Math-in-CTE Lesson Plan

Technical Mathematics: Math-in-CTE

Lesson Title: Animate Your Class Notes **Writers:** John Barber & Suzanne Haberkorn, Joliet Township HS–West **Math Teachers:** Mr. Peterson, Edna Bazik, Kim O'Malley	Lesson #1 Vocabulary: shapes (square, circle, triangle, cube, sphere, cylinder) keys/frames tools axis degrees 2D and 3D Hertz distance time cycles

Technical Area: STEM & BMIS Academy
CTE Concept(s): 2D & 3D Animating
Math Concept(s): Frequency, Cycles, Time, Distance, Arc, Literal Equation
CCSS Math Practices & Standards: **CCSS.9-12.N.CN.1** (Perform arithmetic operations with complex numbers) **CCSS.9-12.A.REI.4** (Solve equations and inequalities in one variable) Workplace, CCSS ELA, and/or NGSS Standards:

Lesson Objective:	Take notes in a core class of student's choice and brings them to the Computer Animation lab. Class notes are animated using **3DSMax or Adobe Flash**.
Supplies Needed:	Computer with internet access 3DS Max software or Adobe Flash software Core classroom notes

THE "7 ELEMENTS"	TEACHER NOTES (Answer Key)
1. Introduce the CTE lesson. QUESTION: Did you ever think that you would actually take notes and use them? Have you ever thought about having your core class notes come to life?	1. Show students a finished project example. 2. Review the rubric guidelines. 3. Introduce the Windows Movie Maker tool that students will use to create their animation and video. 4. Demonstrate the sound recording software students use to narrate/voiceover their project. 5. Students begin working on their animation.
2. Assess students' math awareness as it relates to the CTE lesson. a. Define two dimensional (2D) and give an example. b. Define three dimensional (3D) and give an example. c. What is one drawing followed by another in a slightly different pose called? d. What is the difference between 2D and 3D Animation? e. Are flipbooks 2D or 3D? f. Is stop motion 2D or 3D? **3. Work through the math example *embedded* in the CTE lesson.** Calculate the frequency of a pendulum spinning 3 times in 7 seconds. Teacher and students will have open discussion about solving frequency and how it relates to cycles and time.	a. 2D is a flat surface with no depth. Examples: squares, circles, triangles. b. 3D is an object that has depth. Examples: A cube, cylinder, sphere. c. ANSWER: Animation d. The difference between 2D and 3D animations is: 2D animations follow the previous image with a slightly different movement, whereas 3D animations look more realistic. e. 2D f. 3D 3 full cycles / 7 seconds = **0.429 Hz** HINT: Frequency = Cycles/Time

4. **Work through *related, contextual* Math-in-CTE examples.**	http://screencast.com/t/XaAiUuHcTKoN
If the initial angle is 45 degrees, how many degrees does it take to get to 170 degrees?	170 – 45 = 125 degrees
What is the initial angle of a stable equilibrium?	0 degrees
5. **Work through the traditional math examples.**	
How many degrees make up a complete circle?	360 degrees
What is half of that circle?	180 degrees
When would you need to know degrees?	Compass & protractor measurements
6. **Students demonstrate their understanding.**	
Students present their designs to the class. Audience provides feedback for each presenter.	Share performance assessment projects. **Students create a pendulum in 2D and 3D and then animate it.** This will be produced from their notes taken in physics class.
7. **Formal assessment**.	Select sample release and retired test items to include with an animation-specific assessment.
Source of Formal Assessment Items: Sample release and retired items from ACT, ACT COMPASS, SAT,) ACT WorkKeys, Illustrative Mathematics, NAEP, PARCC), Trends in International Mathematics and Science Study (TIMSS), and teacher-constructed test items.	