GREATNESS STEMS FROM IOWANS

GOVERNOR'S STEM ADVISORY COUNCIL

# Engineering the Future (EtF)

## 2017-2018 STEM Scale-Up Program

**Overview:** *EtF Project 1: Design the Best Organizer in the World* introduces students of all backgrounds and interests to the engineering design process and team practice through engaging hands-on discovery learning challenges. The module offered has a flexible format and is appropriate for in or out-of-school implementation. It takes approximately eight weeks to complete in a formal education setting.

**Grade Levels:** 8-12

### Program Summary

*Engineering the Future (EtF)* is a modular, full-year, 8-12th grade curriculum of introductory engineering and technological literacy for *all* students, including women and minorities and any career aspiration. The full-year curriculum is presented in four modules or projects. The module offered through the STEM Scale-Up Program is *Project 1.0: Design the Best Organizer in the World,* and the program's flexible format is appropriate for in or out-of-school implementation. It takes approximately eight weeks to complete in a formal education setting.

This unit provides students the opportunity to design, build and test prototypes while empowering them to apply math, science and engineering practices, work creatively and collaboratively, communicate and experience the engineering design cycle in real-world design and physics applications. This hands-on STEM curriculum is "designed backwards" to satisfy the same ISTE technological literacy performance expectations as the Iowa Core 21st Century Skills, utilizing affordable materials and supplies readily available to *all* schools. EtF strongly meets Iowa's Core Standards and 21st Century Skills framework to promote understanding of engineering and math content at much higher levels by weaving 21st century interdisciplinary skills, knowledge and experience into real-life applications though projects developed by the National Center for Technological Literacy (Boston Museum of Science).

### Program Objectives and Description

Students taking the EtF course will take on the role of engineers and apply the engineering design process to define and solve problems by inventing and improving products, processes and systems. Students will be expected to work against deadlines and plan and track project progress with Gantt charts. During the implementation process, teams invent, create and innovate, integrating disciplinary learning. They redesign, iterate and optimize using decision matrices. They test mockups and prototypes and assess product life-cycle impacts. Individual evaluation is partially facilitated by student documentation of ideas and team processes, answers to questions in readings and reflections recorded in the *Engineering Notebook*. Additional assessments include self- and teacher-scoring rubrics for team behaviors, products and presentations, and by a comprehensive end-of-project exam.

### What does the program provide to the educator?

- Print/digital and teacher materials and resources for EtF *Project 1: Design the Best Organizer in the World*
- 1-day Regional *Getting Started EtF* Training Workshop (3 optional regional locations, 3 optional dates)
- 1-week online *Getting Started with EtF* professional-development course (2 optional dates)
- Webinar Sessions (2 per semester addressing implementation and best practices)
- 24/7 Online Teacher Support Site

### What is required by the educator in order to implement this program?

Educators should be open to the discovery learning approach, and have flexible classroom seating. They need to have the materials to implement the program and should participate in the PD and support learning community.

**Website:** https://www.iat.com/courses/engineering/engineering-the-future/?type=introduction

***EtF* correlation to NGSS standards:** https://drive.google.com/file/d/0B4aWo37tgA86anh4WG8zOW16cnc/view?usp=sharing