text-align: right;">= 30%</td> </tr> <tr> <td>Clarity of picture</td> <td style="text-align: right;">= 20%</td> </tr> <tr> <td><b>TOTAL</b></td> <td style="text-align: right;"><b>100%</b></td> </tr> </table>	Correctness/appropriateness of the concept	= 50%	Originality/Uniqueness	= 30%	Clarity of picture	= 20%	<b>TOTAL</b>	<b>100%</b>
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Prepared by:

**JUNE NEIL J. SARMIENTO**  
Pre-Service Teacher

Checked by:

**PROF. RAMIL ARCIOSA**  
Science Resource Teacher



## NARRATIVE REPORT

"Everything flows and nothing abides; everything gives way and nothing stays fixed" are the very words of the Greek philosopher Heraclitus of Ephesus. We live in a world of fluids, i.e., substances that can flow. Unlike solids, fluids have no definite form but instead assume the shape of their containers. Fluids include all liquids and gases and a rather strange state of matter called plasma, an ionized gas that scientists believe accounts for 99% of the matter in the visible universe.

Just like fluids, the lesson is important to achieve the objectives inside of the classroom. Thus, 7E's lesson plan about Physical Science specifically the concept of Fluid Mechanics (Fluid, Density, and Pressure) was created meaningfully for the learners' understanding of the concept and to realize its purpose in real-world scenarios.

After the preliminary procedures were conducted by the teacher, students were reminded of the classroom rules. The first part of the lesson plan was the ELICIT, on this part, students were tasked to finish a game called a "Bottle Flip Challenge." The teacher aimed to integrate game-based activity before the discussion so that the students would boost their interest in learning and be able to enjoy the learning process meaningfully. The said activity cultivated the trust of each of the members in the group because not everyone can do it as fast as they can expect and so, students learned how to build trust from their groupmates as well as learning the concepts.

ENGAGE. In this part, the integration of technology was highlighted as this would help learning to be more fascinating. Guide questions were stipulated and must be answered by the students after the video presentation to promote the critical thinking and creative thinking abilities of the students.

One of the factors of experiential learning is the EXPLORE part of the lesson plan. This includes the participation of the class and observation of each student on the activity entitled "Point to Point", on this part, students would further observe what they feel and answer the guide questions to support their observation and conclusion about the activity. Further, this was followed up through the EXPLAIN. The teacher facilitated the discussion by raising questions and allowing students to answer from the factual, conceptual, and metacognitive aspects of learning.

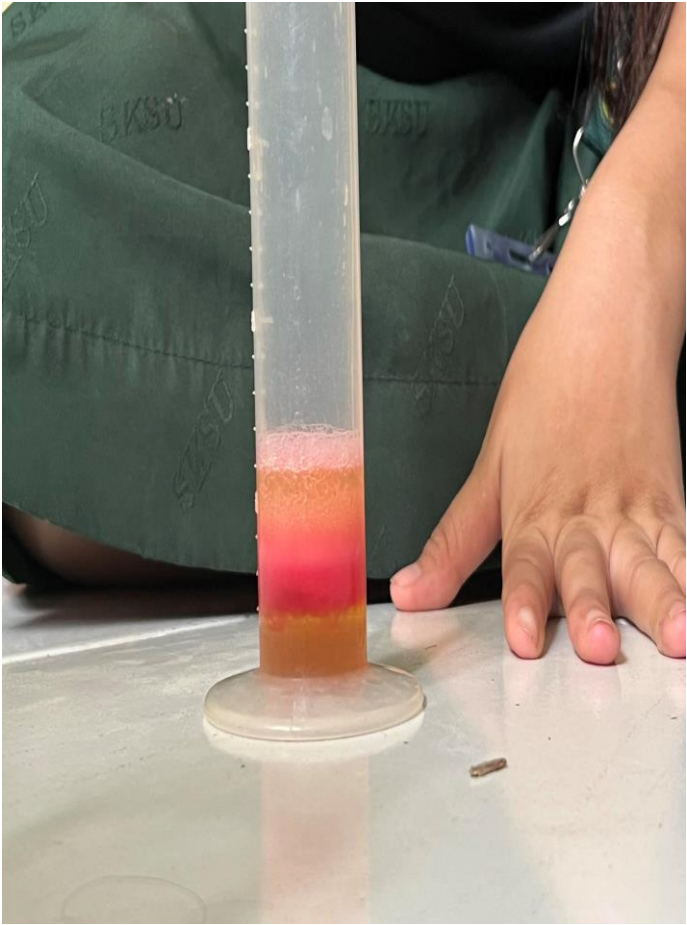
Experimentation in science learning is one of the essential activities in the subject because this includes the highest peak of learning which is demonstrating; ELABORATE. In this part, students were indulged in the investigation of real-world observations about the density of the fluids facilitated by the teacher. To determine the students' learning (EVALUATE), students answered the multiple-choice type of assessment. Moreover, incorporating **cultural perspectives** can help make fluid mechanics more accessible and relevant to students from diverse backgrounds. By highlighting how fluid dynamics impact different cultures and societies, we can engage students in meaningful discussions about the

role of science in addressing global challenges such as water scarcity, climate change, and environmental sustainability.

Ultimately, culture-based learning in fluid mechanics has the potential to foster a more inclusive and holistic approach to scientific education. By embracing the diversity of human experience and knowledge, we can inspire curiosity, promote empathy, and empower students to become thoughtful and responsible stewards of both science and culture (EXTEND; "Take Me Home").

## Documentation





# Student's Output & Activities

YouTube Link:

- <https://www.youtube.com/watch?v=XZC-D7WnLDM>
- [https://www.youtube.com/watch?v=zLLpKzPz84Q&list=PLmdFyQYShrjeBWFnHcLXkS9oVwy\\_mhsnx](https://www.youtube.com/watch?v=zLLpKzPz84Q&list=PLmdFyQYShrjeBWFnHcLXkS9oVwy_mhsnx)



Republic of the Philippines  
**SULTAN KUDARAT STATE UNIVERSITY**  
**COLLEGE OF TEACHER EDUCATION**  
**LABORATORY SCIENCE HIGH SCHOOL**  
 ACCESS, EJC Montilla, Tacurong City



Name: Princes Aires A. Malaguial

Date: 03/03/24

Grade and Section: 12 – HUMSS

**Physical Science**

**Take Home Assignment:** You will demonstrate the concept of density in your homes by taking pictures with a caption to be sent in the class group chat.

**Materials:**




- 2 glasses
- 2 eggs
- Salt
- Spoon
- Labels (optional)


**Closer Look:**




**FLOATING EGG.** The experiment shown in the picture is a comparison of eggs placed in plain and salt water. This is to exhibit the concept of density at home, which refers to a measure of how heavy an object is compared to its volume.

The eggs used had a similar mass for this activity. However, it is evident that the egg placed in the salt water floated compared to the plain one. An explanation for this is that the egg in the fresh water sank, like it normally does, because it had a greater density than the water. But when salt was mixed with the plain water of the glass, the density increased, and the egg became less dense, causing it to float.

To conclude, the eggs may have the same mass, but they can still sink or float differently, depending on the density of the water and the ingredients mixed with it.



Republic of the Philippines  
**SULTAN KUDARAT STATE UNIVERSITY**  
 EJC Montilla, City of Tacurong, 9800  
 Province of Sultan Kudarat



**JOHN PAUL H. PELAEZ GRADE 12-HUMSS**  
**JUNE NEIL SARMIENTO- PST IN PHYSICAL SCIENCE**


**ASSIGNMENT IN PHYSICAL SCIENCE**

**"TAKE ME HOME"**

Directions: You will demonstrate the concept of density in your Homes by taking pictures with a caption to be sent in the class group chat. The rubric is presented below.

**Rubric for grading:**

Correctness/Apropriateness of the concept	= 50%
Originality/Uniqueness	= 30%
Content of Picture	= 20%



**"Layers of Home Density: A Glass Tale"**

In a simple glass jar at home, a fascinating world of density unfolds. At the bottom, steel screws settle like anchors, their weight dominating the base. Just above them, a rich swirl of honey marbles gently rests, its density subtly asserting itself. Maple syrup flows next, thick and indulgent, forming a layer of sweet viscosity.

Moving upward, the scene transforms with each layer. Raisins cluster together, adding their weight to the mix, while milk handwash and peanuts find their place, each contributing to the intricate balance of density. As we ascend further, the colors of water and rubbing alcohol dance, their densities playing a delicate symphony. Finally, at the zenith, buoyant yet poised, sits the ping pong ball, a testament to the playful nature of density and its role in our everyday surroundings.

VISION: A leading University in substantiating scholarly innovation, multi-cultural convergence, and responsive public service in a Globalized Region. **MISSION:** The University shall primarily provide advanced instruction and professional training in science and technology, agriculture, fisheries, education and other relevant fields of study. It shall also undertake research and extension services, and provide progressive leadership in training of specialization. **MANTRA:** Generators of Solutions. **CORE VALUES:** Patriotism, Respect, Integrity, Zeal, Excellence in Public Service.





**THE DENSITY OF A COTTON IN A WATER VS THE DENSITY OF A TISSUE IN A WATER**

**COTTON HAS GREATER DENSITY**

Cottons are usually made of compacted fibers making them denser than water. When the cotton was placed in a glass of water, it sank due to their ability to absorb. This confirms that cotton has higher density than of the water.

**TISSUE HAS LESSER DENSITY**

The density of tissue in water is typically lower than that of water that causes it to float. Tissue fibers are less denser than water molecules, allowing them to displace enough water to remain buoyant. This attests that tissues have higher density than the water, causing them to sink.

# **Chapter 3**

# **THERMODYNAMICS**





7 E'S SEMI-DETAILED LESSON PLAN FOR GRADE 12 HUMSS PHYSICAL SCIENCE  
**Thermodynamics (Temperature & Heat)**

<b>I. OBJECTIVES</b>	At the end of the lesson, the student can: a. differentiate the concept of temperature and heat; b. examine the three mechanisms of heat transfer; and c. calculate the conversion of three temperature scales.
<b>II. SUBJECT MATTER</b>	Thermodynamics (Temperature & Heat)
<b>III. LEARNING RESOURCES</b>	
<b>A. References</b>	
1. Teacher's Guide Pages	Young, H. & Freedman, R. (2012). Sears and Zemansky's University Physics with Modern Physics 13th Edition. Pages 551-578.
2. Learner's Materials Pages	
3. Textbook pages	
4. Additional Materials	Smart TV, laptop, whiteboard pen, visual aids/materials
<b>B. Other Learning Resources</b>	
1. Internet sources	<a href="https://www.greenspec.co.uk/building-design/heat-transfer-conduction-convection-radiation/#:~:text=Heat%20transfer%20is%20the%20exchange,object%20(2nd%20Law%20of%20Thermodynamics)">https://www.greenspec.co.uk/building-design/heat-transfer-conduction-convection-radiation/#:~:text=Heat%20transfer%20is%20the%20exchange,object%20(2nd%20Law%20of%20Thermodynamics)</a>  <a href="https://byjus.com/temperature-conversion-formula/">https://byjus.com/temperature-conversion-formula/</a>
Skills	Analyzing, Observing, Listening, Communicating, Problem-Solving, and Making Interference
Science Concept	<b>Temperature</b> is a measure of the average kinetic energy of the atoms or molecules in the system. On the other hand, <b>heat</b> is thermal energy transferred from a hotter system to a cooler system that is in contact.  Heat can be transferred in three ways: by <b>conduction</b> (the transfer of energy from one molecule to another by direct contact), by <b>convection</b> (the movement of heat by a fluid such as water or air), and by <b>radiation</b> (the transfer of heat by electromagnetic waves).
<b>IV. PROCEDURES</b>	
Preliminary Activities	<ul style="list-style-type: none"> <li>• Prayer</li> <li>• Greetings</li> <li>• Checking of attendance</li> <li>• Classroom rules</li> </ul>
A. ELICIT	<b>“PICTOGRAPH REVIEW”</b> Instructions. The teacher will present a pictograph as a review in the class. The students will choose word/s in the word pool that best describe the picture to complete the paragraph. Answers will be written on the ¼ sheet of paper.

Whether it's a

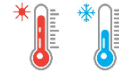


summer day or a



midwinter

night, your body needs to be kept at a nearly constant



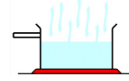
. On a hot

day, you wear less clothing to improve



transfer from your body to

the air and for better cooling by



of



. You drink cold

beverages and may sit near a fan or in an air-conditioned room. On a



you wear more clothes or stay indoors where it's warm. When you're outside,

you keep active and drink hot liquids to stay



### Word pool

heat

warm

cold day

perspiration

temperature

frozen

sweltering

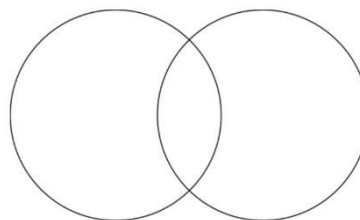
evaporation

## B. ENGAGE

### “VENN-DIAGRAM GAME”

Instructions. The class will be divided into two groups. Each group will create a Venn diagram and the members of the group will play a game entitled: “Word War”, wherein each group will guess the given epic word battles by writing it on a clean paper and raising their answer after 5 seconds. Each correct guess will have the power to choose words on the screen to complete the Venn diagram differentiating the concepts of temperature and heat as well as their similarities. The basis for the winner is the correct words in the Venn diagram chart who will be given extra points in the performance in today's session.

Temperature   Similarities   Heat



Form of energy	Kelvin	Celsius	Fahrenheit
Joules	Hotness or coldness		Ability to do work
Measure the degree of heat			Thermal energy
Transfer of energy caused by change of temperature			
A measurable physical property			State variable
Process variable		Average measurement	
Number of particles		Concept of thermodynamics	

C. EXPLORE

**“HEAT TRANSFER EXPERIMENTS”**

Instructions. The teacher will present a picture and instructions on the screen about the CONDUCTION, CONVECTION, and RADIATION. The students will be grouped into three (3) and perform the heat transfer experiments. Available materials will be used. Students will explore the concept and share it with the class. An observatory report is needed.

Group 1: Conduction



Group 2: Convection



Group 3: Radiation

Choose three different things and place them outside with the direct heat of the sun. Observe what will happen and make a report out of it.

D. EXPLAIN

**“CONVERSION CYCLE”**

Instructions. The teacher will show how to convert the three temperature scales (Celsius, Fahrenheit, and Kelvin) on the board. Students must follow the writings on the board.

**Temperature Conversion Formula Table**

Unit	To Celsius	To Fahrenheit	To Kelvin
Celsius (C)	C (°)	$C(9/5) + 32$	$C + 273.15$
Fahrenheit	$(F - 32) \times 5/9$	F	$(F - 32) \times 5/9 + 273.15$
Kelvin	$K - 273.15$	$(K - 273.15) * 9/5 + 32$	K

Let’s try this!

Question: What is 30°C in Kelvin?

Solution:

The temperature conversion formula from Celsius to Kelvin is,  $K = C + 273.15$

$$K = 30 + 273.15 \quad K = 303.15$$

Question 2: Convert 50°C to °F.

Solution:

Celsius to Fahrenheit conversion formula is given by:

$$°F = °C(9/5) + 32$$

	$= 50 (9/5) + 32$ $= 90 + 32$ $= 122$ <p>Therefore, <math>50^{\circ}\text{C} = 122^{\circ}\text{F}</math></p> <p>Question 3: Convert <math>113^{\circ}\text{F}</math> to Kelvin.</p> <p>Solution: Fahrenheit to Kelvin conversion formula is given by:  <math display="block">\text{K} = (\text{F} - 32) \times 5/9 + 273.15</math> <math display="block">= (113 - 32) \times (5/9) + 273.15</math> <math display="block">= 81 \times (5/9) + 273.15</math> <math display="block">= 45 + 273.15</math> <math display="block">= 318.15</math> <p>Therefore, <math>113^{\circ}\text{F} = 318.15 \text{ K}</math></p> <p>Question 4: Convert <math>225 \text{ K}</math> to Celsius.</p> <p>Solution: Kelvin to Celsius conversion formula is given by:  <math display="block">\text{C} = \text{K} - 273.15</math> <math display="block">= 225 - 273.15</math> <math display="block">= -48.15</math> <p>Therefore, <math>225 \text{ K} = -48.15^{\circ}\text{C}</math></p> </p></p>																
E. ELABORATE	<p><b>“SIR JUN SHOW”</b></p> <p>Instructions. The teacher will be calling names to share their insights and ideas about Temperature and Heat; and application to real-life scenarios. Student volunteers to share their takeaways on the topic will be given extra points for their performance in the class.</p>																
F. EVALUATE	<p><b>“ASSESSMENT (CONVERSION)”</b></p> <p>Instructions. Calculate the conversion of the three temperature scales (Celsius, Fahrenheit, and Kelvin). Complete the table below and show the proper way of solving.</p> <table border="1" data-bbox="448 1385 1464 1609"> <thead> <tr> <th>Unit (Given)</th> <th>To Celsius</th> <th>To Fahrenheit</th> <th>To Kelvin</th> </tr> </thead> <tbody> <tr> <td>Celsius (<math>41^{\circ}\text{C}</math>)</td> <td>-</td> <td>?</td> <td>?</td> </tr> <tr> <td>Fahrenheit (<math>130^{\circ}\text{F}</math>)</td> <td>?</td> <td>-</td> <td>?</td> </tr> <tr> <td>Kelvin (<math>312.15 \text{ K}</math>)</td> <td>?</td> <td>?</td> <td>-</td> </tr> </tbody> </table>	Unit (Given)	To Celsius	To Fahrenheit	To Kelvin	Celsius ( $41^{\circ}\text{C}$ )	-	?	?	Fahrenheit ( $130^{\circ}\text{F}$ )	?	-	?	Kelvin ( $312.15 \text{ K}$ )	?	?	-
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Fahrenheit ( $130^{\circ}\text{F}$ )	?	-	?														
Kelvin ( $312.15 \text{ K}$ )	?	?	-														
G. EXTEND	<p><b>“TALENT MO, SHOW MO”</b></p> <p><b>“CULTURE-BASED LEARNING TASK”</b></p> <p>Instructions. The class will be divided into four (4) groups. Each group will think of a presentation showing the group's strengths and talents such as song composition, role-playing, speech choir, and others. Freedom of choice will be given to each group to activate student's interests. The presentation must showcase a positive response to a global problem like climate change. The rubric is presented below.</p> <p>Rubric for grading:</p> <table data-bbox="448 1983 1000 2158"> <tr> <td>Organization of concept</td> <td>=40%</td> </tr> <tr> <td>Originality and creativity</td> <td>=20%</td> </tr> <tr> <td>Positive and overall impact</td> <td>=20%</td> </tr> <tr> <td>Stage presence</td> <td>=20%</td> </tr> <tr> <td><b>TOTAL</b></td> <td><b>100%</b></td> </tr> </table>	Organization of concept	=40%	Originality and creativity	=20%	Positive and overall impact	=20%	Stage presence	=20%	<b>TOTAL</b>	<b>100%</b>						
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Prepared by:

**JUNE NEIL J. SARMIENTO**

Pre-Service Teacher

Checked by:

**PROF. RAMIL ARCIOSA**

Science Resource Teacher



## NARRATIVE REPORT

A day in a life with the concept of thermodynamics!

A fascinating reality to realize just how much this branch of science influences our everyday experiences, often without us even noticing. Thermodynamics deals with the transfer of heat and energy, and its principles are at work in countless aspects of our daily routines, from the moment we wake up to the time we go to sleep.

As much as the weather is concerned, it is too warm. Just like the minds of young social scientists from the SKSU – Laboratory High School, specifically the Grade – 12 HUMSS students. They were very keen to learn the wonders of thermodynamics through the first activity of ELICIT called “Pictograph review,” this was the best avenue to stimulate the prior knowledge of the students by identifying the given picture with the use of the word pool. The activity was supported by the ENGAGE part of the lesson, wherein the students were tasked to differentiate the concept of temperature and heat with the use of the Venn diagram and by answering epic word battles.

Thereafter, the most exciting part of the lesson was the experimentation (EXPLORE) wherein the teacher presented a short video clip for them to demonstrate scientifically. Each group was divided into the three principles of heat transfer mechanism (conduction, convection, and radiation). Each group made an excellent output and they presented in the class with an excellent observation and understanding of the concept. They were amazed by the concept of thermodynamics with the simple experiments they did in the three phases of matter.

EXPLAIN. Temperature scale is one of the important ideas in understanding the lesson and this involves its conversion. Students are tasked to complete the table that was presented on the TV screen by converting three of the temperature scales which are Celsius, Fahrenheit, and Kelvin, respectively and accurately. The teacher facilitated the computation of the students for positive reinforcement and checking in the EVALUATE part.

Ultimately, the teacher in practice has his way of integrating the concepts into real-life applications wherein he presented the “Sir Jun Show” on the ELABORATE part. He wanted to incorporate **culture-based education** into his lesson by providing local examples on a day-to-day basis for the student's great appreciation of the topic. On the part of EXTEND, the students must showcase a presentation that highlights their positive outlook or response to the growing problem of the globe which is global warming. This was the best avenue to raise awareness of the simple causes of it and ways to prevent a micro-to-macro effect of its devastation. The “**Talent Mo Show Mo – Culture-based learning**” task was graded through a rubric with three judges, appreciation of the efforts, and video presentations were made available online.

Documentation





YouTube Link:

➤ <https://youtu.be/qEwyM3b1EO4>

# **Observation Report**

## **in**

# **Physical Science**

# **(CONDUCTION)**

**ALEGRE, AALEEZA B.**

**SALES, GERALD C.**

**CAMBARIJAN, CRISTEL JUNE T.**

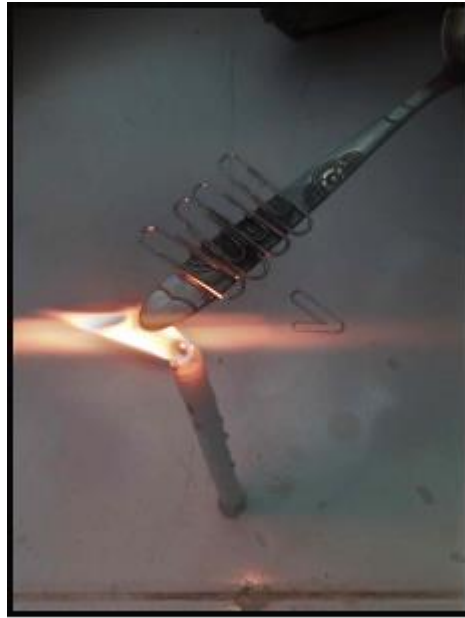
**OBCIANAL, XRICHELL MAE V.**

**GRADE 12 HUMSS**

**June Neil J. Sarmiento**

**Practice Teacher**

## Photo Documentation:



## Observation:

After the discussion with Sir June, he gave us the material for our group experiment. The experiment that we are about to conduct is the paper clip stick in a spoon using candle wax. Sir June explained to us the process by showing us a photo reference, and before that, he gave us 5 minutes to finish the experiment.

First, we light the candle using the lighter, then we wait for the heat to reach the wax, and we slowly drop each of them on the handle of the spoon. According to the image presented, the paper clip must be standing on the spoon handle. But in our case, the paper clips are not able to stand, so Sir June suggests laying down the paper clips rather than making them stand.

We waited for 1 minute for the wax and paper clip to stick to the spoon. Presentation time has come, and as we put the tip of the spoon handle in the candle fire, we notice that it makes the metal hotter over time. We also notice that the wax of the candle that has been put on the paper clip is being dissolved, and as soon as the heat reaches all the paper clips, they slowly fall to the surface.

"Score of ONE, Score of ALL" - Conversion Cycle (12 - HUMSS)

24

Unit (Given)	To Celsius	To Fahrenheit	To Kelvin
Celsius (41°C)		$41 \left( \frac{9}{5} + 32 \right) ?$	<del><math>41 + 273.15</math> <math>\frac{41}{1}</math> <math>314.15 \text{ K}</math></del> 4
Celsius (16°C)		$16 \left( \frac{9}{5} + 32 \right) ?$	<del><math>C + 273.15</math> <math>K = 16 + 273.15</math> <math>K = 289.15 \text{ K}</math></del> 5
Fahrenheit (130°F)	<del><math>(F - 32) \times \frac{5}{9}</math> <math>(130 - 32) \times \frac{5}{9}</math> <math>98 \times \frac{5}{9}</math> <math>490 \div 9</math> <math>= 54.44^\circ\text{C}</math></del> 5		<del><math>(130 - 32) \times \frac{5}{9} + 273.15</math> <math>98 \times \frac{5}{9} + 273.15</math> <math>54.44 + 273.15</math> <math>= 327.59^\circ\text{F}</math></del> 4 <div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> <math>\frac{4}{98}</math>  <math>\frac{5}{970}</math>  <hr/> <math>54.4</math>  <math>970</math>  <hr/> <math>45</math> </div> <div> <math>\frac{40}{50}</math>  <hr/> <math>4</math>  <math>\frac{273.15}{54.4}</math>  <hr/> <math>.55</math> </div> </div>
Fahrenheit (265°F)	<del><math>(F - 32) \times \frac{5}{9}</math> <math>= 265 - 32 ?</math>  <math>277.22^\circ\text{C}</math></del>		
Kelvin (393.15 K)	<del><math>K - 273.15</math> <math>= 393.15 - 273.15</math> <math>= 120^\circ\text{C}</math></del> 4		
Kelvin (211.78 K)	<del><math>K - 273.15</math> <math>211.78 - 273.15</math> <math>= -62.63^\circ\text{C}</math> <math>= -61.37^\circ\text{C}</math></del> 2		

# **Chapter 4**

## **WAVES/ACOUSTICS**





**7 E'S DETAILED LESSON PLAN FOR GRADE 12 HUMSS PHYSICAL SCIENCE**  
**WAVES/ACOUSTICS**

<b>I. OBJECTIVES</b>		
A. Learning Competencies/Objectives	At the end of the lesson, the student can: <ol style="list-style-type: none"> <li>a. distinguish the different types of waves according to the direction of its motion;</li> <li>b. appreciate the function of human ears by discussing its role in sound perception; and</li> <li>c. compute the wave speed based on the frequency, wavelength, and period of a wave.</li> </ol>	
<b>II. SUBJECT MATTER</b>		
	Waves/Acoustics	
<b>III. LEARNING RESOURCES</b>		
<b>A. References</b>		
1. Teacher's Guide Pages	Young, H. & Freedman, R. (2012). Sears and Zemansky's University Physics with Modern Physics 13 <sup>th</sup> Edition. pages 472-542	
2. Learner's Materials Pages	Waves and Optics (Lesson 1 & 2) <i>Wave and Wave Properties</i> <i>Production and Perception of Sounds</i>	
3. Textbook pages		
4. Additional Materials	Smart TV, laptop, whiteboard pen, visual aids/materials, worksheets, and experiment's materials	
<b>B. Other Learning Resources</b>		
1. Internet Sources		
Skills	Analyzing, Observing, Listening, Communicating, Problem-Solving, and Making Interference	
Science Concept	<b>TYPES OF WAVES</b> <b>According to Medium of Propagation</b> <ul style="list-style-type: none"> <li>•Mechanical – requires a medium</li> <li>•Electromagnetic – does not require a medium</li> </ul> <b>According to the Mode of Propagation</b> <ul style="list-style-type: none"> <li>•Pulse – short and fleeting wave</li> <li>•Continuous – steady and repeating wave</li> </ul> <b>According to the Orientation of Propagation</b> <ul style="list-style-type: none"> <li>•Transverse – perpendicular to wave motion</li> </ul> Crest – highest peaks Trough – lowest points	



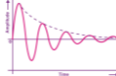

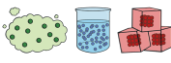
	<p>•Longitudinal – parallel to wave motion  Compression – close together  Rarefaction – spread apart  •Surface – a combination of transverse and longitudinal</p> <p><b>Acoustics</b>  is the Science concerned with the production, control, transmission, reception, and effects of sound. The term is derived from the Greek word – <i>akoustos</i>, meaning “hearing.”</p>	
<b>IV. PROCEDURES</b>	<b>Teacher’s Activity</b>	<b>Student’s Activity/Response</b>
Preliminary Activities	<p><b>Prayer</b>  May I request everyone to please stand for our word of prayer to be led to us by our prayer leader this morning Mr. _____.</p> <p><b>Greetings</b>  Good morning Grade 12 – HUMSS!</p> <p><b>Checking of attendance</b>  Mr. Secretary, are there any absentees for today?</p> <p>Let us give a round of applause to each one of you, we are in perfect attendance. I am so happy with that class.</p> <p><b>Setting of standards</b>  Now class, please be reminded of our classroom rules. Please read everyone.</p> <ul style="list-style-type: none"> <li>• Be on time.</li> <li>• Start the class with a prayer.</li> <li>• Treat everyone with respect at all times.</li> <li>• Keep our classroom clean.</li> <li>• Listen and follow directions.</li> <li>• Raise your hand if you have concerns.</li> <li>• Remember our science clap.</li> </ul> <p>I hope each one of you will do positively in our class this day. Is that clear?</p>	<p>Lord, bless every student here, as well as our teacher and pre-service teacher, as we embark on another day of learning. Please give us clear minds and open hearts so we can grasp the knowledge and lessons set before us. Help us to be attentive, and let Your wisdom guide us in our studies. AMEN.</p> <p>Good morning, Sir Jun and Sir Ramil. It’s nice to see you today!</p> <p>Sir, I am so glad that there are no absentees for today.</p> <p><i>(Students applauded)</i></p> <p><i>(Students read the classroom rules loud and clear)</i></p> <p>Yes Sir!</p>
A. ELICIT	Last meeting we successfully learned about a certain topic. Who among you here in class can still remember our previous lesson? Yes, Mr./Ms. _____.	Sir, it is all about momentum and impulse.

Very good! Can someone share what we did last meeting and your takeaways from our previous lesson? Yes, Mr./Ms. \_\_\_\_\_.

At this point, let us have an activity entitled:

**“PICTOGRAPH REVIEW”**

Instructions. The class is expected to complete the paragraph by choosing the words in the word pool that describe the picture. This aims to identify the students’ prior knowledge and review related terms. The students will write their answers on the 1/4 sheet of paper.

A  is a traveling  consisting of coordinated vibrations or  that  energy through matter. It disturbs the particles of  as it passes, making them move back and forth, but not resulting into a net movement of the matter.

In our activity, what concepts can you derive from the key terms we have?

All right, then our topic for today is all about WAVES/ACOUSTICS. For us to be guided in our class discussion, kindly read our learning competencies/objectives.

- a. distinguish the different types of waves according to the direction of its motion;
- b. compute the wave speed based on the frequency,

We did an egg toss activity and solved the given math word problems. We learned about the relationship between momentum and impulse through the collisions of objects in a real-world scenario.

*(Student participation and cooperation)*

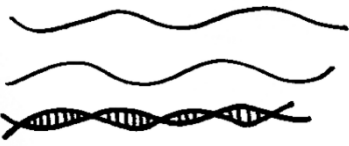
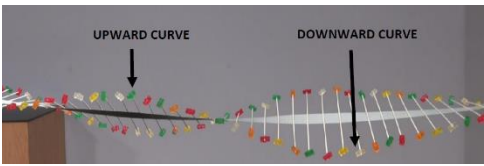
Possible responses/answers:

- 1. wave
- 2. disturbance
- 3. oscillations
- 4. transmit
- 5. matter

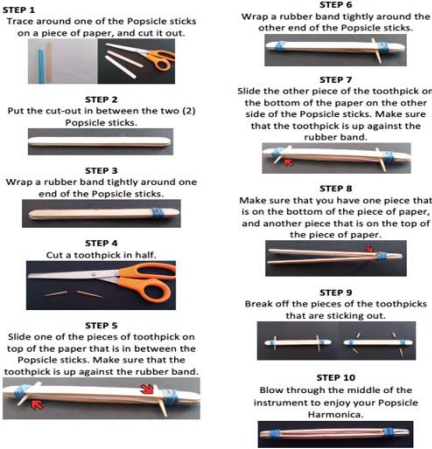
Sir! The concepts of WAVES/ACOUSTICS.

*(Students read the learning competencies/objectives loud and clear)*

	<p>wavelength, and period of a wave; and</p> <p>c. appreciate the function of human ears by discussing its role in sound perception.</p>	
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<p>B. ENGAGE</p>	<p>Class, can you describe what is written on the board?</p>  <p>That is right! Now, let us further engage ourselves in the concept of wave motion using this activity, accomplish five (5) tasks described below with an activity entitled:</p> <p><b>“GUMMY BEAR WAVE MACHINE”</b></p> <p>Instructions. The class will be divided into two groups. Each group will be given a worksheet and procedures for the experiment. After accomplishing the tasks, report the observations in class.</p> <p><b>TASK 1:</b> Lift a barbell at one end of the machine, while the rest of the group members should observe and illustrate what will happen to the wave machine. Draw a figure on the box to represent that observation and provide an appropriate title for it.</p> <p><b>TASK 2:</b> In three (3) seconds, count the number of upward curves and downward curves that the wave machine generated for one-way (from left to right) direction only.</p>  <p><b>TASK 3:</b> This time, observe what will happen if you displace a barbell with varying heights:</p> <ol style="list-style-type: none"> <li>high height or releasing a barbell far from the rest position; and</li> <li>low height or releasing a barbell near the rest position.</li> </ol> <p>Compare the two scenarios. Write your observations on the worksheet.</p> <p><b>TASK 4:</b> Using the wave machine, generate pulses by quickly flicking one barbell. Do not flick again until the wave has travelled the length of the duct tape. Count the number of</p>	<p>Sir, they may have different illustrations but in general, such illustrations are called waves.</p> <p><i>(Group work and collaboration through an experiment and the given worksheet)</i></p>
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	<p>upward and downward curved. Repeat the procedure, this time generate pulses by slowly moving the barbell up and down. Count again the number of upward and downward curves.</p> <p>TASK 5: To observe the propagation through different density media, remove both gummy bears from the sticks leaving the empty skewers on the tape for one-half of the wave machine (from the center to one support rod). What have you noticed when some of the gummy bears were removed from the barbell? Write your observations on the worksheet.</p> <p>Requesting the discussants of each group to share your observatory report and takeaways.</p> <p>The teacher will then discuss different types of waves according to the direction of its motion.</p> <p><b>TYPES OF WAVES</b></p> <p><b>According to Medium of Propagation</b></p> <ul style="list-style-type: none"> <li>•Mechanical – requires a medium</li> <li>•Electromagnetic – does not require a medium</li> </ul> <p><b>According to the Mode of Propagation</b></p> <ul style="list-style-type: none"> <li>•Pulse – short and fleeting wave</li> <li>•Continuous – steady and repeating wave</li> </ul> <p><b>According to the Orientation of Propagation</b></p> <ul style="list-style-type: none"> <li>•Transverse – perpendicular to wave motion</li> <li>Crest – highest peaks</li> <li>Trough – lowest points</li> <li>•Longitudinal – parallel to wave motion</li> <li>Compression – close together</li> <li>Rarefaction – spread apart</li> <li>•Surface – a combination of transverse and longitudinal</li> </ul>	<p><i>(Student’s presentation by group)</i></p> <p><i>(Class discussion)</i></p>
<p>C. EXPLORE</p>	<p>Now, let us proceed to our next exciting activity entitled:</p> <p><b>“POPSICLE HARMONICA”</b></p> <p>Instructions. The teacher will explain the purpose of the activity and the procedures to create a popsicle harmonica. This fun (although noisy) activity kicks off the discussion on</p>	<p><i>(Student participation and cooperation)</i></p>

	<p>sound production and perception. It demonstrates that objects must vibrate to produce a sound.</p> <p>Provide the following materials: 2 Popsicle sticks, 2 rubber bands, a toothpick, a pencil or pen, scissors, and paper.</p> <p>General Question: How does a popsicle harmonica produce sound?</p> <p>We will answer that question after the activity. Is that clear class?</p> <p>Follow these simple steps to make a Popsicle Harmonica:</p>  <p>General Question: How are our ears able to hear sounds?</p> <p>The teacher will then discuss the concept of human hearing and sight in the class.</p> <p>Two of our five human senses are wave detectors: the ear is sensitive to the tiny fluctuations in air pressure caused by compressional waves in air (sound), and the eye is sensitive to electromagnetic waves in a certain frequency range (light).</p>	<p><i>(Student's preparation for the activity)</i></p> <p>Yes Sir!</p> <p><i>(Activity time)</i></p> <p>Possible responses/answers: As the outer ear captures the sound waves, the sound waves travel through the ear canal to the middle ear, which channels to the ear drum. Because a sound wave is a pressure wave, it vibrates the eardrum by pushing it.</p>
<p>D. EXPLAIN</p>	<p>Knowing the concepts of waves and their properties, we are now ready to solve some sample problems through an activity entitled:</p> <p><b>“COMPLETE ME”</b></p>	<p><i>(Developing student's problem-solving skills)</i></p>

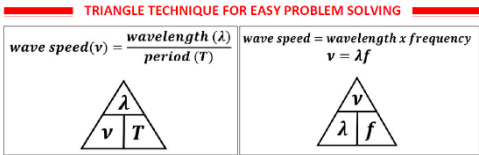
Instruction: The teacher will be calling names to complete the process of problem-solving.

Given certain variables, we can compute the wave speed, wavelength, period, or frequency of a wave by following the formula:

$$\text{wave speed } (v) = \frac{\text{distance}}{\text{time}} = \frac{\text{wavelength}}{\text{period}} = \frac{\lambda}{T}$$

$$\text{wave speed} = \text{wavelength} \times \text{frequency}$$

$$v = \lambda f$$



Let's try this!

A 500-Hz sound travels through pure oxygen. The wavelength of the sound is measured to be 0.65 m. What is the speed of sound in oxygen?

$$v = f\lambda = (500 \text{ Hz})(0.65 \text{ m}) = \mathbf{325 \text{ m/s}}$$

**E. ELABORATE**

Now, that you have already learned how to solve wave speed, let's try to solve frequency, wavelength, and period of wave.

Welcome to **"SIR JUN SHOW!"**

When I say, SIR!  
Kindly say, JUNELLL...

JUNELLL...

I will show examples of math word problems and I will be calling names to write their answer on the board. Is that clear?

Yes Sir!

Instructions. The teacher will discuss the concepts involved and try to solve the given math word problems on the board together with the students.

Let's try this!

1. The wavelength of middle C on the piano is 1.30 m and the wave speed is 344 m/s. What is its frequency as it travels in air at room temperature?
2. The speed of sound in seawater is 1531 m/s. Find the wavelength in seawater of a sound wave where the frequency is 256 Hz.

$$f = \frac{v}{\lambda} = \frac{344 \text{ m/s}}{1.30 \text{ m}} = \mathbf{264.6 \text{ Hz}}$$

$$\lambda = \frac{v}{f} = \frac{1531 \text{ m/s}}{256 \text{ Hz}} = \mathbf{5.98 \text{ m}}$$

	<p>3.</p> <p style="text-align: center;"><u>Given:</u>  velocity (<math>v</math>) = 3 m/s  wavelength (<math>\lambda</math>) = 20 m</p> <p style="text-align: center;"><u>Find: frequency (f) and wave period (T):</u></p> $f = \frac{v}{\lambda}$ $T = \frac{1}{f}$	<p style="text-align: center;"><u>Substitute the formulas:</u></p> $f = \frac{3 \text{ m/s}}{20 \text{ m}} = 0.15 \text{ Hz}$ $T = \frac{1}{0.15 \text{ Hz}} = 6.67 \text{ s}$ <p style="text-align: center;"><u>Final Answer:</u>  The frequency, <math>f = 0.15 \text{ Hz}</math> and the period, <math>T = 6.67 \text{ s}</math></p>
<p>F. EVALUATE</p>	<p>Let us now test what have you learned through an assessment:</p> <p><b>“PROBLEM-SOLVING”</b></p> <p>Instructions. The teacher will give a task of problem-solving and the students are expected to solve and answer on the ½ sheet of crosswise paper. A 5-minute time will be given.</p> <ol style="list-style-type: none"> <li>1. Wave whose crests are 30 m apart reach an anchored boat once every 3.0 s. What is its wave speed?</li> <li>2. Before a concert, musicians in an orchestra tune their instruments to the note A, which has a frequency of 440 hertz. What is the wavelength of this sound in air at room temperature? The speed of sound at room temperature is 344 m/s.</li> </ol>	<p>(Assessment – Problem Solving)</p> $v = \frac{\lambda}{T} = \frac{30 \text{ m}}{3 \text{ s}} = 10 \text{ m/s}$ $\lambda = \frac{v}{f} = \frac{344 \text{ m/s}}{440 \text{ Hz}} = 0.78 \text{ m}$
<p>G. EXTEND</p>	<p>At this moment, the next activity will serve as your assignment, entitled:</p> <p><b>“TAKE ME HOME”</b></p> <p>Instructions. Think of a scenario that illustrates the concepts of waves/acoustics at your home and uses what we have discussed in the gummy bear wave machine and popsicle harmonica. Draw your output on a clean short bond paper.</p> <p>Rubric for grading:</p> <p>Correctness/appropriateness of the concept = 50%  Originality/Uniqueness = 30%  Neatness = 20%  <b>TOTAL = 100%</b></p> <p>The deadline for your assignment will be in the next meeting.</p>	<p>(Homework)</p>

	Is there any question or clarification? If none, let's call it a day!	None, Sir! Goodbye and thank you, Sir Jun and Sir Ramil!
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Prepared by:

**JUNE NEIL J. SARMIENTO**  
Pre-Service Teacher

Checked by:

**PROF. RAMIL ARCIOSA**  
Science Resource Teacher



## NARRATIVE REPORT

“Let the waves carry you where the light cannot” – Mohit Kaushik

Waves including the concept of acoustics in daily life reveal the pervasive influence of these phenomena on our experiences and interactions with the world around us. Waves, whether they be sound waves, light waves, or water waves, play a fundamental role in shaping our perceptions and behaviors daily. Hence, waves and acoustics are ubiquitous in our daily lives, shaping our experiences, interactions, and understanding of the world. By recognizing the role of waves in our everyday experiences, we can develop a deeper appreciation for the interconnectedness of science, technology, and society, and gain a greater understanding of the fundamental principles that govern the universe.

As destiny goes into the path of turbulent flow because of the challenges and uncertainties along the way, the point of life flows smoothly as laminar flow is trying to follow. Hence, teaching practice continued its purpose to teach students the scientific concepts that are relevant on a day-to-day basis. The teacher started the class with preliminary activities to set an authority in the four corners of the classroom. This was essential as it reflected the manageable aspect of classroom order for a better learning experience and conducive to learning.

ELICIT. The activity conducted was the “Pictograph review” wherein students were tasked to guess the picture in the sentences by reviewing their prior knowledge about the topic. This helped the students and teachers set boundaries for the concepts discussed in the lesson. Thereafter, the teacher presented the first experiment which was the “Gummy Bear Wave Machine” (ENGAGE) to showcase the wave as an impulse and determine the accumulated waves in an impulse and unbalanced barbels of the gummy bear wave machine. They had appreciated the machine as colorful, fun, and interesting facts about the wave.

Another fun (although noisy) activity to kick off the discussion on sound production and perception. It demonstrated that objects must vibrate to produce a sound using popsicle sticks. The experiment in the EXPLORE part was called “Popsicle Harmonica.” Thereafter, the students were challenged with math word problems to calculate the wavelength, wave speed, period, and frequency of the examples. The use of the triangular technique to solve various problems was very helpful for students to easily identify the given values (EXPLAIN, ELABORATE, AND EVALUATE).

One way to integrate **culture-based learning** into the study of waves and acoustics is to explore the role of music and sound in different cultures. Music is a universal language that transcends cultural boundaries, yet each culture has its unique musical traditions, instruments, and styles. By studying the acoustics of traditional instruments such as the gong and kulintang in the Philippine setting and as part of their traditional dances, students can gain insight into the physics of sound production and propagation while learning about the cultural significance of music in different societies.

Furthermore, cultural case studies can provide valuable context for understanding how waves and acoustics have been applied in practical contexts. For example, students could explore how indigenous cultures have used sound and wave phenomena for communication, navigation, and spiritual practices. Students can gain a deeper appreciation for the ingenuity and resourcefulness of different cultures in harnessing wave phenomena to meet their needs.

## Documentation



## Student's Output & Activities

YouTube Link:

➤ <https://youtu.be/1S8n37u56yM>



# GUMMY BEAR WAVE MACHINE



# POPSICLE HARMONICA

# Chapter 5

# ELECTROMAGNETISM





7 E'S DETAILED LESSON PLAN FOR GRADE 12 HUMSS PHYSICAL SCIENCE  
**Electromagnetism**

I. OBJECTIVES		
A. Learning Competencies/Objectives	At the end of the lesson, the student can: a. differentiate the concepts of electric and magnetic field; b. relate the applications of electromagnetic induction; and c. create a fruit battery experiment.	
II. SUBJECT MATTER	Electromagnetism <ul style="list-style-type: none"> <li>• <i>Electric and Magnetic Fields</i></li> <li>• <i>Electromagnetic Induction</i></li> <li>• <i>Electric Current</i></li> </ul>	
III. LEARNING RESOURCES		
A. References		
1. Teacher's Guide Pages	Young, H. & Freedman, R. (2012). Sears and Zemansky's University Physics with Modern Physics 13 <sup>th</sup> Edition. pages 551-678. McGrayne, S. Bertsch, Kashy, Edwin and Robinson, Frank Neville H. (2024, February 3). electromagnetism. Encyclopedia Britannica. <a href="https://www.britannica.com/science/electromagnetism">https://www.britannica.com/science/electromagnetism</a>	
2. Learner's Materials Pages		
3. Textbook pages		
4. Additional Materials	Smart TV, laptop, whiteboard pen, visual aids/materials, and materials for experiments	
B. Other Learning Resources		
1. Internet Sources	<a href="https://www.youtube.com/watch?v=uJPO297vsQA">https://www.youtube.com/watch?v=uJPO297vsQA</a>  <a href="https://www.youtube.com/watch?v=qkrFH3WCnkM">https://www.youtube.com/watch?v=qkrFH3WCnkM</a>	
Skills	Analyzing, Observing, Listening, Communicating, Problem-Solving, and Making Interference	
Science Concept	An <b>electric field</b> is the region around a charge where electric force is experienced by another charge. A <b>magnetic field</b> is the region around a magnetic pole where a magnetic material experiences magnetic force.	

	<p>A changing electric field can produce a magnetic field.</p> <p>The process of generating current by the relative motion between a wire and a magnetic field is called <b>electromagnetic induction</b>.</p>	
<b>IV. PROCEDURES</b>	<b>Teacher's Activity</b>	<b>Student's Activity/Response</b>
Preliminary Activities	<p><b>Prayer</b> May I request everyone to please stand for our word of prayer to be led to us by our prayer leader this morning Mr. _____.</p> <p><b>Greetings</b> Good morning Grade 12 – HUMSS!</p> <p><b>Checking of attendance</b> Mr. Secretary, are there any absentees for today?</p> <p>Let us give a round of applause to each one of you, we are in perfect attendance. I am so happy with that class.</p> <p><b>Setting of standards</b> Now class, please be reminded of our classroom rules. Please read everyone.</p> <ul style="list-style-type: none"> <li>• Be on time.</li> <li>• Start the class with a prayer.</li> <li>• Treat everyone with respect at all times.</li> <li>• Keep our classroom clean.</li> <li>• Listen and follow directions.</li> <li>• Raise your hand if you have concerns.</li> <li>• Remember our science clap.</li> </ul> <p>I hope each one of you will do positively in our class this day. Is that clear?</p> <p><b>Positive reinforcements</b> Last meeting I gave you homework and now please pass your assignment/output in front.</p> <p>Before we dive into our lesson properly, I just want to commend your active participation in our previous session. Kindly give yourself a round of applause.</p>	<p>Lord, bless every student here, as well as our teacher and pre-service teacher, as we embark on another day of learning. Please give us clear minds and open hearts so we can grasp the knowledge and lessons set before us. Help us to be attentive, and let Your wisdom guide us in our studies. AMEN.</p> <p>Good morning, Sir Jun and Sir Ramil. It's nice to see you today!</p> <p>Sir, I am so glad that there are no absentees for today.</p> <p><i>(Students applauded)</i></p> <p><i>(Students read the classroom rules loud and clear)</i></p> <p>Yes Sir!</p> <p><i>(Collection of homework last meeting)</i></p> <p><i>(Student's extrinsic motivation of learning)</i> <i>(Students applauded)</i></p>

A. ELICIT

Last meeting we successfully learned about a certain topic. Who among you here in class can still remember our previous lesson? Yes, Mr./Ms. \_\_\_\_\_.

Very good! Can someone share what we did last meeting and your takeaways from our previous lesson? Yes, Mr./Ms. \_\_\_\_\_.

At this point, let us have an activity entitled:

**“MAGIC TIME!”**

It is time for us to appreciate the wonders of science through this simple experiment.



Instructions. The teacher will prepare the materials which are the balloons and soda cans and together with the students will do the simple experiment.

Please make a space at the center while silently lifting your chairs.

Guide Questions:

- What can you say about our activity?

Very good, observation.

- What scientific concepts can you derive from our activity?

That is right!

With that being said, our topic that will explain the idea of the concepts of electricity and of course magnetism

Sir, it is all about thermodynamics.

We did a Venn diagram game in which we learned the differences and similarities of the concepts temperature and heat. Also, we demonstrated the heat transfers through experiments which were the Conduction, Convection, and Radiation. Lastly, I learned about the three temperature scales which were the Celsius, Fahrenheit, and Kelvin.

*(Student immediate response)*

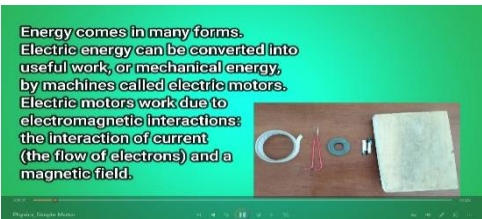
*(Activity time)  
(Appreciation and appraise for the student’s participation)*

Possible responses/answers:  
I/We enjoyed a lot with the activity we did, sir. All I can say is that science is interesting and fun!

The scientific concepts that are integrated into our activity are static electricity, charged electrons, and friction.

	<p>is all about ELECTROMAGNETISM. For us to be guided in our class discussion, kindly read our learning competencies/objectives.</p> <p>d. differentiate the concepts of electric and magnetic field;  e. relate the applications of electromagnetic induction; and  f. create a fruit battery experiment.</p>	<p><i>(Students read the learning competencies/objectives)</i></p>
<p>B. ENGAGE</p>	<p>Class, I have a question.</p> <p>What does it mean when you hear the word, ELECTROMAGNETISM?</p> <p>That is right! In this lesson, we will further engage ourselves in the concepts of electric and magnetic field. Hence, we will do an activity entitled:</p> <p><b>“TRUE OR FALSE”</b></p> <p>Instructions. The teacher will be calling names in the class to choose stars on the screen and answer the given sentence whether a true or a false.</p> <p>Are you ready class?</p> <ul style="list-style-type: none"> <li>• Electric fields are produced by three kinds of charges; positive, negative, and neutral charges.  <i>Rationale: The direction of the force in the electric field that is exerted on a negative charge is opposite that which is exerted on a positive charge.</i></li> <li>• Magnetic fields are associated with two magnetic poles; north and south.  <i>Rationale: The magnetic pole line region of a magnet</i></li> </ul>	<p>Possible responses/answers:  Electromagnetism is a science of charge and of the forces and fields associated with charge. Electricity and magnetism are two aspects of electromagnetism.</p> <p>Furthermore, electric forces are produced by electric charges either at rest or in motion. Magnetic forces, on the other hand, are produced only by moving charges and act solely on charges in motion.</p> <p><i>(Student participation and cooperation)</i></p> <p><i>(Class recitation and discussion)</i></p> <p>Yes Sir!</p> <p>FALSE</p> <p>TRUE</p>

	<p>toward which the lines of magnetic induction converge (south pole) or from which the lines of induction diverge (north pole).</p> <ul style="list-style-type: none"> <li>• The region around the electric charge where the electric force exists is called magnetic field. <i>Rationale: Electric field is an electric property associated with each point in space when charge is present in any form.</i></li> <li>• Magnetic field is an exerted area around the magnetic force and it is obtained by moving electric charges. <i>Rationale: A charged particle produces an electric field. This electric field exerts a force on other charged particles. Positive charges accelerate in the direction of the field and negative charges accelerate in a direction opposite to the direction of the field. A moving charged particle produces a magnetic field.</i></li> <li>• The strength of an electric field is expressed as <math>E = F / q</math>. <i>Rationale: The electric field strength (E) is defined as the amount of force exerted upon a test charge per unit of charge on the test charge (q). That is, <math>E = F / q</math>. The electric force (F) depends upon a number of variables as described by Coulomb's law.</i></li> <li>• The electric field intensity is measured by an electrometer. <i>Rationale: Magnetometer is an instrument used for measuring magnetic forces, especially the earth's magnetism.</i></li> <li>• A magnetic field strength is expressed in Tesla. <i>Rationale: Magnetic field is denoted by B and H. The SI unit of H is amperes per meter and the SI unit of B is Newtons per meter per ampere or Tesla.</i></li> <li>• The magnetic field line can do work, example, the speed and the direction of the charge changes. <i>Rationale: The magnetic field cannot do work since the</i></li> </ul>	<p>FALSE</p> <p>TRUE</p> <p>TRUE</p> <p>TRUE</p> <p>TRUE</p> <p>FALSE</p>
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	<p><i>speed of the particles remain constant.</i></p> <ul style="list-style-type: none"> <li>• Magnetic field is caused by both moving and non-moving charges. <i>Rationale: A magnetic field is generated only by moving charges. The magnetic force is a consequence of the electromagnetic force, one of the four fundamental forces of nature, and is caused by the motion of charges. Two objects containing charge with the same direction of motion have a magnetic attraction force between them.</i></li> <li>• Electric field can do work, for example, the particles change direction &amp; moves. <i>Rationale: When a charged particle moves from one position in an electric field to another position in that same electric field, the electric field does work on the particle. The work done is conservative; hence, we can define a potential energy for the case of the force exerted by an electric field. However, magnetic field cannot do work i.e. the particles change direction but does not move.</i></li> </ul>	<p>FALSE</p> <p>TRUE</p>
<p>C. EXPLORE</p>	<p>Now, let us explore the experiment we did when I where in college on our subject “Electricity and Magnetism” called</p> <p><b>“SIMPLE ELECTRIC MOTOR EXPERIMENT”</b></p> <p>Together with our Physics friends: Regner Dayo Jr. Mark Brian Flores June Neil Sarmiento Bobster Mariano III Katherine Rose Dolormente</p> <p>Are you ready class? Kindly take note of the salient points discussed on the video. Please listen and watch this video presentation:</p> 	<p><i>(Student exploration and cooperation)</i></p> <p>Yes Sir! We are all, ready!</p>



(ICT Integration through video presentation)



Guide Questions:

1. Which of the following materials mentioned in the video are conductors of electricity?

Possible responses/answers:

1. Copper wires, coiled copper, and magnet.

The teacher will discuss conductors and insulators.

2. Describe the interactions that happened in the electric motors.

2. When a conductor is placed in a magnetic field and current flows in the conductor, the magnetic field and the current interact with each other to produce force. The force is called "Electromagnetic force".

3. How does the coil spin?

3. The current goes around the coil so that it points in one direction in one end of the loop and in the other direction at the other end of the loop. The magnetic field at both of these spots points in the same direction.

D. EXPLAIN

The experiment showed that electricity is produced in a wire as it moves through a magnetic field. It also shows that the direction in which the coil moves affects the direction of the current. The conducting material like the coil cuts the magnetic lines of force that produce electric current.

(Developing student's mastery of the concepts)

If we moved the magnet in and out of the magnetic field, is there a current produced?

Possible responses/answers:

- Yes, the effect is the same, but if the magnet does not move, no current is

produced, because no magnetic lines of force exist.

Michael Faraday concluded that when a wire is moved through a magnetic field, a current is generated in the wire.

This process of generating current by the relative motion between a wire and magnetic field is called **electromagnetic induction**.

At this moment, let us further discuss the application of electromagnetic induction through identifying the picture presented on screen.

### “SKL – SHARE KO LANG”

Instruction. The teacher will present a picture on the screen and the students will share their thoughts in the class about the application of electromagnetic induction.

*(Student recitation and collaborative insights)*

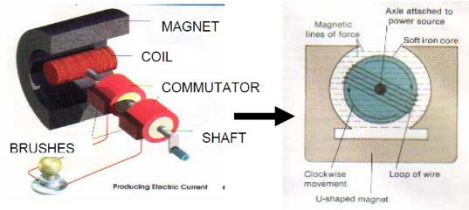
### 1. GENERATOR



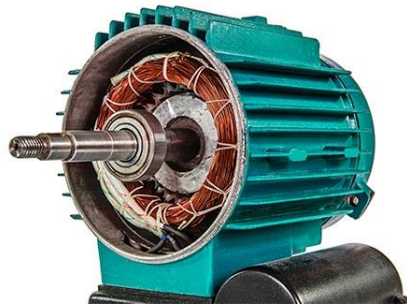
It consists of a u-shaped magnet that produces magnetic field, and insulated loop of wire. The wire loop is attached to a power source placed between the magnetic poles. The power source slowly begins to rotate the wire clockwise. As the wire loop moves, it cuts through the magnetic lines of force that induce current. As the rotation of the wire loop continues, it moves parallel to the magnetic lines of force. When the wire is in this position, no lines of force are cut, therefore, there is no electricity. As it moves further clockwise, the lines of force are cut again producing electricity. The alternate movement of the wire causes alternating current. A rectifier changes alternating current into direct current. A moving loop cuts through a magnetic field, which generates current in the wire.

Possible responses/answers:

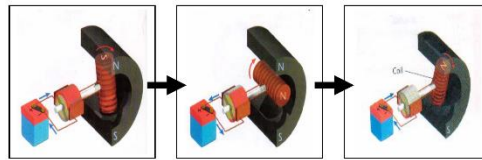
1. A generator operates on the principle of electromagnetic induction. A generator is a device that converts mechanical energy to electrical energy.



## 2. ELECTRIC MOTOR



A motor contains a movable electromagnet. If an alternating current is supplied to the electromagnet, its poles are reversed. Where it was once attracted by the opposite pole of fixed magnet, it will next be repelled. This process is repeated many times each second.



## 3. TRANSFORMER

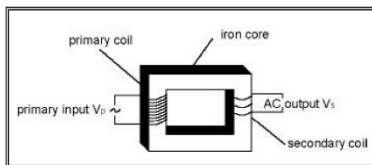


A simple transformer is made of two coils of wire called the primary and the secondary coils. These coils are wrapped around an iron core. As an alternating current passes through the primary coil, the iron core becomes an electromagnet. Because the current changes direction many times each second, the magnetic field also changes its direction and induces an alternating current in the secondary coil.

2. One of the most important uses of electromagnetism is in the electric motor. An electric motor is a device that converts electrical energy to mechanical energy.

3. The alternating current through power lines is at an extremely high voltage. Before alternating current from the power plant can enter your home, its voltage must be decreased. The current must flow through a device called a transformer to decrease the voltage. The transformer regulates the voltage that enters the system. The operation of a transformer operates on the principle of both electromagnetism and electromagnetic induction.

Schematic Diagram of the Parts of a Transformer



E. ELABORATE

Welcome to **“SIR JUN SHOW!”**

“Were In Science, We Trust! In Science, We Unite!”

When I say, SIR!  
Kindly say, JUNELLL...

Instructions. The teacher will present the experiment’s objectives, materials, and procedures. The students will be guided by the teacher.

**“FRUIT BATTERY EXPERIMENT”**



**Objectives**

At the end of the experiment, the students will be able to:

1. Describe the flow of electrical energy through a simple series circuit;
2. Explain how the potato battery works and the science behind it; and
3. Evaluate the potato battery experiment.

**Materials**

- 4 pcs. of fresh potatoes
- 4 pcs. of zinc nails
- 4 pcs. of copper pennies
- Copper wires
- Small LED light bulb
- Multimeter/Voltmeter
- Plywood



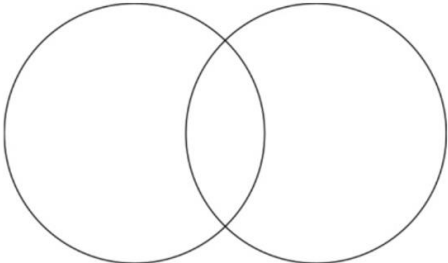
JUNELLL...

*(Student participation and cooperation)*

F. EVALUATE

Now class, let us proceed to our **“Assessment – Venn Diagram”**

*(Assessment – Venn Diagram)*

	<p>Instructions. Complete the Venn diagram below on the differences between electric field and magnetic field as well as the similarities. Write your answers on ¼ sheet of paper. A 5-minute timer will be given.</p> <p style="text-align: center;">Electric field    Magnetic field</p>  <p>Time's up! Class. Please pass your papers in front. 1, 2, 3...</p>	<p><i>(Student's response)</i></p>
<p>G. EXTEND</p>	<p>At this moment, the next activity will serve as your assignment, entitled:</p> <p><b>“WHAT HAPPENED?”</b></p> <p>Instructions. Create an observatory report and describe the flow of electrical energy through a simple series circuit on the “Fruit Battery Experiment” you did by group. Answers must be typewritten on an A4 bond paper which includes the following: Hypotheses, Materials, Procedures, Conclusion, and Documentation.</p> <p>Rubric for grading:  Correctness/appropriateness of the concept = 50%  Organization of ideas = 30%  Completion of experiment = 20%  TOTAL = 100%</p> <p>The deadline for your assignment will be in the next meeting.</p> <p>Is there any question or clarification?  If none class, please be reminded that as for the wonders of SCIENCE, this is the reality that we could never escape.</p> <p>Let's call it a day!</p>	<p><i>(Homework)</i></p> <p>None, Sir!</p> <p>Goodbye and thank you, Sir Jun and Sir Ramil!</p>

Prepared by:

**JUNE NEIL J. SARMIENTO**

Pre-Service Teacher

Checked by:

**PROF. RAMIL ARCIOSA**

Science Resource Teacher



## NARRATIVE REPORT

Navigating the complex mathematics and abstract concepts inherent in electromagnetism has been no small feat. From understanding Maxwell's equations to grasping the behavior of electromagnetic waves, each topic has demanded patience, persistence, and a willingness to grapple with ambiguity.

Yet, with each hurdle overcome, there is a sense of accomplishment and a deeper appreciation for the elegance of nature's design. Whether it is seeing the practical applications of electromagnetism in technologies like motors, generators, and wireless communication, or pondering the profound implications for our understanding of the universe at a fundamental level, the journey through electromagnetism has been immensely rewarding.

Moreover, studying electromagnetism has taught students valuable lessons beyond the realm of physics. It has honed students' problem-solving skills, encouraged students to think critically and analytically, and instilled a sense of wonder and curiosity about the world around them; through short experiments about static electricity (ELICIT).

The teacher presented the "True or False" activity on the TV screen and each student was expected to stand and choose a star with a corresponding statement (ENGAGE). Using multimedia tools in teaching, the teacher showed his experiments way back when he was in college. This would help learners to appreciate the wonders of science wherein the impossible to happen would possibly happen because of the idea of electromagnetism (EXPLORE, ELABORATE, EVALUATE, and EXTEND).

EXPLAIN. In this part, the students were ready to think and share some of the real-life applications of the lesson which was electromagnetic induction. The teacher presented the activity called "Share Ko Lang (SKL)," wherein the students are expected to share their insights about the given applications of electromagnetic induction which are the generators, electric motors, and transformers. Ultimately, the importance of shared insights of the students accounted for the **culture-based perspectives** of the students.

Exploring electromagnetism through the lens of culture provides a unique perspective, highlighting how scientific concepts intersect with human creativity, innovation, and societal progress. In many cultures, electromagnetism has played a pivotal role in shaping technological advancements and influencing artistic expression. For example, the development of electricity and magnetism has revolutionized communication, transportation, and entertainment, fundamentally altering the way people interact and engage with the world.

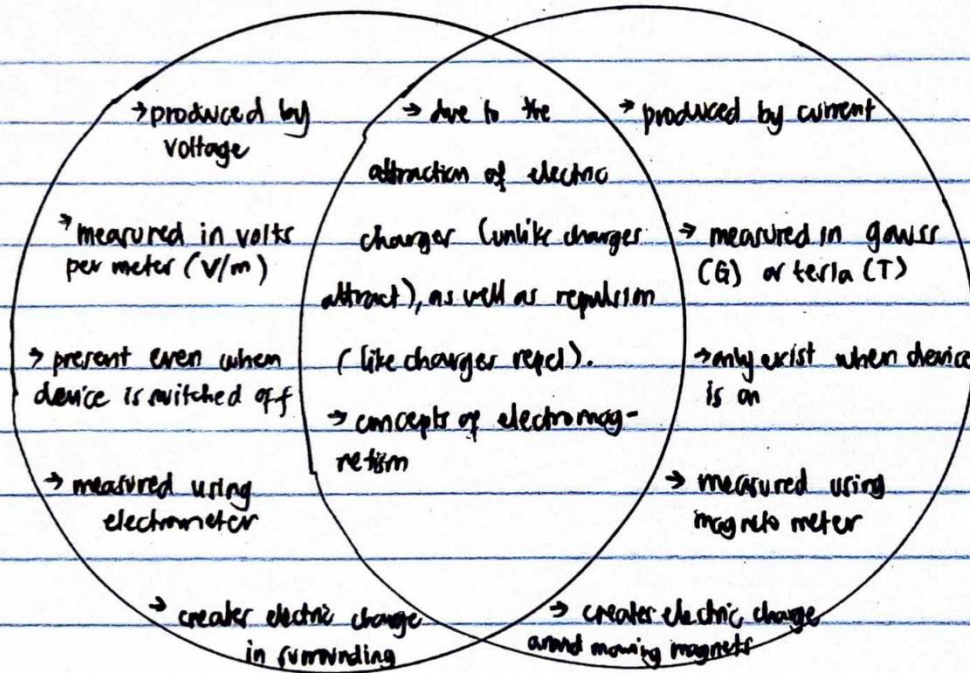
# Documentation



## Student's Output & Activities

YouTube Link:

➤ [https://youtu.be/u\\_M6BwFh5jM](https://youtu.be/u_M6BwFh5jM)



Electric Field

Magnetic Field

# **Chapter 6**

## **OPTICS**



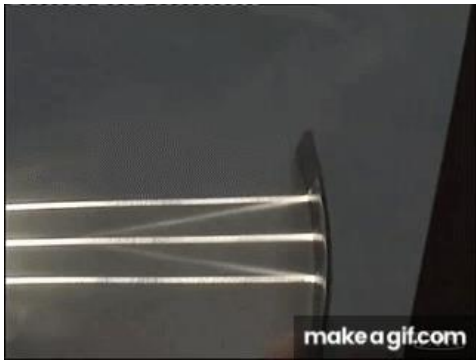


**7 E'S DETAILED LESSON PLAN FOR GRADE 12 HUMSS PHYSICAL SCIENCE**  
**FINAL DEMONSTRATION**  
**OPTICS**

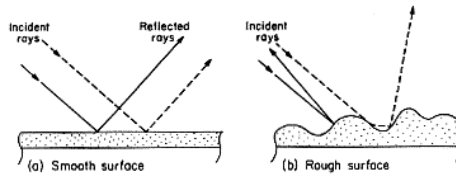
<b>I. OBJECTIVES</b>		
A. Learning Competencies/Objectives	At the end of the lesson, the student can: <ol style="list-style-type: none"> <li>a. differentiate what happens when light is reflected, refracted, transmitted, and absorbed;</li> <li>b. illustrate simple anatomy of the human eye; and</li> <li>c. show awareness of the various light phenomena.</li> </ol>	
<b>II. SUBJECT MATTER</b>		
	Optics	
<b>III. LEARNING RESOURCES</b>		
<b>A. References</b>		
1. Teacher's Guide Pages	Cudera, R., Carreon, H., & Morales, N. (2016). <i>Physical Science for Senior High School</i> . Mutya Publishing House, Inc. pages 154-175.  Young, H. & Freedman, R. (2012). <i>Sears and Zemansky's University Physics with Modern Physics 13th Edition</i> . pages 1080-1105.	
2. Learner's Materials Pages		
3. Textbook pages		
4. Additional Materials	Laptop, PowerPoint presentation, and multimedia (video and images)	
<b>B. Other Learning Resources</b>		
1. Internet Sources	<a href="https://www.youtube.com/watch?v=9OJ7piwbbHc">https://www.youtube.com/watch?v=9OJ7piwbbHc</a>	
Skills	Analyzing, Observing, Listening, Communicating, and Making Interference	
Science Concept	<b>Properties of Light</b> <ul style="list-style-type: none"> <li>• Reflection – As light travels through matter, it might encounter a smooth surface or rough surface.</li> <li>• Refraction – Light bends when it changes medium because the speed of light varies in each medium.</li> <li>• Transmission – Some materials allow much of the light that falls on them to move through the material without being reflected.</li> </ul>	

	<ul style="list-style-type: none"> <li>• Absorption – The ability of objects to absorb light is dependent on the electromagnetic frequency of the light.</li> </ul> <p><b>Parts of the Human Eye</b></p> <ul style="list-style-type: none"> <li>• Cornea</li> <li>• Pupil</li> <li>• Iris</li> <li>• Lens</li> <li>• Retina</li> <li>• Optic nerve</li> </ul> <p><b>Various Light Phenomena</b></p> <ul style="list-style-type: none"> <li>• Blue skies</li> <li>• White clouds</li> <li>• Reddish sunset</li> <li>• Rainbow</li> <li>• Mirage</li> </ul>	
<b>IV. PROCEDURES</b>	<b>Teacher's Activity</b>	<b>Student's Activity/Response</b>
Preliminary Activities	<p><b>Prayer</b> May I request everyone to please stand for our word of prayer to be led to us by our prayer leader this morning Mr. _____.</p> <p><b>Greetings</b> Good morning Grade 12 – HUMSS!</p> <p><b>Checking of attendance</b> Mr. Secretary, are there any absentees for today?</p> <p>Let us give a round of applause to each one of you, we are in perfect attendance. I am so happy with that class.</p> <p><b>Setting of standards</b> Now class, please be reminded of our online classroom rules. Please read everyone.</p> <ul style="list-style-type: none"> <li>• Be on time.</li> <li>• Be attentive.</li> <li>• Start the class with a prayer.</li> <li>• Treat everyone with respect at all times.</li> <li>• Act like you are at school.</li> <li>• Keep your microphone muted unless you are asked to speak.</li> <li>• Listen and follow directions.</li> </ul>	<p><i>Lord, bless every student here, as well as our teacher and pre-service teacher, as we embark on another day of learning. Please give us clear minds and open hearts so we can grasp the knowledge and lessons set before us. Help us to be attentive, and let Your wisdom guide us in our studies. AMEN.</i></p> <p><i>Good afternoon. Sir Jun and to all the evaluators. It's nice to see you this afternoon!</i></p> <p><i>Sir, I am so glad that there are no absentees for today.</i></p> <p>(Students applauded)</p> <p>(Students read the classroom rules loud and clear)</p>

	<ul style="list-style-type: none"> <li>• Tap the raise hand emoji if you have concerns.</li> </ul> <p>I hope each one of you will do positively in our class this day. Is that clear?</p>	<p><i>Yes Sir!</i></p>
<p>A. ELICIT</p>	<p><b>Review</b> Last meeting we successfully learned about a certain topic. Who among you here in class can still remember our previous lesson? Yes, Mr./Ms. _____.</p> <p>Very good! Can someone share what we did last meeting and your takeaways from our previous lesson? Yes, Mr./Ms. _____.</p> <p>It is good that there are concepts retained in your mind, class.</p> <p><b>Motivation</b></p> <p><b>“NEWTON’S CONCEPT OF LIGHT – STORY”</b></p> <p>Class, do you want to hear a story?</p> <p><a href="https://www.youtube.com/watch?v=9OJ7piwbbHc">https://www.youtube.com/watch?v=9OJ7piwbbHc</a></p> <p>The end.</p> <p>Now, let us gather words from our class that can be related or associated with our story in a Word Cloud (Mentimeter). To participate, kindly click this link: <a href="http://www.menti.com">http://www.menti.com</a> and answer the question: what key concepts can you derive from our story, class?</p> <p>It is very good to come up with various ideas, concepts, and insights into words from our class.</p> <p>(The teacher will consolidate and sort the word association of the students)</p> <p>Now, what do you think is our lesson for this afternoon?</p> <p>All right, then our topic for today is all about OPTICS. Kindly read our learning competencies/objectives.</p>	<p><i>Sir, it is all about waves and acoustics.</i></p> <p><i>We conducted a Gummy Bear Wave Machine Experiment wherein we demonstrated how the waves propagate according to their medium, mode, and orientation. Also, we created our own Popsicle Harmonica wherein we produced sound through vibrations, and appreciating how our ears work was somehow interesting that we learned.</i></p> <p>(Student’s participation using Mentimeter)</p> <p><b>OPTICS!</b></p>

	<p>g. differentiate what happens when light is reflected, refracted, transmitted, and absorbed;</p> <p>h. illustrate simple anatomy of the human eye; and</p> <p>i. show awareness of the various light phenomena.</p> <p>These objectives serve as our guide and expected achievement at the end of our lesson.</p>	<p>(Students read the learning competencies/objectives loud and clear)</p>
<p>B. ENGAGE</p>	<p>At this moment, please be ready for our first activity entitled:</p> <p><b>“JUMBLE WORD OBSERVATION”</b></p> <p>Instructions: The teacher will present short video clips about the properties of light and the students are expected to answer the given jumble words on their screen by writing their answers in the Google Meet chat box. A student will be called to share their observations on the short video clip.</p> <p>Click the heart emoji on your screen if you are all ready.</p> <p>Here is the first short video clip. Alright, please write your answers in the chat box.</p>  <p><b>1. T I R E O N F C L E</b></p> <p>Can someone share his/her observation in the short video clip? Yes, Mr./Ms. _____.</p> <p>(The teacher will present the first property of light – REFLECTION)</p> <p>We always encounter light daily. We feel and see it almost everywhere. Thus, we human beings need to learn the – <b>PROPERTIES OF LIGHT</b></p> <p>A. <b>Reflection</b> – As light travels through matter, it might encounter a smooth surface (mirror) or a rough</p>	<p>(Student’s participation in answering questions)</p> <p>(Student’s respond to the teacher)</p> <p>(Student’s guesses)</p> <p><i>REFLECTION</i></p> <p><i>The light rays reflect to a surface wherein it bounces all the light to a specific direction.</i></p>

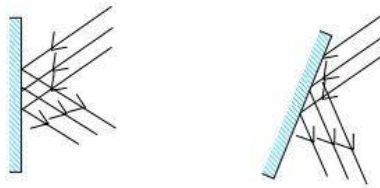
surface (paper, wood, cloth, or skin that is not shiny).



<https://osa.magnet.fsu.edu/teachersparents/articles/images/reflectionoflight02.gif>

**Think about it:**

To reduce the glare of the surroundings, the windows of some department stores, rather than being vertical, slant inward at the bottom. How does this reduce the glare?



<https://homework.study.com/cimages/multiimages/16/capture1560061831366789527.jpg>

Okay, second short video clip. Arrange the jumbled words correctly. Write your answers in the chat box.

*This slant reflects the sunlight further down toward the ground than would have happened if they were vertical.*

(Student's guesses)



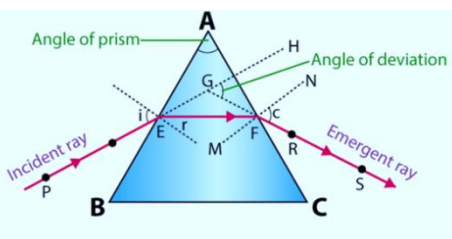
**REFRACTION**

**2. NOIFARCTEFR**

Can someone share his/her observation in the short video clip? Yes, Mr./Ms. \_\_\_\_\_.

*There is a change in the direction of the arrow as it passes from air through the glass and water.*

**B. Refraction** – This is also known as bending. Light bends when it changes medium because the speed of light varies in each medium.

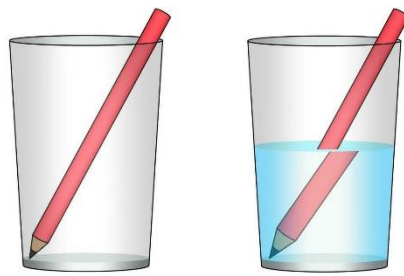


<https://www.learnatnoon.com/s/in/explain-the-refraction-of-light-through-a-triangular-glass/9206/>

**Think about it:**

When does the pencil look broken when placed in a glass half-filled with water?

### Refraction of Light



Empty Glass + Pencil

Glass + Water + Pencil

<https://i.pinimg.com/originals/5b/99/85/5b99854b37c40e10b3dfef29ac0c4456.jpg>

*Light first travels through the air – which is easy to move through – and then through the water, where it slows down. This change in speed causes the light to bend.*

Next, the third short video clip.  
Arrange the jumbled words correctly.  
Write your answers in the chat box.



(Student's guesses)

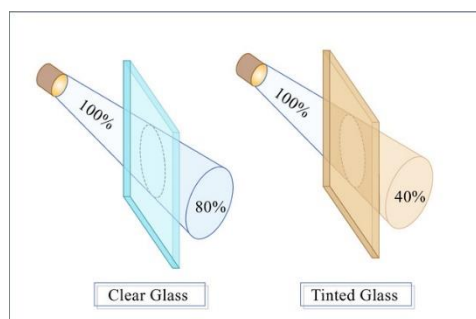
### 3. SSRTNIOANSIM

Can someone share his/her observation in the short video clip?  
Yes, Mr./Ms. \_\_\_\_\_.

TRANSMISSION

**C. Transmission** – Some materials allow much of the light that falls on them to move through the material without being reflected. Materials that allow transmission of light through them are called transparent (glass and clear water). Do not allow transmission of light (opaque).

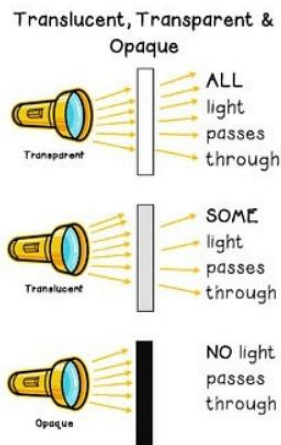
*When light hits an object that is transparent or translucent like the glass of a window, the light can penetrate the material to travel all the way through.*



[https://live.staticflickr.com/4118/4816216822\\_0e723c8f2f\\_z.jpg](https://live.staticflickr.com/4118/4816216822_0e723c8f2f_z.jpg)

**Think about it:**

What makes an object transparent, translucent, and opaque? List some items that are considered transparent, translucent, and opaque.



<https://images.collegedunia.com/public/image/04e105ab6220f3e82c35b353dec25b21.png>

Alright, here is the fourth short video clip.

Arrange the jumbled words correctly. Write your answers in the chat box.



**4. B R P A S O O N I**

Can someone share his/her observation in the short video clip? Yes, Mr./Ms. \_\_\_\_\_.

**D. Absorption** – This occurs when an object does not reflect or transmit the light. The ability of objects to absorb light is dependent on the electromagnetic frequency of the light being transmitted and the nature of the atoms in the object.

**Think about it:**

Why does wearing black shirts on sunny days make you feel hot?

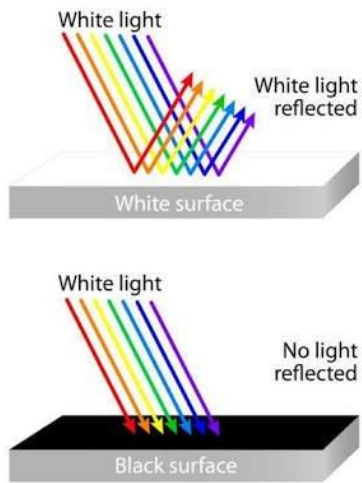
*Those objects through which light can pass easily are called transparent objects e.g. water, glass. Those objects through which light can pass partially are called translucent objects e.g. tracing paper, and waxed paper. The objects that do not allow the light to pass through are called opaque objects e.g. wood, or stone.*

(Student's guesses)

**ABSORPTION**

*Our eyes can tell what the leaf makes green and for us to understand behind it, other colors were absorbed and only green color reflected to our eyes.*

*Darker or black clothing absorbs more wavelengths, absorbing more heat, hence making the clothing warmer to wear.*



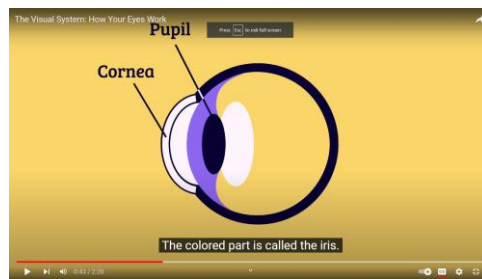
<https://qph.cf2.quoracdn.net/main-qimg-ca3bf4869d788e2fc100bde9f63492f3-lq>

C. EXPLORE

Now, let us watch the video presentation **“THE VISUAL SYSTEM: HOW YOUR EYES WORK”**

Instructions: The teacher will present a video about how the human eye works. The students are expected to draft an illustration of the anatomy of the human eye and write the salient points discussed in the video.

YouTube video link:  
<https://www.youtube.com/watch?v=TY1giZgddAs>



(Student’s appreciation of the topic and responsibility to take notes while the video is playing)

(The students will draft an illustration of the anatomy of the human eye and write the salient points discussed in the video)

D. EXPLAIN

You have already watched how our eye works through the video presentation. Now, it is high time to go deeper into the **“HUMAN EYE; AS AN OPTICAL INSTRUMENT”**

Instructions: Finalize your illustration of the anatomy of the human eye on a clean short/A4 bond paper by taking a picture of it and kindly send it to our official messenger group chat “12 – HUMSS Physical Science (w/ Sir Jun)”. A 5-minute timer will be given to each of the students.

(The teacher will present the output of the students)

(The students will send a picture of their illustration/output of the anatomy of the human eye in the official messenger group chat)

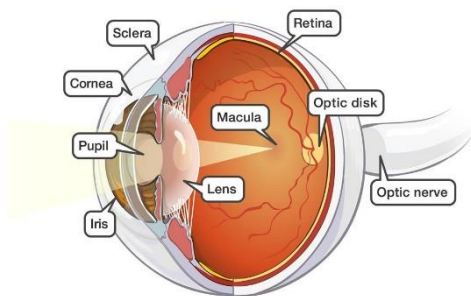
In the video presented, here are the guide questions that must be answered and I will use the “Spin the Wheel” to identify students who will answer the question.

Is that clear, class?



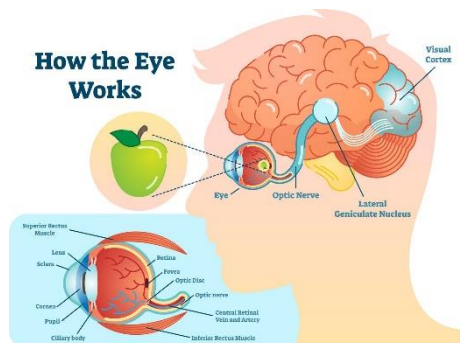
Guide Questions:

1. What are the important parts of the human eye to function?

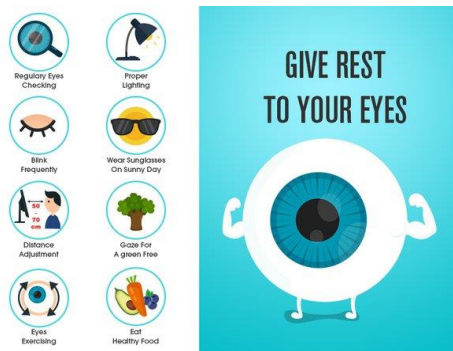


© AboutKidsHealth.ca

2. How the human eye works?



3. Why is it important to take care of your eyes?



Yes, Sir!

*The cornea, a clear window at the front of the eye, covers the iris and the pupil. A clear lens, located behind the pupil, acts like a camera lens by focusing light onto the retina at the back of the eye. The retina is a light-sensitive inner lining at the back of the eye.*

*The lens works together with the cornea to focus light correctly on the retina. When light hits the retina (a light-sensitive layer of tissue at the back of the eye), special cells called photoreceptors turn the light into electrical signals.*

*Your eyes are an important part of your health. Most people rely on their eyes to see and make sense of the world around them. However some eye diseases can lead to vision loss, so it is important to identify and treat eye diseases as early as possible.*

E. ELABORATE

Welcome to “**SIR JUN SHOW!**”

“Were In Science, We Trust! In Science, We Unite!”

When I say, SIR!  
Kindly say, JUNELL...

At this time, let us appreciate the wonders of science through our activity called: **“FAMILY FEUD: Online Class Edition”**

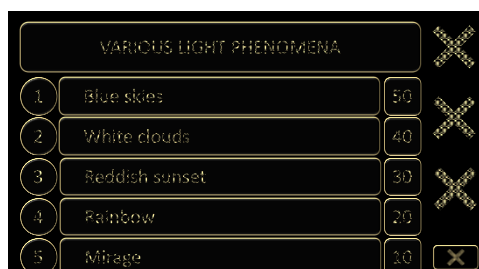
Instructions: The class will be divided into two groups. Each group will choose a leader. To start the first round, leaders from each group will have a “Face-Off”

#### Gameplay (Face-Off)

- The leader who first taps the raise hand button and provides an answer that reveals the highest ranking on the board can choose for their team to pass, or play.

#### Gameplay (Continued)

- After a team has chosen to pass or play, the playing team must guess the remaining answers on the board.
- Players on the team answer one at a time, within 10 seconds of hearing the question, with no help from their other teammates. If a player incorrectly guesses or doesn't provide a guess in time, the team receives a strike.
- When a team reaches 3 strikes, the opposing team has a chance to steal the board. The opposing team can work together to quickly come up with an answer.
- If the opposing team reveals one of the remaining answers on the board, the opposing team steals all the revealed points for that round.
- If the opposing team is unable to reveal an answer on the board, the playing team keeps the points they've earned and the round is over. The remaining answers are revealed.



VARIOUS LIGHT PHENOMENA		
1	Blue skies	50
2	White clouds	40
3	Reddish sunset	30
4	Rainbow	20
5	Mirage	10

JUNELL...

(Student's participation and cooperation by group)

(The teacher will present the pictures of the various light phenomena and discuss briefly why they happen)

(Student's real-world observation of the different light phenomena)

### 1. Blue skies



- White light from the sun
- Rayleigh Scattering (selective)
- Blue light is scattered in all directions (short wavelength)
- Light travels a shorter distance

### 2. White clouds



- Light interacts with water droplets (clouds)
- Sunlight is equally scattered by much larger water droplets
- Cloud scatters all wavelengths with roughly the same effectiveness.

### 3. Reddish sunset



- White light from the sun
- Sunlight travels a longer path through the atmosphere to reach our eyes (red as the longest wavelength)
- Pass through pollutants (severe)

### 4. Rainbow



- Result of the refraction and reflection of light to water droplets (e.g. raindrops or fog)

### 5. Mirage



- Layers of air of varying density
- Deceptive appearance of a distant object or object caused by the bending of light rays (refraction)

### F. EVALUATE

Let us now test what have you learned through an “ASSESSMENT”

Instructions: The teacher will send a link and Game PIN in the Google Meet chat box: <https://kahoot.it/> to access the assessment. The students will answer the multiple-choice type of questions by choosing the correct answer on the four choices given. <https://create.kahoot.it/share/assessment-optics-final-demo/32aa2c3e-45e9-499d-8e72-16fe44e69c5d>

1. Which of the following properties of light travels through a regular and an irregular surface?
  - a. **Reflection**
  - b. Refraction
  - c. Transmission
  - d. Absorption
2. Why light bends when it changes medium?
  - a. Wavelength of light varies in each medium
  - b. Frequency of light varies in each medium
  - c. **Speed of light varies in each medium**
  - d. Amplitude of light varies in each medium

(Student’s assessment)

	<p>3. Which part of the human eye where the image form is inverted or upside-down?  a. Cornea      c. Iris  b. Pupil      d. <b>Retina</b></p> <p>4. Which is NOT good for our human eye?  a. Proper lighting  b. <b>Blink occasionally</b>  c. Eyes exercising  d. Distance adjustment</p> <p>5. What is the result of refraction and reflection of light to water droplets?  a. Mirage      c. White cloud  b. Blue sky    d. <b>Rainbow</b></p>	
<p>G. EXTEND</p>	<p>At this moment, the next activity will serve as your assignment, entitled:  <b>“BE A RESEARCHER!”</b></p> <p>Instructions: Find other light phenomena (5 or more) by searching from the internet or library. Copy-paste and take a photo of the phenomena and make an explanation of why it happens. The answers must be computerized on a short bond paper.</p> <p>Criteria for grading:  Exploration of the phenomenon (explanation) = 50%  Photo image (clarity) = 50%  <b>TOTAL = 100%</b></p> <p>The deadline for your assignment will be in the next meeting.</p> <p>Is there any question or clarification?  If none class, please be reminded that as for the wonders of SCIENCE, this is the reality that we could never escape.</p> <p>Let’s call it a day!</p>	<p>(<i>Homework</i>)</p> <p>None, Sir!</p> <p>Goodbye and thank you, Sir Jun!</p>

Prepared by:

**JUNE NEIL J. SARMIENTO**

Pre-Service Teacher

Checked by:

**PROF. RAMIL ARCIOSA**

Science Resource Teacher



## NARRATIVE REPORT

Foreseeing the uncertainties in education has been one of the essential strategies in conducting classes in a synchronous mode of learning. Hence, the SKSU--Laboratory High School initiated an online final demonstration through the memorandum order from the Dean of the College of Teacher Education.

Studying optics has been a journey of discovery, unveiling the intricate workings of light and its interaction with matter. From understanding the behavior of light waves to exploring the phenomena of reflection, refraction, and diffraction, optics has offered a window into the fundamental principles that govern how students perceive the world around them (ELICIT)

One of the most captivating aspects of optics is its ability to bridge the gap between the abstract and the tangible. Through experiments with lenses, mirrors, and prisms, the students have been able to witness firsthand the transformation of light as it bends, scatters, and converges, giving rise to stunning visual effects and optical illusions. These experiences have not only deepened my understanding of optical phenomena but have also sparked a sense of wonder and curiosity about the nature of light itself (ENGAGE and EXPLORE).

Moreover, optics has practical implications that extend far beyond the confines of the laboratory. From the design of camera lenses and microscopes to the development of laser technology and optical fibers, the applications of optics are ubiquitous in modern life, driving innovations in fields ranging from medicine and telecommunications to astronomy and beyond (EXPLAIN and ELABORATE).

Studying optics has also challenged students to think critically and creatively about problem-solving. Whether analyzing the behavior of light in complex optical systems or designing experiments to test theoretical predictions, optics has demanded precision, attention to detail, and a willingness to explore new ideas and approaches (EVALUATE).

Furthermore, optics has provided insights into the interconnectedness of scientific disciplines. From its roots in physics and mathematics to its applications in engineering, biology, and beyond, optics serves as a nexus where diverse fields converge, highlighting the interdisciplinary nature of scientific inquiry (EXTEND).

In reflecting on my practice teaching journey through optics, I am reminded of the profound impact that scientific exploration can have on our understanding of the natural world and our ability to harness its wonders for the betterment of society. As I continue to delve deeper into the realm of optics and beyond through **culture-based education**, I am inspired by the endless possibilities that lie ahead and the opportunity to contribute to the ongoing quest for knowledge and discovery.



SULTAN KUDARAT STATE UNIVERSITY  
LABORATORY HIGH SCHOOL



# YOU ARE INVITED

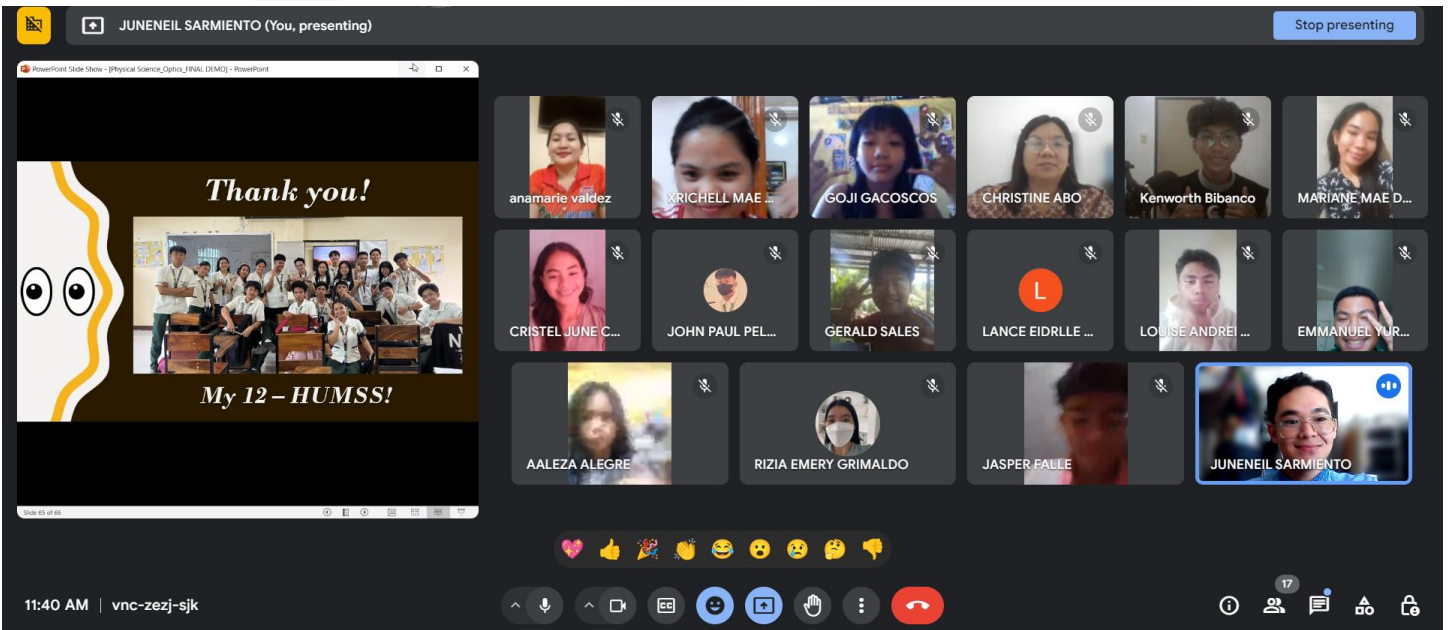


## ONLINE FINAL DEMONSTRATION

**PHYSICAL SCIENCE**  
GRADE 12 - HUMSS  
APRIL 11, 2024 (10:00 - 11:15 AM)  
THURSDAY

juneneilsarmiento@sksu.edu.ph

To join the video meeting, click this link:  
<https://meet.google.com/vnc-zezj-sjk>  
Otherwise, to join by phone, dial +1 661-622-3656 and enter this PIN: 609 247 001#



## Student's Output & Activities

Online Class Link:

- <https://www.loom.com/share/a3794b64d5e946958ee0839e7f9ab3a7?sid=9f7c24fc-b9fb-42ef-93b2-d9e1f364b155>

