

Challenge Based Learning in CS & STEM

CS4CT Summit 2018

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Cromwell, CT

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Goals & Objectives

1. Welcome / Introduction
2. The STEM + C Challenge
3. STEM + Computer Science Intersection
4. Sample Projects
5. Questions





Skills21 delivers flexible, affordable, and road tested models for driving student success. Using a variety of learning technologies, Skills21 programs help increase rigor and relevance at school.

Fuel - focuses on the development of language-rich learning dialogs for young kids and their families

Quest - delivers powerful experiential learning marrying the real world and mobile devices by leveraging VR

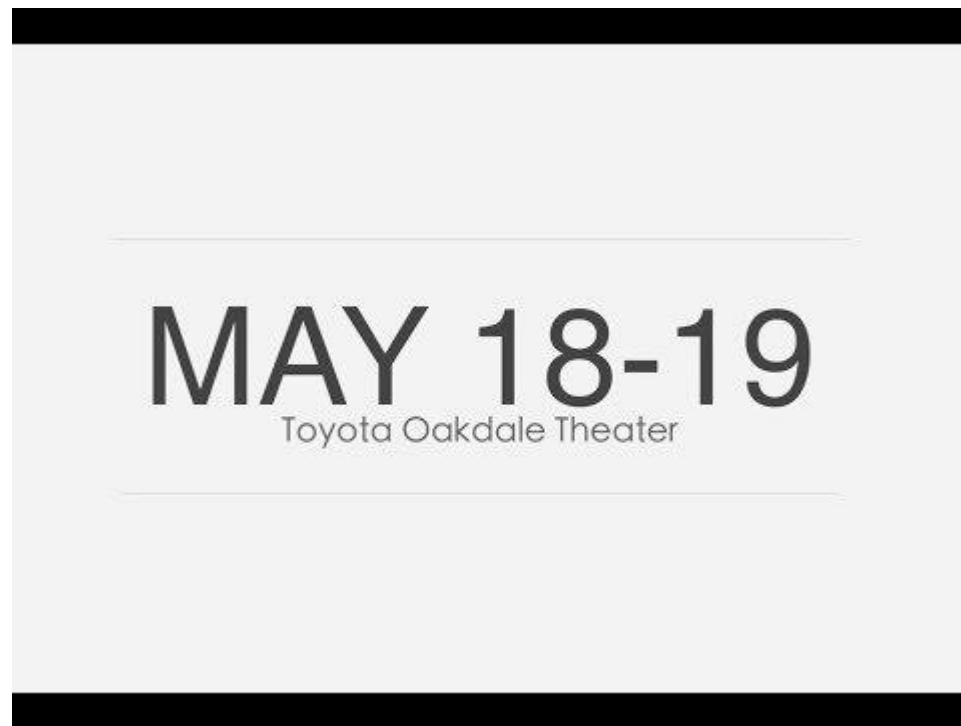
Track - real-time challenge based learning academic competition judging platform

Launch - a purpose-built, challenge based learning hub packed with interactive modules and rich resources

Expo Fest - the Ultimate showcase of inspired learning, creative design, & student solutions

Skills21 is an integrated suite of PreK-16 offerings, the programs are positioned to impact a diverse population of students in a wide variety of settings. Skills21 welcomes you to explore and join 15 years of student success at skills21.org.





The STEM + C Challenge

The Skills21 STEM + CS challenge invites any STEM course or club to compete in the Expo Fest Challenge project. STEM is the foundation of the project and teams are asked to create a computer-science driven product, service or solution that addresses a real-world problem or issue.

- Identify a problem that will be addressed by the project idea.
- Investigate the topic via research, development, experiment or testing method, and data analysis.
- Develop an innovative, computer-science driven or aided solution that addresses the problem.
- Demonstrate application of the solution via experimentation and modeling.
- Showcase the project via a professional exhibition booth and presentation at Expo Fest on May 18 & 19, 2018 at the Oakdale Theatre, Wallingford, CT.



Approaches for adding a CS Component

- **Mobile app**
- **Model or simulation**
- **Data collection or experiment**
- **Theoretical or practical CS**



Computer Science Principles

<http://apcsprinciples.org/>

- New College Board Advanced Placement course in CS.
 - Largest course launch in AP history
- Breadth-first course organized around 7 ***Big Ideas***
- Broadly appealing to girls and underrepresented minorities.



7 Big Ideas

- Creativity
- Abstraction
- Data
- Algorithms
- Programming
- The Internet
- Impact



7 Computational Thinking Practices

CORE PRACTICES
INCLUDING COMPUTATIONAL THINKING



Judging

The STEM + CS Challenge is aligned to the seven CS practices outlined in the K-12 Computer Science Framework.

Research and Development	Description	Score
Evidence and Research	Project is based on <i>both</i> valid background research of credible sources, and the team's own investigations. Observations and data are used to test and revise solutions, or develop new ones.	
Creating Computational Artifacts	Team creates one or more computational artifacts that acts as their solution and/or aids in their solution (P5). Team thoroughly documents how the artifact has been tested or modified, and the results used to improve its overall design and function. (P6).	
Experiment or Testing Method	Project includes at least one investigation/experiment that is valid and informs one or more key components of the proposed solution.	
User/Audience Consideration	Team has made an effort to consider the needs of diverse users in the design process, and incorporates multiple perspectives when collaborating on project development (P1).	
Modeling and Prototyping	Team develops and uses models and/or prototypes (can be physical or digital) to help evaluate ideas and identify strengths and limitations of design (P4).	
Expert Input	Project development has been clearly advised by at least one outside advisor/mentor and identifies how his/her contributions have been incorporated (P2).	

A STEM + CS Example



Thermal Life

BRINGING WARMTH TO THE WATER

Welcome to the **Expo Fest 2016** Project Site of [Bridgeport Regional Aquaculture Science & Technology Education Center](#). We are a group of innovative, creative, intelligent and hardworking students, aspiring to put forth the best project possible. Our cold water safety suit will help a group of people that we believe deserve to be protected, admired & heard:

Mariners.



A STEM + CS Example



WARMTH

Using a chemical reaction involving sodium acetate, the Thermal Life vest produces heat to protect the wearer from frigid temperatures.



PROTECTION

Thermal Life will keep mariners safe from hypothermia, a dangerous threat that comes with working on the water.



PEACE OF MIND

By having this vest comfortably on their body, seafarers will go about their daily duties feeling safe and secure.



MAKE IT STEM +CS

Add an app

Add GPS tracker

Alert Coast Guard/other person



Questions???

