

Wave Whisperer



How can advanced manufacturing technology be leveraged to convert potential energy to kinetic energy in a maritime vessel?

Suggested Equipment Skill Level

Intermediate User

Equipment Skills

3D Design

Marine Machinist, Marine Fabricator, Ship Builder

Career & Skillset Connections

- Precise
- Dexterity
- Attention to detail

Project Guiding Themes

- Engineering design process
- Designing in 3D modeling software
- Designing a prototype that meets multiple constraints

Suggested Software & Materials

- 3D Modeling Software
- Mousetrap
- Recycable Materials
- AquaTrak

Aligned VDOE CTE Course(s) and Competencies

Manufacturing Systems I

36-Weeks

Production Systems

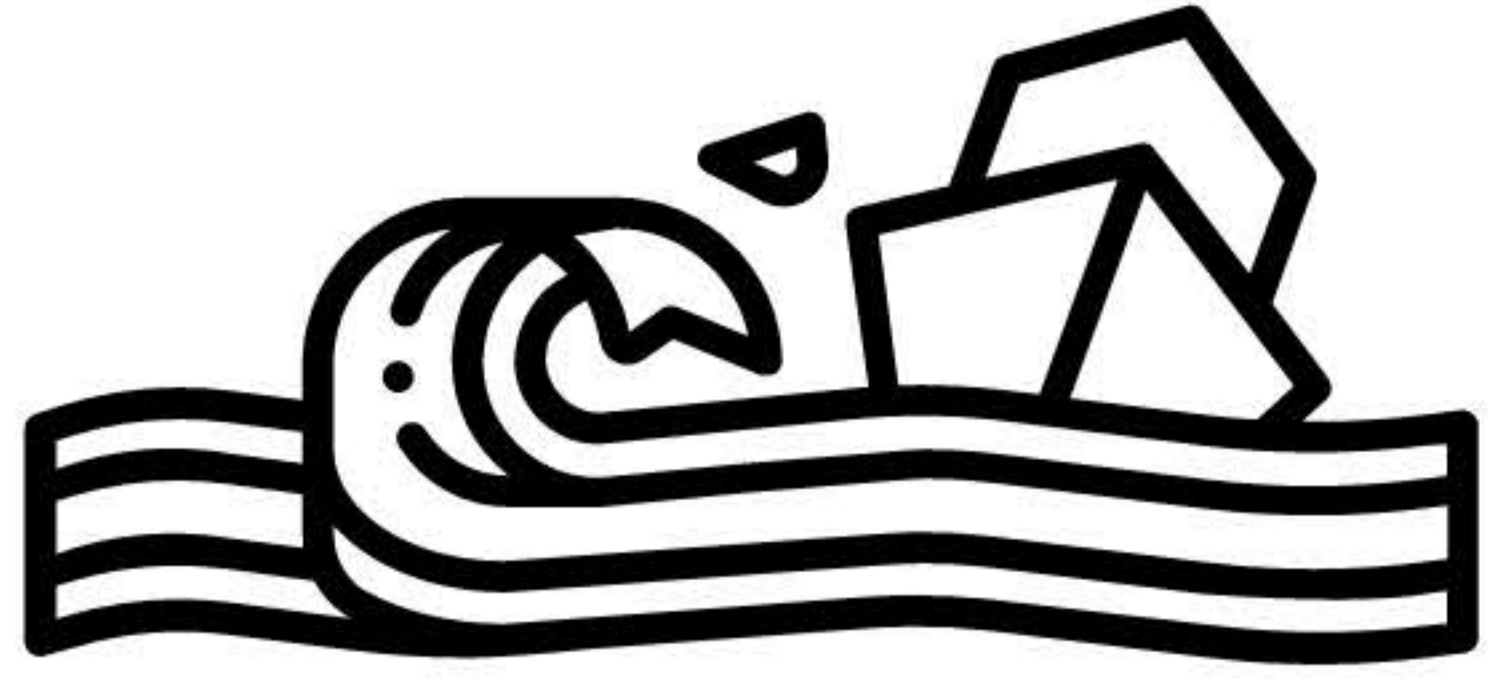
36-Weeks

Technology Foundations

36-Weeks

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Intermediate Skill Level



How can advanced manufacturing technology be leveraged to convert potential energy to kinetic energy in a maritime vessel?

Project Problem & Career Prompt

You work for Aquatronics Maritime Solutions (AMS), a company that focuses on innovative solutions to powering maritime vessels. You are a part of the core team which consists of you (a marine mechanist), a marine fabricator, and a ship builder. Together you have been leading the charge in developing the latest solution, converting potential energy to kinetic energy to create a vessel that glides across the surface of the water with minimal resistance. Your team must prepare a fully functional prototype in 2 weeks to present to the CEO of AMS.

Project Background & Resources

Converting potential energy to kinetic energy

How do mousetrap powered cars work?

Investigative Questions

- What can be adjust to control the speed of the vessel?
- What materials and components ar emost conducive to converting potential energy into kinetic energy for a maritime vessel?

Project Criteria

- Prototype must travel down the AquaTrak in a relatively straight manner
- Prototype must be able to travel down the AquaTrak without any aid from an outside source
- Final working prototypes must be completed by the project deadline

Project Constraints

- A minimum of one part each must be constructed using the 3D printer and CNC Machine
- Mousetrap cannot be altered other than holes drilled to mount it (if necessary)
- Cannot use prefabricated 3D models as parts to be 3D printed or machined

Suggested Pacing

2-3 Days of research and sketching ideas

5-7 Days of 3D modeling, making parts (3D printer, CNC Machine), construction

3-4 Days of testing and adjusting (then retesting)

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Career & Skill Set Connections

Marine Machinist

Marine Machinists are responsible for the installation, maintenance, and repair of mechanical systems and equipment on ships

Marine Fabricator

Fabricates aluminum, stainless steel, and other metals to build or repair ships.

Ship Builder

Builds, assembles, and repairs large ships such as warships, submarines, ferries, cruise ships, and tankers using materials such as steel and other metals.

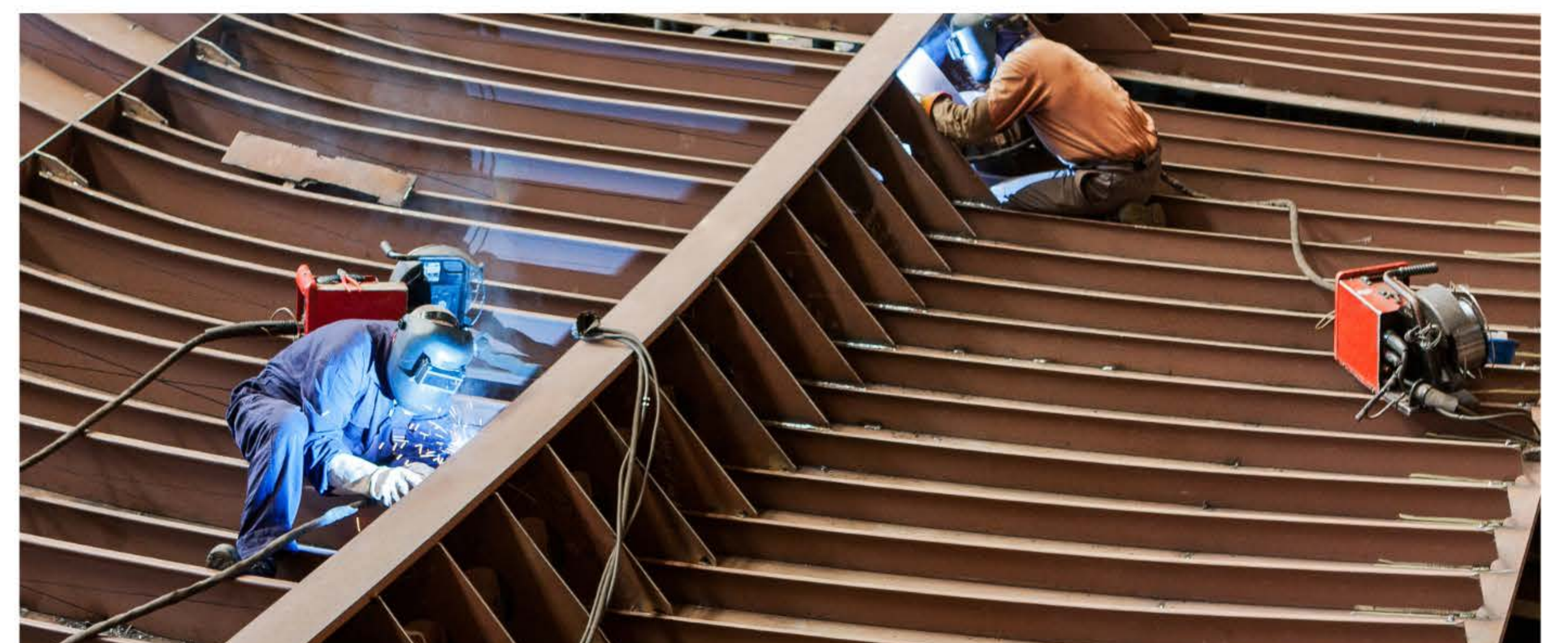
Essential Skills

- *Attention to detail
- *Problem Solving
- *Troubleshooting
- *Time Management
- *Communication



Academic Pathway

High School Diploma
and
Community College/Certification
or
Bachelor's degree



Aligned VDOE CTE Course(s) and Competencies

Workplace Readiness Skills & Work-Based Learning Opportunities & Examine All Aspects of an Industry

Manufacturing Systems I

Exploring Materials and Processes

- Describe additive processes
- Describe subtractive processes
- Demonstrate methods of combining materials
- Use materials to make a product

Understanding Production Processes

- Describe the engineering design process
- Apply technology to produce a prototype
- Describe rapid prototyping/modeling

- Evaluate the processes and the prototype

Production Systems

Analyzing Design

- Describe the engineering design process
- Employ different problem-solving techniques
- Communicate ideas through sketching, technical drawing, computer aided design and drafting (CADD), and storyboarding

Developing Abilities for a Technological World

- Construct models and/or prototypes
- Perform secondary processing operations on stock to produce products

Examining the Designed World

- Create products using a combinations of CADD, computer aided manufacturing (CAM), computer numerical controlled (CNC), CIM, and flexible manufacturing systems (FMS) processes

Technology Foundations

Using materials as a technological resource

- Create a detailed diagram for producing a designed product/model/prototype
- Use tools, machines, and processes to change materials to produce a designed product
- Develop a design using recycled materials

Using Energy as a Technological Resource

- Identify the two types of energy
- Identify the sources of energy used with technological devices

Designing a Product

- Generate potential solutions to the problem, challenge, need, or opportunity
- Select the best solution for a problem
- Construct a prototype of the best solution

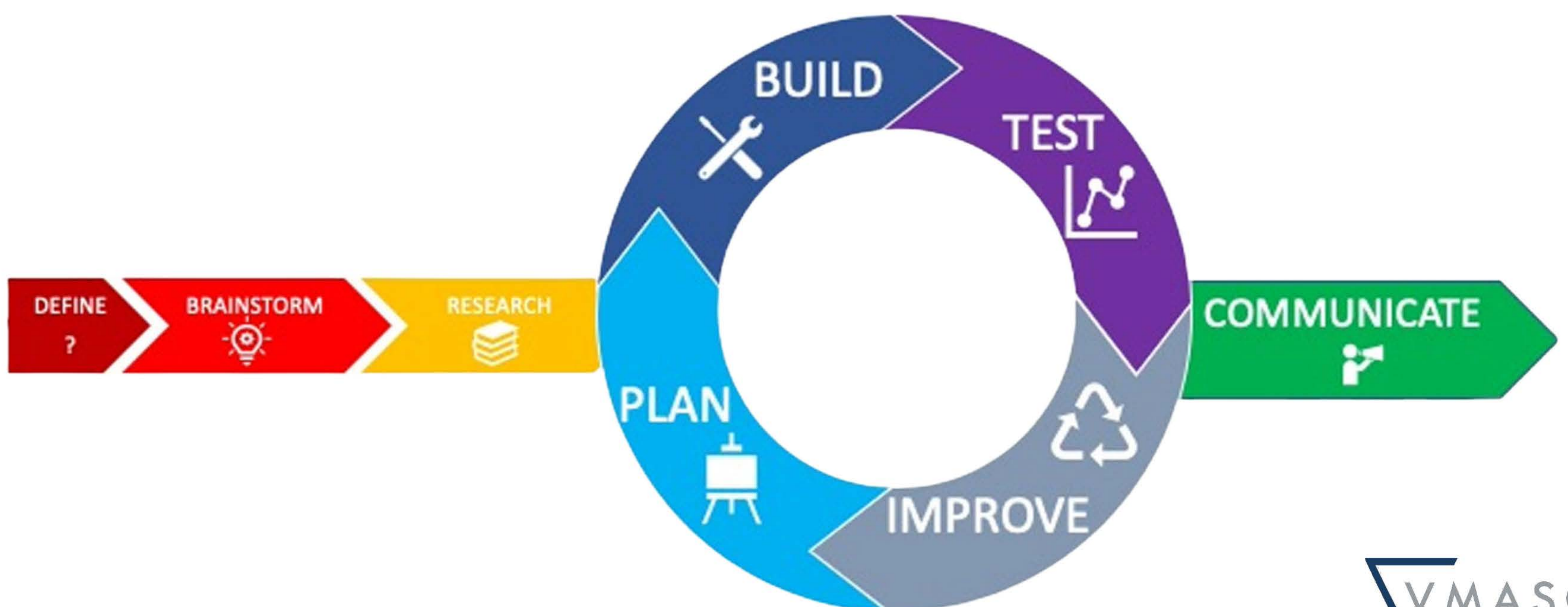
Project Management Plan

Team
Member
Roles

Team
Goals &
Timelines

Team
Member
Tasking

Sketches & Design Planning



Notes

Notes