**Technology Lesson Plan**

***Title:* Imaginary Numbers Can Be Complex**

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***Topic:* Complex Numbers**

***Connection to Core Curriculum:***

* Standard N.CN.1: Know there is a complex number i such that = −1, and every complex number has the form a + bi with a and b real.
* Standard N.CN.7: Solve quadratic equations with real coefficients that have complex solutions.
* Standard (Honors) N.CN.3: Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers

***Objectives:*** Participants will

* Review basic properties of imaginary numbers and their uses by watching an introductive video.
* Take specific notes from the video on how imaginary numbers are useful.
* Conclude that imaginary numbers help scale directions to degrees less than 180.
* Practice their abilities to multiply algebraic expressions with real and imaginary parts (Understanding why it’s important to split up complex numbers into real and imaginary parts).

***Materials Needed***

* Computers (to access programs and practice problems)
* Paper and a writing utensil

***Technology:***

* Online Videos
* Practice Problems

***Role of Technology***

* The videos will review and enhance students’ understanding of complex numbers.
* The online practice problems serve as additional exercise with helpful hints for solving.

***Web Reference:***

* Link for introduction/review for complex numbers [***https://www.youtube.com/watch?v=oxF5VQSA4Hw***](https://www.youtube.com/watch?v=oxF5VQSA4Hw)
* Website with helpful practice problems[***http://www.regentsprep.org/regents/math/algtrig/ato6/multprac.htm***](http://www.regentsprep.org/regents/math/algtrig/ato6/multprac.htm)
* Link to humorous video summarizing complex numbers [***https://www.youtube.com/watch?v=aP4fWMLofvo***](https://www.youtube.com/watch?v=aP4fWMLofvo)

***Activity Plan:***

1. Instruct students to grab computers and have a browser open and ready.
2. Additionally, instruct them to have a paper and pencil ready in order to take notes on the video.
3. Ask students to work in groups of 2-3 people.
4. Show the students the first video on complex numbers. Instruct them to take notes on information they learned from the video.They need to take notes specifically on how imaginary numbers are helpful, why it is important to split up imaginary and real parts to complex numbers, and anything unique that they learned or remembered.
5. Encourage students to engage in brief discussion with their group members on interesting properties they learned about complex numbers.
6. Engage in brief class discussion and review.
7. Instruct students to go to the next web link where they can engage in the exercises #2 and #3. This work may be done in their groups. The teacher will monitor and answer any questions as needed.
8. Engage in a brief review to answer any questions from the exercises.
9. Conclude by watching the YouTube Video (link above).

The time allotted to each of the steps to this activity are outlined below.

**Items 1-3:** 1 Minute

**Items 4-6:** 9-10 Minutes

**Items 7-8:** 2-3 Minutes

**Item 9:** 3 Minutes

***Background:***

* Participants should have a basic knowledge of how to expand and multiply algebraic expressions.
* Participants should have a basic understanding of complex numbers and some of their properties (i.e. = −1)

***Extensions:***

* From their basic knowledge of complex numbers, students will be able to multiply complex numbers and understand further the importance of the real and imaginary parts.

***Included documents:***

***References:***

* [***http://www.regentsprep.org/regents/math/algtrig/ato6/multprac.htm***](http://www.regentsprep.org/regents/math/algtrig/ato6/multprac.htm)
* [***https://www.youtube.com/watch?v=oxF5VQSA4Hw***](https://www.youtube.com/watch?v=oxF5VQSA4Hw)
* [***https://www.youtube.com/watch?v=aP4fWMLofvo***](https://www.youtube.com/watch?v=aP4fWMLofvo)