

**Project 2.5 Clean Sweep: Design Challenge**

|  |
| --- |
|  |
| **Introduction**  ***Scientific Inquiry: Guiding Question – What are features of a design solution to reduce the amount of plastic pollution in marine habitats?***  **Lesson Objectives:**  At the end of this lesson, you will be able to:   1. Work in a cross-curricular team to design, build, and test a device to collect plastic pollution from an aquatic habitat.   **Equipment**   * Large plastic tub * Various plastic pollution * Sea Perch robotics kit * 3D Printer * Autodesk Inventor   **Procedure**  Revisit the design brief and accompanying resources for the Clean Sweep project. Your project will have the following criteria and constraints in order to create a design solution.   * The design must mimic the location and movement of a whirligig beetle in the environment * Must have at least one 3D printed part in the final solution * Must use materials that can be used in an aquatic environment (No VEX parts can be used) * Must collect and store various plastic “pollution” from the marine habitat  1. Complete the Define the Problem section on the Clean Sweep Submission Form to review the elements of the design brief. 2. Brainstorm possible concepts of possible design solutions. Each group needs to compile at least 10 brainstormed ideas for an adequate brainstorming session. 3. Discuss and evaluate the brainstormed ideas and select three possibilities to explore. From the three ideas selected, complete a decision matrix using the criteria and constraints to provide an unbiased evaluation to determine the “best” solution. 4. Document the initial design solution by sketching an isometric pictorial of the solution with annotations, signatures, and dates. 5. Model the initial design using Autodesk Inventor and create working drawings of the parts required to build your solution. 6. Begin constructing and testing your prototype for the design problem, modifying and completing redesign as needed throughout the allotted time. 7. Prepare a testable prototype for an initial round of testing and all groups will test to evaluate the performance of the design solution. 8. Time will be given to redesign and modify the solution in preparation for final testing. 9. You will test your revised solution and complete a final evaluation of the design solution. Complete a final design solution isometric sketch of the design with annotations, signatures, and dates. 10. Update the initial design using Autodesk Inventor and create working drawings of the parts required to build your solution. Submit your completed working drawings in PDF format to Canvas. 11. You will present your solution and complete the Clean Sweep Submission Form for grading. |

