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CENTRAL BICOL STATE UNIVERSITY OF AGRICULTURE
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DETAILED LESSON PLAN

MATH8

Learning Competency

● Solving a problems and master all formulas

Learning Outcomes

At the end of the lesson, 75% of the learners are able to:

1. investigate the relationship between the longest side and the largest angle in the triangle and vice versa;
2. investigate the relationship between the sum of any two sides and the remaining sides in a triangle;
3. illustrate theorems on triangle inequalities such as the Exterior Angle Inequality Theorem, Triangle Inequality Theorem, and Hinge Theorem with its converse; and
4. connect theorems in triangle inequalities in real-life setting

Subject Matter

Illustrating Theorems on Triangle Inequalities

References:

- MATH8-Q4-MOD1.pdf (depedtambayan.net)

Materials:

- Laptop
- TV or projector
- Speaker
- PowerPoint presentation
- Copy of the listening text to be provided (The Dog and the Bone, The Thirsty Crow)

Procedure

TEACHER'S ACTIVITY	STUDENT'S ACTIVITY

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A. Preparation **1. Prayer** "Okay, class, let us all stand up for the prayer."	(The teacher has already assigned the students to lead the prayer in alphabetical order.) In the name of the father… Amen.
2. Greetings "Good morning, class!"	-Good morning, sir! Good morning, classmates!
"Alright, you may take your seats."	(Students take their seats)
3. Checking of Attendance "May I ask the secretary of this class for the attendance. Who is absent this morning?"	-(Secretary checks attendance) None, sir!

"Wow, that's great, everyone is here! How are you today?"	
4. Review "Before we proceed to our next topic let us Have a short review about. Who among you can still remember our last topic?	-(Students' answer how they are feeling that day.)
	(Students raise their hands.)
"Yes, correct! Very good. We discussed about Illustrating Theorems on Triangle Inequalities"	- Sir , the topic we discussed last meeting is all about the application of exterior angle inequality theorem.
"Yes, _____."	
"That's right! I am glad that you've already understood our lesson, let's move to our next topic.	sir exterior inequality theorem state that the measure of an exterior angle of a triangle is greater than the measure of the either remote interior angle.
5. Motivation But before that let's have a game first. Our game is called "WIKA RAMBULAN." Class, do you know that game?	- no sir
Since not everyone knows how to play thegame, I will flash the mechanics, can you please read, (choose student)	Mechanics of the game.

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Example 1: Pray-Queen-sea-tea-ball means “Frequency table” Example 2: Quo-wide-ray-lee-tea-reelmeans “Quadrilateral” Class, is that clear? Since you understand the game let’s begin. 1. May-shore-meant 2. Pooh-lay-gone 3. Tea-you-ray-I'm 4. Pass-sea-ball-ray-inks 5. Try-young-gel-and-I-quo-lay-tea 6. Try-young-gel-has-threw-say-aids 7. Pour-teen-ace-lace-done-say-vane-teen 8. Duh-sum-off-and-tear-your-angels-offtry-young-gel-is-180° 9. sea-vane-ace-gray-tea-are-done-won	1. The players will group into 4, based onthe color on their name tags: orange, pink, green, and red. 2. Wika Rambulan is rumbled word andeach player will try to find out what that word is. 3. After guessing the word, the playersget the answer in front and put it to his/her forehead. 4. The group who will first answer -yes sir Measurement Polygon Theorem Possible range Triangle Inequality Triangle has three sides. 14<17

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	The sum of interior angles of triangle is 180°
“Do you have any other questions?” “Alright, you may start. You have 3 minutes tofinish.” “Okay, time is up! Are you done?”	7 > 1 -none, sir
(Teacher creates a word web and asks students what they have written in their paper.)	(Students will provide their answers and the teacher writes them on the board)
From our previous game, what do you think is our lesson for today? Yes, John Paul. ‘That’s correct!’ Please, come in front and cut the hat of Triangula then pull it, to know if you guessed the topic correctly? Everyone, please read what’s on the board. John Paul is correct, our lesson today is all about Illustrating Theorems on Triangle Inequalities	I think it is all about triangle Inequality. (John Paul will go in front to cut and pull the hat of cute-angel) Illustrating Theorems on Triangle Inequalities

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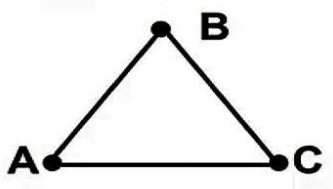
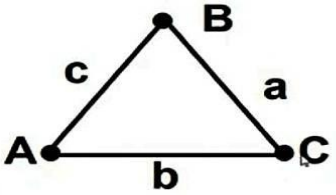
6. Discussion	
"Class What comes to your mind when you hear the word triangle inequalities? Yes, Eliza!"	(Students will raise their hands to answer)
	sir, when I hear the word triangle inequalities, it comes to my mind that their corresponding angles and sides are not congruent. In other words, triangle inequalities do not equal in sides and angles
That's right, Eliza! Class, do you still remember what triangle inequality theorem 3 states?	Yes, sir.
Who wants to recall what that theorem is all about? Yes, Jomer!	Triangle inequality theorem (S1 +S2 >S3) states that sum of the lengths of any two sides of a triangle is greater than the length of the remaining side.
Can you please come in front and open the bag of Ms. Triangula to see if your answer is correct?	(Jomer will go in front to pull the nose of Ms. Triangula)
Excellent, Jomer. Your answer is correct!	

Anyway, how do we represent the lengths of the sides of a triangle? Yes, Dianne! How? Can you illustrate it, to your classmates using this triangle?  "Wow, very good! Thank you very much for all your inputs! Your answers are all correct." "For you to understand further, let us have another discussion!" *While Listening -* **Group Activity** Instructions: The students will be divided into 5; they will realife application of triangle. Its that clear?	sir in representing the lengths of the sides, we can use a small letter of the angle to its opposite side. Sure sir 

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Lets come up now to the discussion There are various theorems on triangle inequalities. These theorems can be illustrated in one triangle and in two triangles. The most commonly used theorems in one triangle are Angle-Side Relationship Theorem, Triangle Inequality Theorem, and Exterior Angle Inequality Theorem. On the other hand, the Hinge Theorem (SAS Inequality Theorem) and the Converse of Hinge Theorem (SSS Inequality Theorem) illustrate the inequalities in two triangles. To fully understand these theorems, read and understand the figures and illustrations below. **Inequalities in One Triangle** In your activity in Measuring Angles and Sides you found out that there is a relationship between the measure of the angle and the length of the side of a triangle. This theorem is referred to as Angle-Side Relationship Theorem which states that: In a triangle, the side opposite the larger angle is the longer side and vice versa. To know more about this theorem, examine the following examples: Example 1: Compare the length of the sides of the following triangle.	Yes sir

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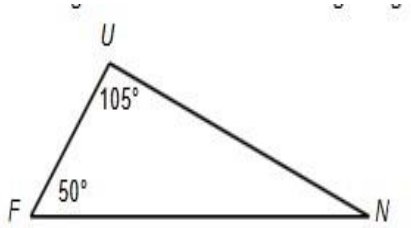


Solution:

Step 1: Find the measure of the third angle. The sum of all the angles in any triangle is 180º.

$\angle F + \angle U + \angle N = 180°$ Sum of interior angles of a triangle

$50° + 105° + \angle N = 180°$ By substitution

$\angle N + 155° = 180°$ Adding 50° and 105°

$\angle N + 155° + (-155°) = 180° + (-155°)$ Addition property of equality

$\angle N + 0 = 180° - 155°$ Identity property of addition

$\angle N = 25°$ By simplifying

Step 2: Look at the relative sizes of the angles and compare.

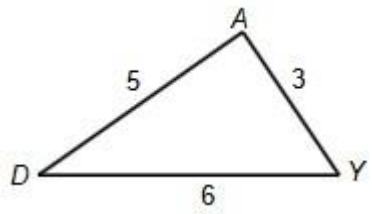
$\angle N < \angle F < \angle U$

Step 3: Following the angle-side relationship we can order the sides accordingly. Remember it is the side opposite the angle.

Thus, FN is the longest side since it is the opposite side of the largest angle, ∠U, while FU is the shortest

side whose opposite angle, ∠N measures 25°.

Example 2: Compare the measure of the angles of the following triangle.



Solution:

Step 1: Since the length of the sides were given, we can easily compare the lengths from shortest to longest.

$$AY\%...\%... < DA\%...\%... < DY\%...\%...$$

Step 2: Following the angle-side relationship we can order the angles opposite to these sides accordingly.

$$\angle D < \angle Y < \angle A$$

Therefore, $\angle A$ is the largest angle whose is opposite to side DY whose side is 6 units. It follows with the other angles. Example 1 and Example 2 illustrate the angle-side relationship theorem.

How can we form triangles?

Not any three lengths can form the sides of a triangle. Let a, b, and c be the lengths of the sides of a triangle. A

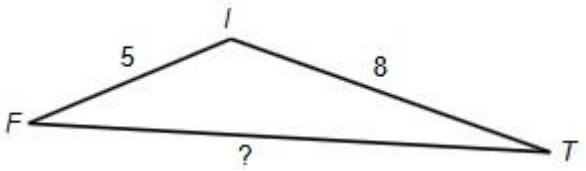
Sir we can form a triangle by choosing a point from A B and C

That's right!

triangle can only be formed under the following conditions:

$a + b > c$
$a + c > b$
$b + c > a$

Example 3: In Δ FIT, find the range of the possible lengths of $\overline{FT}$.



Solution: Let a = 5 and b = 8

Step 1: Using the triangle inequality theorem for the above triangle gives us three statements:

$a + b > c \Longrightarrow 5 + 8 > c \Longrightarrow c < 13$

$a + c > b \Longrightarrow 5 + c > 8 \Longrightarrow c > 3$

$b + c > a \Longrightarrow 8 + c > 5 \Longrightarrow c > -3$ (disregard because lengths must be positive)

Step 2: Combining the two valid statements:

$3 < c < 13$ (The length of $\overline{FT}$ is greater than 3 and less than 13)

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Triangle Inequality Theorem

The sum of the lengths of any two sides of a triangle is greater than the length of the remaining side.

Let a, b, and c be the lengths of a triangle. These lengths may only form a triangle if the three conditions are satisfied:

$a + b > c;$
$a + c > b;$
$c + b > a.$

Let b an unknown side of a triangle. To find the range of possible measure of side b, the inequality below may be used:

$(a - c) < b < (a + c)$

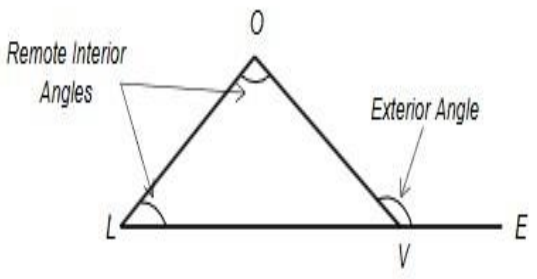
Example 4: Which length/s can form a triangle?
A.) 3, 4, 6 B.) 5, 6, 11 C.) 2, 3, 9
Solution: Check the lengths given if it will form a triangle using Triangle Inequality Theorem.

Given lengths	$a=3, b=4, c=6$		$a=5, b=6, c=11$		$a=2, b=3, c=9$	
$a+b>c$	$3+4>6$	True	$5+6>11$	False	$2+3>9$	False
$a+c>b$	$3+6>4$	True	$5+11>6$	True	$2+9>3$	True
$b+c>a$	$4+6>3$	True	$6+11>5$	True	$3+9>2$	True
Decision	Triangle		Not a Triangle		Not a Triangle	

Based on the Triangle Inequality Theorem, only option A satisfies the condition that will form a triangle.

Exterior Angle Inequality Theorem

The measure of an exterior angle of a triangle is greater than the measure of either remote interior angle.



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Example 5: In the figure above, if m∠L= 45° and m∠O= 105°, then by Exterior Angle Inequality Theorem:

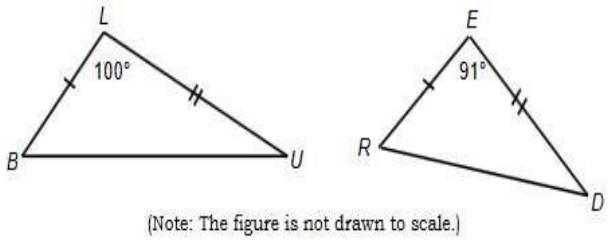
$m\angle OVE > m\angle L$ or $m\angle OVE > m\angle O$

$m\angle OVE > 45°$ or $m\angle OVE > 105°$

Inequalities in Two Triangle

The previous theorems deal with inequalities in one triangle, this time, we will be dealing with inequalities in two triangles.

Example 6: Compare the lengths of the third side of Δ BLU and Δ RED.



(Note: The figure is not drawn to scale.)

Given: $B \cong R$, $L \cong E$, B ?R

Solution: ∠L > ∠E

$10° > 91°$

B >R

Based on the angle-side theorem, the opposite side of the greater angle is longer side.

From this example, the corresponding two sides of two triangles are congruent but the measure of their included angles differ, it follows that the opposite side of the greater angle is longer. Thus, the opposite side of ∠L which is BU⁒…⁒… is greater than the opposite side of ∠E which is RD⁒…⁒…. This theorem is what we called the **Hinge Theorem** or the **SAS Inequality Theorem.**

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Do you have any question or clarification? In summary, the following are theorems in triangle inequalities.	None sir

INEQUALITIES	THEOREM	IF-THEN STATEMENT
Inequalities in One Triangle	Angle-Side Relationship	If two angles of a triangle are not congruent, then the larger side is opposite the larger angle.
		If two sides of a triangle are not congruent, then the larger angle is opposite the larger side.
	Triangle Inequality Theorem	The sum of the lengths of any two sides of a triangle is greater than the length of the third side.
	Exterior Angle Inequality Theorem	The measure of an exterior angle of a triangle is greater than the measure of its either remote interior angle.
Inequalities in Two Triangles	Hinge Theorem or SAS Inequality Theorem	If two sides of one triangle are congruent to two sides of another triangle, but the included angle of the first triangle is greater than the included angle of the second, then the third side of the first triangle is longer than the third side of the second.
	Converse of Hinge Theorem or SSS Inequality Theorem	If two sides of one triangle are congruent to two sides of another triangle, but the third side of the first triangle is longer than the third side of the second, then the included angle of the first triangle is larger than the included angle of the second.

since you don't have any questions , I have a questions okay?	Yes sir
Abstraction Class, how you can connect triangle inequality in real life-situations?	sir, triangle inequality is the imperfection of size. sir like in reallife situations; inequality describes

Very good noel okay next, erica How about the side of triangle inequality?	imperfection to us as individuals. Because we're not born to be perfect.
	Sir, triangle has three sides. I describe it as love, hope, and faith. Therefore, when I connect to inequality, not all of us have been blessed by love, hope, and faith.
Very good class all of you are correct The triangle is the simplest of shapes made with straight sides. There are three simple sides to the Christian faith: "faith, hope, and love, and the greatest of these is love. The triangle inequality is the size of an imperfection in a triangle. When I connect this to a real-life situation, every individual is also not perfect. In reality, every one of us has an inequality when it comes to love, hope, and faith. There are people who are blessed with love and a good life. There are also people who don't receive the affection that their loved ones do. So that's where self-comparison comes in. Some people compare themselves, asking, "Why are others blessed with a good life and love while I don't feel it? Class, don't think like that. I'll remind you, comparing yourself to others will disappear if you put, God, at the top of a triangle or the center of your life then you feel justice.	

Because in God's eye, no one is greater. No one is least. Therefore, we shall all be equal. Is that clear, class!	 Yes, sir

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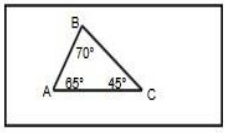
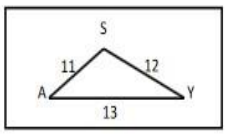
Activity 1: Identify Me

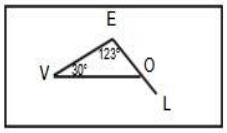
Directions: Write your answer on a separate sheet of paper. Answer what is asked in the given problem

1. 

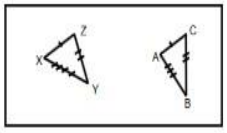
a. What is the longest side in a ΔABC? How about the shortest side?
b. What theorem did you apply in determining the longest and shortest side?

2. 

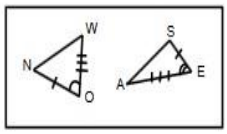
a. What is the smallest angle of ΔSAY? How about the largest angle?
b. What theorem did you apply in determining the smallest and largest angle?

3. 

a. What is the measurement of $\angle LOV$?
b. Using the relation symbols $>, <,$ or $=$, complete the statements below:
$m\angle LOV$ ___ $m\angle E$ and $m\angle LOV$___ $m\angle V$.
c. What theorem did you use to justify the statements above?

4. 

a. Using the relation symbols $>, <,$ or $=$, complete the statement below:
$m\angle Z$___ $m\angle C$
b. What theorem did you use to justify the statement above?

5. 

a. Using the relation symbols $>, <,$ or $=$, complete the statement below:
$\overline{NW}$ ___ $\overline{AS}$
b. What theorem did you use to justify the statement above?

8. Generalization

Class, I can see that you have learned a lot today, let's generalize what you have learned.

What are the three cases that we should satisfy in triangle inequality theorem?

Yes, Vanessa?

(Students will raise their hands)

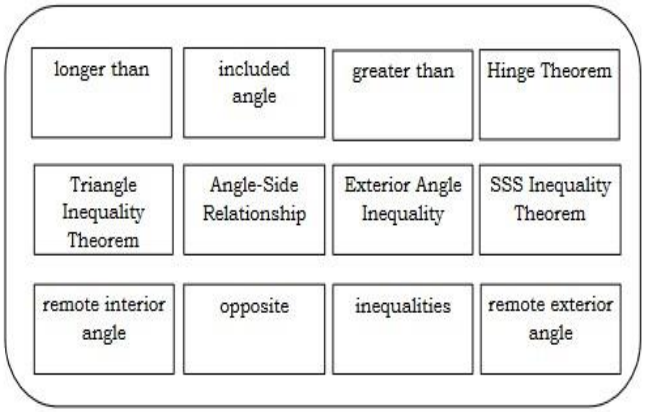
a + b > c a + c > b b + c > a

Very good, Vanessa. And what will you do if two sides are given and the third side is missing? Yes, Rosana? Very good, Rosana! Absolutely, class! Now that you've already understand our topic.Give yourself a GoodJob-Clap!	(students will raise their hands) $(a- c) < b < (a + c)$ (The students do the GOOD-JOB-CLAP)

IV. Evaluation

Fill in the blanks!

Directions: Complete the paragraph below by filling in the blanks with correct word/s or figure/s which you can choose from the box below. Each word or figure may be used repeatedly. Write your answer on a separate sheet.



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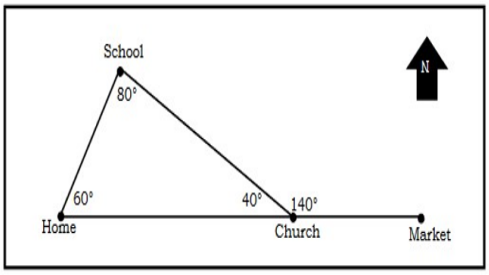
There are two types of theorems of inequalities in triangles. One is the Inequalities in One Triangle. One theorem under the inequalities in one triangle is the _____ in which if two angles of a triangle are not congruent, then the larger side is _____ to the larger angle. The second one is the _____ which states that the sum of the lengths of any two sides of a triangle is _____ the length of the third side. The third one is the_____ Theorem which states that the measure of an exterior angle of a triangle is greater than the measure of its _____. On the other hand, there are also theorems of the inequalities in Two Triangles. One of its theorem is the _____ or SAS Inequality Theorem in which if the two sides of one triangle are congruent to two sides of another triangle, but the included angle of the first triangle is greater than the included angle in the second, then the third side of the first triangle is _____ the third side of the second. The other theorem is the Converse if Hinge Theorem or _____ which states that if two sides of one triangle are congruent to two sides of another triangle, but the third side of the first triangle is longer than the third side of the second, then the _____ of

the first triangle is larger than the included angle of the second. Okay time is up. Pass your Activity Sheets Forward. **V. Assignment** Please answer at home and pass by next meeting okay class? **V. Assignment** **Activity 4** Directions: Read the problem below and answer the questions that follow. In the map below, the locations form a triangle. Dina, a student, is at home while Alvin, her classmate is at school. In this situation, answer the questions that follow.  Questions: 1. Who is farther from Church given their locations, Dina or Alvin? What triangle inequality theorem is applied in this situation? 2. Dina requested Alvin to pick her up in going to Church. Will Alvin be able to travel the shortest path to go to Church given Dina's request? What triangle inequality theorem is applied in this situation? 3. Given the same time started and same rate of walking, who among the two can arrive at the Market first? 4. If a new road will be constructed connecting the School and the Market, is the constructed road longer than the road between Home and Church? What triangle inequality theorem is applied in this situation? that's all for today class **REMARKS** - The lesson was represent and introduce the triangle inequalities theorems and its applications.	Yes, sir

- Visual presentation: incourage the students to identify and to adopt and a have a clear presentation of triangle. - Real world situation and application: help the students to find the importance of the theorems in real life and various fields - Assessment: continue to use formative assessment to improve and enhance the critical thinking of a students - Encourage students to find and to explore a real world situations and application about the triangle iniquallity theorem though presntation or activity	
Please study the next lesson page (/page-page).	Yes, sir
Mrs. poche please led the closing prayer.	”praise be the name of our lord jesus christ, now and forever amen”
REFLECTION	
A. .No. of learners who earned 80%	_____ of learners who earned 80% above
B. No. of learners .who require additional activities for remediation	_____ of learners who require additional activities for remediation
C. Did the remedial.lessons work? No. of learners who have caught up with the lesson	_____ of learners who require additional activities for remediation

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D. Which of my.teaching strategies worked well? Why did this work? E. What difficulties did I encounter which my principal or supervisor can help me solve? F. What innovation.or localized materials did I use/discover which I wish to share with other teachers?	Strategies used work well: Why: _____Bullying among pupils _____Pupil's behavior/attitude _____Colorful IMs _____Unavailable Technology Equipment (AVR/LCD) _____Science/Computer/Internet Lab _____Additional Clerical works _____ of learners who earned 80% above

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Name: GALVEZ VINCENT
Instructor: BONG B. SIGUENZA JR

Yr & Sec: BSED MATH 3A
Date: OCT 17, 2024

Criteria	Points	Description	Total
LESSON PLAN			
Objective Clarity	15	Clear, specific, and measurable learning objectives aligned with curriculum standards. Objectives demonstrate progression in language skills.	
Content Appropriateness	20	Content selection suitable for the grade level and language proficiency of secondary students. Engaging materials and activities relevant to students' interests.	
Assessment and Feedback	15	Clear assessment criteria aligned with lesson objectives. Formative and/or summative assessment strategies. Provision of constructive feedback.	
DEMO TEACHING			
Classroom Management	10	Effective management of classroom procedures and student behavior. Positive and inclusive learning environment.	
Delivery and Presentation	15	Clear delivery of instructions and explanations. Effective use of voice modulation, gestures, and visual aids.	
Student Engagement and Interaction	10	Encouragement of active participation and interaction among students. Opportunities for collaboration and discussion.	
Instructional Strategies	15	Variety of instructional methods catering to diverse learning styles. Incorporation of collaborative learning, differentiation, and scaffolding techniques.	
OVERALL EVALUATION			
REMARKS			

REMARKS:
Excellent: 90-100 points
Good: 80-89 points
Fair: 70-79 points
Needs Improvement: Below 70 points

BONG B. SIGUENZA JR.
INSTRUCTOR