

Figure It Out!

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Host Organization: Lockheed Martin

ETP Type: Traditional

Subject/Grade: 10-12th grades/Computer Science



[ETP Section Guide](#)

[ETP Rubric and Checkbric](#)

[ETP Review Prompts](#)

[Active STEM Learning](#) and [21st Century Skills](#)

Abstract (~150-250 words)

There are many instances in all areas of the workforce, where we are given a task in which we may not have all the necessary skills or knowledge to accomplish the goal immediately. We are challenged daily to research, study, learn, and apply new skills and tools to keep up with all innovations of the modern tech world.

In Computer Science class we focus on web design and coding (using html and CSS). There is an absolute need to be specific for the final product to function properly. In addition, clear and effective communication, willingness to collaborate with others, and problem solving skills are essential to creating this final product. Such skills are not only necessary in the classroom, but in all aspects of life (social and workplace inclusive).

This ETP will challenge Computer Science students to... complete a task which they may not already explicitly know how to do. Students will need to work with others in a small group to call upon their prior knowledge and current skills to learn and apply a new piece of code on their own. This will include using any/all tools and resources available to them (resource notebooks, prior tutorials, peers, youtube, etc.) to complete the task assigned within a given amount of time, independent of teacher instruction.

Focal Standard(s)

Career Technical Education CA State Standards

California Standards for Career Ready Practice

- 1: Apply appropriate technical skills and academic knowledge
- 2: Communicate clearly, effectively, and with reason.
- 4: Apply technology to enhance productivity

Information and Communication Technologies Knowledge and Performance Anchor Standards

- 2.5: Communicate information and ideas effectively to multiple audiences using a variety of media and formats
- 4.1: Use electronic reference materials to gather information and produce products and services
- 5.6 Know the available resources for identifying and resolving problems

Information and Communication Technologies Pathway Standards

Information Support and Services Pathway

- A3.2: Validate and cite Internet resources
- A3.5: Use multiple online search techniques and resources to acquire information

Software and Systems Development Pathway

C4.6: Use proper programming language syntax
C6.6: Integrate media into a full project using appropriate tools
C7.5: Create an online project

Measurable Objective(s)

1. Students will be able to create webpages using accurate coding
2. Students will be able to collaborate in small groups to complete an assigned task
3. Students will be able to explain the function of a new piece of code

Formative Assessment(s)

Daily progress check in the form of Exit Ticket

- Student daily reflection:
 - New information learned—from where/who?
 - Challenge or “stuck” moment
 - Lingering Question(s)

Summative Assessment

“End Deliverable”

New website section with 60-90 second video informational tutorial on new code researched/learned on their own, independent of teacher instruction:

- What’s the code
- How it works
- Why it’s relevant to use in your own website
- Where you found this information

[final website: students code in formatting that has been given/taught to them in class. Students have an additional piece of code that they discovered/researched themselves using resources (youtube, w3 schools, alternate coding website). Students video themselves talking about the website and their code (especially including the “new” code they found on their own and applied—explaining what it does, where they found it, why they wanted to include this in their website). Also submit a written reflection piece]

21st Century Skills and Applications (1-2)

- Problem Solving
 - Secures additional relevant information regarding problem and generates multiple strong alternatives for solving it
 - Produces thorough analysis of effects and tradeoffs for various alternatives
 - Addresses problem in greater context, including contributing factors and long-range effects.
- Communication and Collaboration

- Written and oral communications are clear, correct, and concise
- Demonstrates willingness to make necessary compromises to accomplish common goals
- Employs media and technologies that align with purpose and enhance communication

Fellowship Description (300-500 words)

Lockheed Martin is a global company concerned with research, design, development, manufacture, integration, and sustainment of advanced technologies focused on global security and aerospace development. In this time, I have met aerospace engineers, software engineers, quality assurance specialists, researchers, internal auditors, and information technology specialists who are all passionate about Space, technology, continued learning, and pride in a sustained production of quality products. I work in the Mission Success department of the Space Division at Lockheed Martin supporting two different projects. The first project is with the Audit team. This team internally audits and ensures that all proper processes and protocols are being followed and adhered to by engineers and production teams. I support streamlining the project management schedule process—coding programs (macros in Microsoft Excel) to quickly and efficiently digest information on multiple data sheets into an organized, single location. The second project I support is the analysis of various successes and failures of various missions: noting patterns and trends in causes and corrective actions for different productions that can inform future processes and procedures.

Overall, through my experience at Lockheed Martin, I have not only gained new knowledge about Space and engineering, but also about production and manufacturing processes and procedures. Additionally, I have witnessed the iterative design and engineering process in action (Plan/Research-Design-Create/Build-Test-Reflect-Refine-Test-Share) and have experienced the process myself while working on my own projects. Some of the most challenging times have been teaching myself more intricate macro construction in excel spreadsheets, then debugging the code so it works just right; and learning new terminology and acronyms to be able to digest complex text when combing through reports for causes and corrective actions. Skills I have had to put into practice are: asking specific questions for clarity in project tasks, clearly communicating to schedule meetings and networking with experts, researching information for new knowledge or tools, trying and testing different approaches to complete projects on-time, and persevering through the challenging situations.

Fellowship Connection to School/Classroom (300-500 words)

When I first came into Lockheed Martin, my scope and knowledge of Space, design, production and manufacturing was very little. It was rather intimidating. Something similar to how a student going out into the workforce for the first time my feel. I was given a few projects which included a set of tasks to complete. At first, I was not sure of how to begin or where to start and end. Given time to think, process, and plan; I began to research and work with what I already knew how to do. I was then able to learn additional, necessary skills and find helpful tools to aid my progress toward project completion. I asked questions, met up with experts who educated me, did research, went through multiple trial-and-error cycles, and watched a lot of youtube tutorials.

In this same way, the students in my Computer Science class can be challenged to solve the task(s) given to them even if they don't know how to fully complete it...yet. Relying on their own prior knowledge and skill set, they can research, collaborate, plan, and experiment with options in order to finish the task assigned. By the end, they will be able to explain what they learned, how and where they were able to gain this information and how this new information was relevant to their overall website project. With such an experience, small scale, it is with hope that students will take the skills necessary to complete this project and apply it to other classes, or even to their life and career path outside of the classroom.

END of ETP Proposal!

(DUE by Friday of Week 2)

Instructional Plan

Prior Knowledge:

This assignment will happen 4 weeks into the 6-week marking period.

Students will have 3 in-class days (75 minutes each) to complete and submit.

Students already know the following code and proper usage:

- Paragraph `<p>` `</p>`
- Header `<h1>` `</h1>` thru `<h6>` `</h6>`
- Image `</img>` and citing where the image is found
- Lists (Ordered, Unordered, List item) `<ol>` `</ol>`; `<ul>` `</ul>`; `<li>` `</li>`
- Hyperlinks `<a href>` `</a>`

Students are already familiar with code.org login and layout.

Students are already familiar with accessing Google Classroom and submitting work.

Purpose:

- Students assess their own progress on their website and decide on an aspect they would like to add to enhance their webpage.
(Measurable Outcome #1)
- Students use their research skills to research and apply the code they would like to incorporate (can work with a partner who would like to use the same code).
(Measurable Outcome #2)
- Students record (individually) a video tutorial of their code explaining how it works, the resource where they found the code information, and why they chose this code to fit with their site.
(Measurable Outcome #3)

Actions/Activities:

DAY 1

Do Now (project on screen) ~7 minutes

- Check-in question about previous class session (use notes in folders)
 - Grab a paper that has a copy of textbook page on it
 - Write on paper the code that would correspond with the information on the page
 - Pick a partner:
 - Describe to your partner what code you already know to recreate this page on a website
 - Describe to your partner what code you don't know in order to recreate this page on a website (positioning and style matter)
 - Quick group share-out 2-3 people

Activities

Explaining the Task (~10 minutes)

- SAY: We are not going to learn EVERY SINGLE code, but we are learning some foundational (essential) pieces of code to set up a general layout and get started. So far, I have been the giver of information to you. Today (and this week) you will get to be the seekers of NEW information to add to your own page in whatever way you want and then the givers of this information to others.
- Students login to Google Classroom and read the Task Card : Figure It Out
 - Review the Task
 - Leave time for questions
- Give students 5 minutes to brainstorm what they would like to add to their page to make it (look or function) better.
 - Students share out what they want to do
 - Students can pair up with someone wanting to do something similar
- Brainstorm HOW they can find this information
 - Possible answers: youtube, google search, code.org, w3schools.com
- Remind students that they need to save their research source to cite on reference sheet
- Remind students to refer to their Task Card for their steps
- Send students off to work (desktops or chromebooks)

Worktime (~15 minutes)

- Circulate around groups to monitor progress or support with research process
- Do not be an “Answer Fairy”

Quick Stop & Check-in (~5 minutes)

- SAY: You have about 15 more minutes to research the code and test it
- Address any common challenges or “stuck” issues that are coming up

Worktime (~15minutes)

- Circulate around groups to monitor progress or support with process
- Encourage and push to test the code that it will fit with their page(s)

Closing (~10 minutes)

- Remind students of the timeline and where they should be by the end of today or the start of next class session in order to meet deadline.
- Today = Research & some testing
- Next Session = More testing and revision. Also, drafting your video tutorial script
- Last Session = Finalizing script and making video. Also, submit script and video
- Students go onto Google Classroom and fill in Reflection Form
- Sign-out of accounts and computers

Exit Ticket (project on screen) ~5 minutes

- Write 3 action steps or “To Dos” for yourself next class so you can meet the deadline
- *Students turn this in as they walk out so they can get it back the next class session and have a reminder from themselves of what they need to accomplish that day.*

DAY 2

Do Now (project on screen) ~7 minutes

Look at your “To Do List” that you wrote for yourself at the end of last class session. Based on this list, write (on a half sheet) your goal for yourself (to accomplish and meet) by the end of today’s session. Give 2-3 mini steps that you need to take in order to get this accomplished.

- Share with a partner, then turn and share with another partner

Activities

Reviewing the Task and today’s deadline ~7 minutes

- Review Task Card
- Review today’s deadline
 - More testing and revision. Also, drafting your video tutorial script
 - Turn in Script on google Classroom (will get it turned back tomorrow to edit more and use for tutorial video)
 - Reminder:
 - TOGETHER: partners can research and test code
 - INDIVIDUALLY: write script and record tutorial—turn in separate work

Worktime (~20 minutes)

- Circulate around groups to monitor progress or support with research and script process
- Do not be an “Answer Fairy”

Quick Stop & Check-in (~5 minutes)

- SAY: You have about 20 more minutes to test code and write script rough draft
- Address any common challenges or “stuck” issues that are coming up

Worktime (~20 minutes)

- Circulate around groups to monitor progress or support with research and script process
- Do not be an “Answer Fairy”

Closing (~10 minutes)

- Remind students of the timeline and where they should be by the end of today or the start of next class session in order to meet deadline.
- Today = Testing and refining your new code and drafting script for your video.
- Next Session = Finalize script for video. Record and turn in tutorial video with script.
- Students go onto Google Classroom and fill in Reflection Form
- Sign-out of accounts and computers

Exit Ticket (project on screen) ~5 minutes

- Write 3 action steps or “To Dos” for yourself next class so you can meet the deadline.
- *Students turn this in as they walk out so they can get it back the next class session and have a reminder from themselves of what they need to accomplish that day.*

DAY 3

Do Now (project on screen) ~7 minutes

Look at your “To Do List” that you wrote for yourself at the end of last class session. Based on this list, write (on a half sheet) your goal for yourself (to accomplish and meet) by the end of today’s session. Give 2-3 mini steps that you need to take in order to get this accomplished.

- Share with a partner, then turn and share with another partner

Activities

Reviewing the Task and today’s deadline ~7 minutes

- Review Task Card
- Review today’s deadline
 - Finished tutorial script and video tutorial
 - Turn in Script on google Classroom, send/share video via email or DRIVE
 - Reminder:
 - TOGETHER: partners can research and test code, help proof-read and record
 - INDIVIDUALLY: write script and record tutorial—turn in separate work

Worktime (~20 minutes)

- Circulate around groups to monitor progress or support with research and script process
- Do not be an “Answer Fairy”

Quick Stop & Check-in (~5 minutes)

- SAY: You have about 20 more minutes to test code and write script rough draft
- Address any common challenges or “stuck” issues that are coming up

Worktime (~20 minutes)

- Circulate around groups to monitor progress or support with research and script process
- Do not be an “Answer Fairy”

Closing (~10 minutes)

- Students go onto Google Classroom and fill in Reflection Form
- Sign-out of accounts and computers
- Based on your process, effort, and product quality due today, give yourself an overall grade and provide 2 reasons why you earned this grade.

Exit Ticket (project on screen) ~5 minutes

On a half sheet of paper, to turn in at the end of class:

- What was easy about this activity? WHY.
- What was challenging/difficult about this activity? WHY.
- One academic related piece of learning for you.
- One life/skill/personal piece of learning for you.
- *Students turn this in as they walk out*

Supply List

- Computers (desktops or chromebooks)

- Code.org sign-in (**Unit # and Lesson # and bubble #**)
- Google Classroom sign-in (assignment on classroom)
- Video Recording device (phones ok)
- Sample video recording + script
- Sample webpage with learned code and citation

References

Teach Computer Science. (2019 June). Retrieved from <https://studio.code.org/courses?view=teacher>
HTML Introduction. (2019, June). Retrieved from https://www.w3schools.com/html/html_intro.asp
CSS Introduction. (2019, June). Retrieved from https://www.w3schools.com/css/css_intro.asp

Keywords

Coding Websites: Paragraph, Heading, Ordered List, Unordered List, List Item, Image, Hyperlink
High School, computer science

Links to Files in this ETP

[Figure It Out Task Card](#)
[Reflection Questions \(days 1-3\)](#)--can be printed or used in Google Forms
[Do Now & Exit Ticket prompts \(days 1 - 3\)](#)
[Reference sheet](#)
[Script graphic organizer](#)
[Final Grading Rubric](#)

END of ETP!

Draft 1 due: Wednesday of Week 4

Draft 2 due: Friday of Week 5

Final Draft due: 3 days before end of Fellowship