

STEM

How Odyssey of the Mind Fulfills STEM Objectives

Fern Brown & Cindy Byars



STEM Core Concepts

21st Century Knowledge and Skills

- Communications
- Problem Solving
- Critical Thinking
- Information Technology Applications
- Systems Thinking
- Safety, Health, and Environment
- Leadership and Teamwork
- Ethics and Legal Responsibilities
- Creativity, Invention, and Ingenuity

Improved STEM Programs can Create Individuals Capable of New Solutions and Better Decisions

- Increased Science and Math Capability is Not Enough
- Experiences Centered on Design, Innovation, Engineering, and Technology Will Increase Creativity, Inventiveness, Ingenuity, and Imagination Capabilities
- These Characteristics are Fostered in STEM Centered Learning Experiences

Engineering Design Process

GOAL Identify the need/problem.

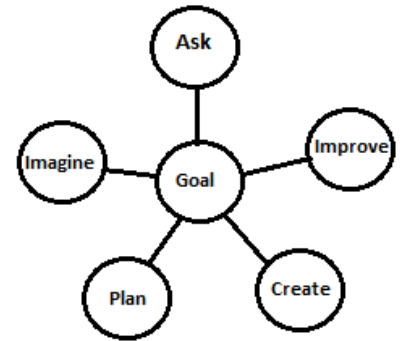
ASK Identify all known facts related to the need or problem. Identify information that is not known but essential to the situation. Identify what is happening now in relation to the need or problem. Explore other options via the internet, library, interviews, etc.

IMAGINE Brainstorm possible solutions. Draw on mathematics and science. Choose the best solution for action by using a list of selected criteria.

PLAN Create a list of necessary materials. Determine the steps in the process of creating the solution. Draw a diagram to match the steps. Troubleshoot to avoid possible problems.

CREATE Construct the prototype. Follow the plan to implement the solution. Test it!

IMPROVE Evaluate the solution. Redesign the prototype after each trial to gain maximum success.



What Should Be the Function of a K-12 STEM Education?

Problem-solvers – able to define questions and problems, design investigations to gather data, collect and organize data, draw conclusions, and then apply understandings to new and novel situations.

Innovators - creatively use science, mathematics, and technology concepts and principles by applying them to the engineering design process.

Inventors - recognizes the needs of the world and creatively design, test, redesign, and then implement solutions (engineering process).

Self-reliant - able to use initiative and self-motivation to set agendas, develop and gain self-confidence, and work within specific time frames.

Logical Thinkers – able to apply rational and logical thought process of science, mathematics, and engineering design to innovation and invention.

Technologically Literate – understand and explain the nature of technology, develop the skills needed, and apply technology appropriately.