

# STEM Integration Guide

<b>Title of Unit:</b>		<b>Time Frame:</b>	
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## STAGE 1

*Enduring Understandings: What should I be able to do (in another setting) with what I have learned in this unit?*

*Essential Questions: What questions focus and guide my thinking? STEM essential questions should be based on these guiding principles. Consider also specific Sustainable Development Goals.*

What is the problem that needs to be solved?  
 Who has the problem that needs to be solved?  
 Why is this problem important to solve?

*Catholic Identity: Describe how you will overtly incorporate Catholic content. Included below are Sustainable Development Goals.*

\_\_\_\_ No poverty  
 \_\_\_\_ Quality education  
 \_\_\_\_ Affordable/clean energy  
 \_\_\_\_ Life below water  
 \_\_\_\_ Responsible consumption/  
 production

\_\_\_\_ Zero hunger  
 \_\_\_\_ Decent work/economic growth  
 \_\_\_\_ Industry/innovation/  
 infrastructure  
 \_\_\_\_ Sustainable cities/communities  
 \_\_\_\_ Peace/justice/strong institutions

\_\_\_\_ Good health/well being  
 \_\_\_\_ Clean water/sanitation  
 \_\_\_\_ Climate action  
 \_\_\_\_ Life on land

### Integrated Focus Standards

#### Science--Specific standards included

#### Technology--How will you integrate technology? Not just computers/tablets.

\_\_\_\_ Research  
 \_\_\_\_ Collaboration  
 \_\_\_\_ Communication--Written product  
 \_\_\_\_ Communication--Graphs/Posters

\_\_\_\_\_Communication--Multimedia--presentation, webpage, video

## **Engineering**

\_\_\_\_\_Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

\_\_\_\_\_Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

\_\_\_\_\_Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

\_\_\_\_\_Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

\_\_\_\_\_Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

\_\_\_\_\_Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

## **Arts--Can be used in the transfer of information, not just final product.**

\_\_\_\_\_Visual Arts (Painting, sculpture, sketch)

\_\_\_\_\_ Graphic design (Poster)

\_\_\_\_\_ Music

\_\_\_\_\_ Theatre/Dramatics

\_\_\_\_\_ Dance

\_\_\_\_\_ Literature/Poetry

**Math--Can also include specific standards**

- \_\_\_\_\_ Make sense of problems and persevere in solving them.
- \_\_\_\_\_ Use mathematics and computational thinking.
- \_\_\_\_\_ Construct viable arguments and critique the reasoning of others.
- \_\_\_\_\_ Model with mathematics.
- \_\_\_\_\_ Use appropriate tools.
- \_\_\_\_\_ Attend to precision.
- \_\_\_\_\_ Look for and make use of structure.
- \_\_\_\_\_ Look for and express regularity in repeated reasoning.

**Other Subjects**

**Skills: What will students be able to do?--Adapted from Maryland State Department of Education**

- \_\_\_\_\_ Ask questions to identify and define global issues, challenges, and real world problems.
- \_\_\_\_\_ Conduct research to refine questions and develop new questions
- \_\_\_\_\_ Answer complex questions, to investigate global issues, and to develop solutions for challenges and real world problems.
- \_\_\_\_\_ Identify, analyze, and synthesize appropriate science, technology, engineering, and mathematics information (text, visual, audio, etc.).
- \_\_\_\_\_ Engage in critical reading and writing of technical information.
- \_\_\_\_\_ Evaluate and integrate multiple sources of information (e.g.: quantitative data, video and multimedia) presented in diverse formats.
- \_\_\_\_\_ Apply integrated science, technology, engineering, mathematics content, and other content as appropriate to answer complex questions, to investigate global issues, and to develop solutions for challenges and real world problems.

\_\_\_\_\_ Evaluate, select, and apply appropriate systematic approaches (scientific and engineering practices, engineering design process, and/or Standards for Mathematical Practices).

\_\_\_\_\_ Apply science, technology, engineering, and mathematics content to construct creative and innovative ideas.

\_\_\_\_\_ Analyze the impact of global issues and real world problems at the local, state, national, and international levels.

\_\_\_\_\_ Develop an evidence-based opinion or argument.

\_\_\_\_\_ Communicate effectively and precisely with others.

\_\_\_\_\_ Share ideas and work effectively with a STEM focused multidisciplinary team to achieve a common goal.

\_\_\_\_\_ Listen and be receptive to ideas of others.