**Lesson Plan Template**

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| Subject: Physical Education | Topic & Concept: PBL with 3D Printer | Grade: 9-12 |

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| Standards: | **Content Standard: Learning Concepts Standard 2: The student demonstrates understanding of movement concepts, principles, strategies, and tactics as they apply to the learning and performance of physical activities. Benchmark 1: The student will demonstrate and refine movement concepts, principles, strategies, and tactics that apply to the performance of physical activities.** |

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| Content Objectives: | The student will be able to create a solution to the problem they are assigned using a 3D printer. | Language Objectives: The student will be able to explain to the class their situation, solution to the problem, and use of the 3D printer. |

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| Assessment Plan: (Formative and/or Summative) | Informal Formative: Students will be observed to ensure they are using a 3D printer correctly. |

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| Integration of Literacy:   * Reading * Writing * Listening * Speaking * Viewing * Visual Representation | Reading: The students will need to read their situation in order to solve the problem.  Writing: Students will need to write the solution to their problem.  Listening: Students will listen to directions from the teacher and to input from peers in their group.  Speaking: Students will share with the class the solution to their problem.  Viewing: Students will watch presentations from peers. | Vocabulary:  3D printing: Is a process of making three dimensional solid objects from a digital file. |

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| Materials/Technology: | 3D printer, paper, pencils, computer/iPad (for possible research). |
| Differentiation: | Students that struggle with reading comprehension will be put into groups with at least one strong reader.  Students that aren't comfortable using a 3D printer will be put into groups with students that are. |
| Introduction: | Alright class today is a classroom PE day and we will be using the 3D printer to come up with a solution to an equipment problem. |

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| Anticipatory Set:  (Background knowledge) | We can all agree that physical activity is important, right? But what if I have a condition or situation that limits my physical activity in someway? This unit you will be in collaborative groups and given a situation with a problem that requires special equipment. You will solve the problem then design and develop the piece of equipment using the 3D printer. |

Lesson Procedure (The following three categories occur simultaneously)

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| Instruction | Modeling | Checking for Understanding |
| 1. Students will enter the classroom and sit in squads for attendance.  2. Introduction and anticipatory set.  3. Teacher will split students into collaborative groups of 3-4 students.  4. Each group will receive a situation and develop a solution using a 3D printer.  (Example 1: A left handed student wants to play golf/hockey in PE what equipment needs to change?) (Ex. 2: A person with low vision enjoys table tennis but struggles to play. What is a possible solution?)    5. Students will discuss possible solutions to their situation and work on a plan of what equipment to develop. (Ex1: Students develop a left handed golf club/hockey stick.)  (Ex2: Students design a larger, brighter ping pong ball and ping pong racket.)  6. After students have developed a solution and designed the equipment they will use the 3D printer to create the specified equipment.  7. All groups will orally present their problem, solution, and explain the process/reasoning of creating their equipment. (5-10 minute presentation). | 1. Teacher will model the use of a 3D printer based on student need.  2. Teacher will redirect questions to groups that require assistance.  3. | 1. Teacher will use Fist to Five to determine students level of comfort with the 3D printer.  2. Teacher will walk among the groups to assess if any groups need assistance.  3. |

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| Guided Practice: | When the teacher gives instruction and assists with any issues students have using the 3D printer. |
| Independent Practice: | Students working in groups on the project. |
| Closure: | Good work on your equipment and presentations. I hope this project helped you think about how frustrating it would be to be unsuccessful in an activity because you lack the correct equipment. |
| Self Reflection: | Did my students meet the objective?  Were my students engaged?  Did my students stay focused on stations?  Did students transition effectively?  Did I use a novelty to reach my students? |