**DI Lesson Planning Template**

**Teacher Name: Jeff Bucklen**

**Subject Area: 7th grade math**

**Date: 11/24/14**

**State Standards/Benchmarks:**

**Most SOLs can be incorporated with this lesson. This lesson will be taught toward the end of the school year so students will understand the mathematical concept being presented. It just depends on the mathematician they choose.**

**Examples:**

* **Galileo who experimented with the concept of gravity**

**SOL 7.12 functional relationships**

**SOL 7.2 arithmetic and geometric sequences**

* **Archimedes who discovered laws of the lever, buoyancy, and balance scales**

**SOL 7.5 volume of prisms and cylinders**

**SOL 7.14 solving and balancing equations**

* **Ada Lovelace (a woman which is rare among mathematicians) explained the process now known as computer programming**

**SOL 7.13 evaluating variable expressions**

**SOL 7.12 functional relationships**

**There will be a list that students can choose from of mathematicians/scientists that include but not limited to:**

**Isaac Newton Sophie Germain**

**Srinivase Ramanujan Leonhard Euler**

**Thales Pythagoras**

**Euclid Emma Noether**

**Heron John Napier**

**Charles Babbage John Venn**

**Blaise Pascal Polya**

**Lesson Essential Question: Higher level mathematical theories and ideas can be demonstrated by using mathematical concepts learned in 7th grade. It is important that students make these connections and understand the importance of math and science.**

**Time Required: Two full days of class time which includes all phases of the project to be complete. 2 days = 2 ½ hours. Each class is 80 minutes. That includes work on the project and presentations. Basically, students will have one day to put their projects together and one day to present. Students will choose their mathematician a few days before we start in order for them to research. What is not completed during class must be completed outside of class (activity period, homeroom, third bell, home, etc…)**

**What will I differentiate?**

* **Content This is more of a project that will be done at the end of the school year where all of the SOLs have been covered. This is an activity where students can see how the math they learned can be used to understand a higher level math concept. Making function tables and variable expressions to understand gravity and using volume to understand laws of buoyancy would be two examples. Also, students are learning about mathematicians, the time period in which they lived, and the adversities in which they faced.**

* **Process This is the part of the project where differentiation is strongly being applied. Student’s role will be based on their strengths and interests. If students want to work more on the writing component, they will chose the printing press activity. If students are more comfortable making a presentation and speaking in front of class, they will choose the Prezi. For more higher level math thinkers, the experiment/demonstration section where application is paramount will be their activity.**
* **Product Final Product will be graded based on a rubric. Rubric used is hyperlinked in the technological section. Also, it is the students who are presenting the Prezi, making the poster/newspaper article/brochure, and the demonstration. This makes the presenters and the audience learning in a distinctive way.**

**How will I differentiate?**

* **For Readiness Students will know exactly what their roles are and by following the rubric, know what they must do to get the maximum credit.**
* **Interest Students will take the survey before the project starts and will be matched up with his or her interest.**
* **Learning This will take place with a partner. Most students will be working with technology. Others will be investigating how to explain and present a math theory**
* **Affect/Learning Environment Students will work in computer lab with partners. They will present in class. Everyone in the group needs to support each other because their final grade will depend on it.**
* **Combination**

**As a result of this lesson/unit students will:**

**Understand:** *(big ideas, principles, generalizations, rules, the “point” of the discipline or topic within the discipline)*

**The students will understand where some of the mathematical concepts taught in math originated from.**

**The students will understand how these concepts relate to scientific advancements.**

**The students will understand the hardships and struggles of these mathematicians the time frame in which they lived. Examples: Women were not allowed in specific math/science fields, discrimination with race, conflict with The Church.**

**The students will understand that these mathematical theories can be proven using what they learned in 7th grade.**

**Know:** *(facts, vocabulary, how-to’s, information that is memorizable)*

**The students will know terminology such as patterns, formulas, volume, experiments, process of elimination, logic, and other terms that correlate with how mathematicians deduct**

**Do (Skills):** *(Bloom’s higher order thinking skills, skills of the discipline—skills you will assess)*

**There will be several instances where students will either explain a mathematical concept to the class or the students in the class have to participant in a higher thinking activity.**

**Pre-Assessment:** *(How will you find out about where your students are at for this lesson? What will your pre-assessment look like?)*

**I will use entrance/exit cards using note cards. The day before the project, but after all groups have chosen their mathematician, I will hand out a note card and ask them to jot down everything they know about the 3 or 4 people chosen by their class. At the end of the project, once presentations, brochures, and experiments have been completed, I will hand out note cards and ask the same question.**

**I will also use a survey to find what interests the student in order to place them in the group where their strengths will be exhibited. The survey will hopefully place them into a role where they want to be involved.**

**Steps in the Lesson**: (*Include ideas for whole-class instructions, if any; differentiated activities; sharing, etc.)*

**A group of 6 or 7 students will choose a mathematician or scientist from the above list. This group will then be separated into three groups.**

* **From here, one group will work on a brochure or newspaper using the printing press on the read, write think website. This group will look up the life of their mathematician, contributions to math or science and other important aspects of his or her life.**
* **Another group will work on a Prezi Presentation that will be presented to the class at the end of the project. The Prezi will also focus on what the mathematicians contributed to math or science, their life, and why they should be remembered.**
* **The third group must take a math concept and be able to explain it to the class by an experiment. This will be presented in front of class after the Prezi presentation. I have several activity sheets for each of these mathematicians that will assist them in explaining how a specific concept works. Class will be active participants.**

**Example: A group selects Galileo. Two students will make a brochure or write a newspaper writing about his experiments with gravity and his disagreement with the Catholic Church. Two students will make a Prezi re-emphasizing what the brochure/newspaper mentioned but may also give more information about Galileo. Maybe they focus more on his belief that the planets revolve around the sun instead of what was believed by the people at that time (that the planets and sun revolve around earth) The last two students may want to do an activity involving gravity. If a tennis ball in dropped from a certain height, how long will it take to hit the ground? Or what was the velocity of the tennis ball at certain times during the fall. I have all kinds of activity sheets that really breaks it down so middle school students can understand.**

**Closure Activity/Wrap up:** (*This may be in the form of independent practice, a chance to share, or explicit restatement of the goals of the lesson.)*

**At the end of the presentations, I will cover what may have not been explored by the groups. I want to assure that the students understand several points:**

* **Mathematicians figured concepts out by deductive reasoning.**
* **Some mathematicians/scientists were not popular and were extremely disliked by the uneducated and simple-minded.**
* **Women had a difficult time getting any respect in the math/science field because of stereotypes.**
* **Many of these thinkers spent years proving a theory or concept but persistence won the day.**

**Post-Assessment:** (*How will you use this data to inform your next learning experience?)*

**Exit cards will be given to students as they leave the classroom that will have the exact same questions asked before the project began.**

**Integrated Instructional Technologies and Resources Utilized:** (*Include websites/tools used.)*

<http://rubistar.4teachers.org/index.php?screen=ShowRubric&module=Rubistar&rubric_id=2491843>

<https://www.surveymonkey.com/s.aspx?PREVIEW_MODE=DO_NOT_USE_THIS_LINK_FOR_COLLECTION&sm=_2FBt62Rp1viNjtWjrb4etBm1g6LFa52A0PzSYQwof92M_3D>

<http://www.readwritethink.org/classroom-resources/student-interactives/printing-press-30036.html>

[**https://prezi.com/your/**](https://prezi.com/your/)

[**Entrance, exit survey.docx**](Entrance%2C%20exit%20survey.docx)

**Weebly Link:** (*Copy/paste the link to the weebly you created here.)*

<http://outofthedarknessmath.weebly.com/>