Lesson Plan for ... (STEM Asyut)

Date & Time Created:	Click or tap to enter a date.		
Date & Time Modified:	Click or tap to enter a date.		
Subject	math G10		Semester 1
Grade	10		Choose an item.
Teacher:	OMAR ABD ELKAREEM	**School :**	Stem Asyut
Learning Outcome			
LO Code	CH.2.08	**LO text**	Complex numbers are the numbers that are expressed in the form of a+ib where, a,b are real numbers and 'i' is an imaginary number called "iota". The value of i = (√-1). For example, 2+3i is a complex number, where 2 is a real number (Re) and 3i is an imaginary number (Im).

Concepts	**Skills**
• Complex Numbers • real numbers • imaginary numbers • complex numbers. • Addition • subtraction • Multiplication • division • distributive property • absolute value	• The ability to deal with complex numbers in their mathematical form • Understand how to represent complex numbers on a complex surface • The ability to use complex numbers to solve various mathematical equations and problems. • Analytical and critical thinking • effective communication

Duration of Learning Outcome
CH.2.08(Week 01 - Week 03)
Evidence of Learning Outcome
• Solve questions, participate in individual and group activities, deliver the project as required, and be able to perform mathematical operations on any imaginary number.
Capstone Connection
CH.2.08:
Textbook & Resource Material
https://byjus.com/maths/complex-numbers/
Essential Question/s
What is the origin of the complex number and how is it formed?
Lesson Number in LO Sequence

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Objective/s for Lesson
By the end of this session students should be able to: 1. Introducing students to the concept of complex numbers and how to represent and deal with them. 2. Expanding students' concept of numbers, as they discover that there are numbers outside the realistic range. 3. Develop their skills in solving complex mathematical problems using complex numbers. 4. Application of complex numbers in diverse fields such as engineering, physics, and technology. 5. Expanding students' understanding of geometric dimensions, by representing complex numbers on a complex surface. 6. The lesson encourages students to think critically and solve problems in different ways using concepts associated with complex numbers.

Evidence of Achievement of Lesson	
Solve questions, participate in individual and group activities, deliver the project as required, and be able to perform mathematical operations on any imaginary number.	
Instructional Activity #(1)	
Purpose of Activity	Conclusion and writing
Estimated Time:	5 min
Organization of Students - Student will work in:	Individually
Teaching Strategy	Brain storming
Specific concept and/or skill addressed	Exploring the Complex Plane
Description of Activity	- Provide graph paper or a coordinate plane template. - Have students plot various complex numbers on the plane and identify their real and imaginary parts. - Ask them to calculate the modulus and argument of each complex number and label them accordingly.
Connections to Capstone, Grand Challenge, other subjects	Example of periodic motions such as water waves, alternating current, light waves, etc., which depend on sine or cosine waves
Formative Assessment During Learning:	Students answers in worksheet
Instructional Activity #(2)	
Purpose of Activity	Conclusion and writing
Estimated Time:	10 min
Organization of Students - Student will work in:	Groups of 5

Teaching Strategy	Writing
Specific concept and/or skill addressed	Visualizing Operations
Description of Activity	- Create flashcards with pairs of complex numbers. - Ask students to perform addition, subtraction, multiplication, and division of the complex numbers on the flashcards. - Have them visualize the operations by drawing the complex numbers on the plane and using geometric methods to solve.
Connections to Capstone, Grand Challenge, other subjects	Example of periodic motions such as water waves, alternating current, light waves, etc., which depend on sine or cosine waves
Formative Assessment During Learning:	Students answers in a worksheet
Instructional Activity #(3)	
Purpose of Activity	Exploration and analysis
Estimated Time:	10 min
Organization of Students - Student will work in:	Groups of 5
Teaching Strategy	Exploration
Specific concept and/or skill addressed	Complex Number Puzzles
Description of Activity	- Create crossword puzzles or word searches with terms related to complex numbers. - Include vocabulary words such as modulus, argument, conjugate, real part, imaginary part, etc. - Encourage students to solve the puzzles individually or in pairs to reinforce terminology.

Connections to Capstone, Grand Challenge, other subjects	Example of periodic motions such as water waves, alternating current, light waves, etc., which depend on sine or cosine waves
Formative Assessment During Learning:	Students answers through discussion.
Instructional Activity #(4)	
Purpose of Activity	Brain storming and warm up
Estimated Time:	10 min
Organization of Students - Student will work in:	Groups of 5
Teaching Strategy	Brain storming
Specific concept and/or skill addressed	Real-World Applications

Samples of Student Work (Exceeds Expectations, Proficient, Needs Work):	
Description of Activity	- Present real-world scenarios where complex numbers are used, such as in electrical engineering or physics problems. - Challenge students to model and solve these problems using complex numbers. - Discuss how understanding complex numbers enhances problem-solving skills in various fields.
Connections to Capstone, Grand Challenge, other subjects	Example of periodic motions such as water waves, alternating current, light waves, etc., which depend on sine or cosine waves
Formative Assessment During Learning:	Students presentation
Evaluation of Evidence:	
If the student miss any part in learning activity (1&3) he/she is not proficient yet(yellow) If the student answer all questions in learning activity (2&4) he/she is proficient (green) If the student answer all questions in learning activity (2)&(3) &(4)he/she is high proficient (blue)	
Homework:	
Solve some questions in Worksheet	
Teacher Notes and Reflections:	
Evidence of learning is worksheets in learning activity 2&3.	

Lesson Plan for traditional schools

Date:	Class:2B
Unit title: algebra	Time of lesson:60 min
Lesson title: complex number	Grade: 1 secondary

Objective/s for Lesson

A. (Knowledge objectives)

1. The student should know the difference between the imaginary and complex number
2. To know the process of collecting complex numbers
3. To know the process of multiplying complex numbers
4. To know the lows of the lesson

B. (Skill objective)

The student should be able to analyze the equation.

C. (Emption objective)

Ability to work in groups

The ability to think deeply

Resource work:

An external book

Teaching strategies:

Brainstorming

Observation

discussion

Inquiry based learning

Cognitive theory

(These theories are achieved by activities)

Issues included:

Do not fight with co-workers while solving the exercises.

Warm up:

Do you think $\sqrt{-4}$ has a solution Undefined disagreement? (first part of lesson)

Do you think what the complex number can relate to the imaginary number? (second part of lesson)

Elements of lesson:

1- Quick review on the past year

2- Imagination

3- The root of one negative is equal to i

4- Complex number

5- Calculations on complex numbers

Conclusion:

I will summarize the lesson rules in the form of key points to solve any question in a form of mind map.

Evaluation:

1- $i^{43} =$
2- $i^{1000} =$
3- $2 + 3i + 5 - 4i =$
4- $5 + 2i - (5 - 2i) =$
5- $2(3 - 4i) =$
6- $2i(1 + \sqrt{-4}) =$

Home work:

$$(2 + 3i)^2$$

$$(1 + i)^2$$

$$(1 + i)^4$$