

CHAPTER 1

ACTIVITY 3: Finding Academic Solutions for Sustainability

Activity Objective: Identify how sustainability can be increased using STEM (Science, Technology, Engineering & Math) academic disciplines.

REVIEW VIDEO: https://www.youtube.com/watch?v=xei9Z6k_4Do

Materials: Chapter 1, paper, computer, printer, Internet Access

Background: TechShop is a chain of member-based workshops that lets people of all skill levels come in and use industrial tools and equipment to build their own projects. They have three locations in California, one in Arizona, one in Arlington, Virginia (near DC), one in Michigan, one in Texas, and one in Pittsburgh, Pennsylvania. TechShop is affiliated with the maker culture, and participate in Maker Faire events. The maker culture is a contemporary culture or subculture representing a technology-based extension of DIY (Do-it-Yourself) culture, which intersects with hacker culture and revels in the creation of new devices as well as tinkering with existing ones. The maker culture includes engineering-oriented pursuits such as sustainability.

Maker culture has attracted the interest of educators concerned about students' disengagement from STEM subjects (science, technology, engineering and mathematics) in formal educational settings. Maker culture is seen as having the potential to contribute to a more participatory approach and create new pathways into topics that will make them more alive and causes the learners to be more interested in STEM activities.

REVIEW MAKER CULTURE VIDEOS: <https://www.youtube.com/watch?v=ux3Ze7RjPoA>
<https://www.youtube.com/watch?v=-uIXJclJE2Y>

Procedure:

1. Research sustainability issues under the three pillars of sustainability illustration below in Figure 1 and identify several sustainability issues that could be addressed using a STEM academic discipline. Ask the question does the knowledge needed for the sustainability solution come from one or more academic disciplines? For example: some sustainability issues are conserving water, reducing energy use, and reducing waste. Some academic disciplines are math, geology, biology (Science), engineering, or other technologies



Figure 1 "3 pillars of sustainability", in which both economy and society are constrained by environmental limits

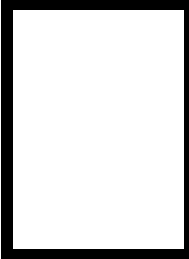
6. Identify what area of STEM, the academic discipline falls under.

Sustainability Issue	3-Pillars	Academic Discipline	How discipline provides a solution	Where does academic discipline fall in STEM?
Reducing Energy	Economic Social Environment	Mathematics	The amount of Kilowatt hours generated by fossil fuel sources to solar or wind energy as to what level will improve sustainability	Engineering
Population Growth				



RUBRIC

4 World-Class Learner	3 Proficient Learner	2 Developing Learner	1 Emergent Learner
Learner at this level has gone beyond mastery of knowledge, skills, & attitudes described in project. World-class learner consistently exhibits high-quality performance.	Learner at this level has had opportunities to apply knowledge, skills, & attitudes of component of project. Proficient learner has mastered essential attributes, thus proving mastery.	Learner at this level has been exposed to & had opportunity to apply knowledge, skills, & attitudes of project. Developing learner may have only a few essential attributes to master before mastery.	Learner at this level may or may not have been exposed to knowledge, skills, & attitudes required by academic standards of the project.



- 1= Emergent Learner
- 2 = Developing Learner
- 3 = Proficient Learner
- 4 = World-Class Learner