**NGSS Lesson Planning Template**

Lessons Planned and Presented by: Lisa Reaves and Luther Wilson

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| Grade/Grade Band: Grades 3-5 | Topic: 3D Printer and It’s Uses | | | Lesson # 1 in a series of 1 lesson |
| Brief Lesson Description including estimated time:  We will be explaining what a 3D printer is and some possible real world uses for one. | | | | |
| Performance Expectation (s): Students will be able to explain possible uses of a 3D printer, in their own words. | | | | |
| Narrative/Background Information:  Explain how the differences between a 3D printer and a computer printer you are used to seeing and using. | | | | |
| Prior Student Knowledge: Ask all/some of the following questions:   * What is a printer? * What kind of printers are you familiar with? Computer printer? What does it print? * How do you think this printer will be different? | | | | |
| Science & Engineering Practices: [Constructing Explanations and Designing Solutions](http://www.nap.edu/openbook.php?record_id=13165&page=67) [Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.](http://www.nap.edu/openbook.php?record_id=13165&page=67)   * [Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3-5-ETS1-2)](http://www.nap.edu/openbook.php?record_id=13165&page=67) | | Disciplinary Core Ideas:  Use TN Science Standards *(for now)*   * SPI 0407.T/E.1 Select a tool, technology, or invention that was used to solve a human problem. | Crosscutting Concepts: [Influence of Science, Engineering, and Technology on Society and the Natural World](http://www.nap.edu/openbook.php?record_id=13165&page=212)  * [People’s needs and wants change over time, as do their demands for new and improved technologies. (3-5-ETS1-1)](http://www.nap.edu/openbook.php?record_id=13165&page=212) * [Engineers improve existing](http://www.nap.edu/openbook.php?record_id=13165&page=212) | |
| Possible Preconceptions/Misconceptions:   * You can print anything on a 3D printer * They are difficult to use * They are cost prohibitive to buy/run * You can’t really use the stuff you print, so it’s just a fancy toy | | | | |
| **LESSON PLAN – 5-E Model** | | | | |
| ENGAGE: Opening Activity – Access Prior Learning/Stimulate Interest/Generate Questions:  Ask all/some of the following questions:   * What is a printer? * What kind of printers are you familiar with? Computer printer? What does it print? * How do you think this printer will be different? * Show “BrainPop” Video for 3D printer * Ask students: What is something you learned? How are 3D and computer printer different?/alike? | | | | |
| EXPLORE: Lesson Description – Materials Needed/Probing or Clarifying Questions:  **Materials Needed:**   * 3D printer * Compouter * Handouts/worksheets * 3D printer filament * Display Screen (for videos) * Webistes: * 7 shocking 3-D printed Things: <https://youtu.be/xVU4FLrsPXs> * 3D Printed Shelby Cobra: <https://youtu.be/HXvIMRklWiM> * Thingverse - 3D printer ideas: [www.thingverse.com/education](http://www.thingverse.com/education) | | | | |
| EXPLAIN: Concepts Explalined and Vocabulary Defined:   * 3D Printer * Filiment * Construct | | | | |
| ELABORATE: Applications and Extensions:   * Students will be able to understand the basic concepts behind the function of a 3D printer | | | | |
| EVALUATE:  Formative Monitoring (Questioning/Discussion):   * Students will be assessed based on their corporation and participation.   Summative Assessment (Quiz/Project/Report):   * Students will use grid paper to draw something that would be useful, but still simple enough to make on a 3D printer. The design has to have a purpose. * Student will be evaluated based on how well they complete the assignment and how well they completed the assignment. | | | | |
| Elaborate Further/Reflect: Enrichment:   * We have focused on the positive aspects of the 3D printer. What are some of the negatives / difficulties with using a 3D printer? * Does the good outweigh the bad? Are they worth continuing to improve the technology? | | | | |