Introduction to Research & Proposal Development

Content Area: **Computer Science**
Course(s):
Time Period: **Marking Period 1**
Length: **2-3 Weeks**
Status: **Published**

Summary

In this course, students will build a plan to advance their understanding of an advanced computer science topic, execute that plan making modifications throughout the process based on feedback & self assessment, and present a final product at the end of the year. In this first unit, students will develop criteria for quality and useful resources to develop their projects. They will build guiding rubrics and develop lists of credible resources to help them along their paths. Then students will develop short and long term goals in order to achieve their end result of their project.

Diversity and Inclusion: Students will focus on equity, inclusion, and tolerance when analyzing the comparison of various quantities regarding characteristics of people & resources. Equality will also be highlighted through the topic of digital citizenship. This can be associated with treating people fairly and equally.

English Language Development Standard 4: Language for Science: English language learners communicate information, ideas and concepts necessary for academic success in the content area of science.

Information Literacy: This unit challenges students to locate, evaluate, and use information effectively. Information literacy includes, but is not limited to, digital, visual, media, textual, and technological literacy. Lessons may include the research process and how information is created and produced; critical thinking and using information resources; research methods, including the difference between primary and secondary sources; the difference between facts, points of view, and opinions, accessing peer-reviewed print and digital library resources; the economic, legal, social, and ethical issues surrounding the use of information.

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P.1	Act as a responsible and contributing community members and employee.
TECH.K-12.1.1.a	articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.
TECH.K-12.1.1.b	build networks and customize their learning environments in ways that support the learning process.
P.4	Demonstrate creativity and innovation.
P.5	Utilize critical thinking to make sense of problems and persevere in solving them.

TECH.K-12.1.1.d	understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.
P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
8.1.12.CS.4	Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.
P.9	Work productively in teams while using cultural/global competence.
TECH.K-12.1.2.a	cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world.
TECH.K-12.1.2.b	engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices.
TECH.K-12.1.2.c	demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.
TECH.K-12.1.3.a	plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.
TECH.K-12.1.3.b	evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.
TECH.K-12.1.3.c	curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.
8.1.12.IC.1	Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.
TECH.K-12.1.4.a	know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.
TECH.K-12.1.4.b	select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.
TECH.K-12.1.4.d	exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.
TECH.K-12.1.5.a	formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
TECH.K-12.1.5.c	break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.
TECH.K-12.1.6.b	create original works or responsibly repurpose or remix digital resources into new creations.
TECH.K-12.1.7.a	use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning.
8.1.12.AP.5	Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.
8.1.12.AP.6	Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs.
8.1.12.AP.8	Evaluate and refine computational artifacts to make them more usable and accessible.
8.1.12.AP.9	Collaboratively document and present design decisions in the development of complex programs.
8.2.12.ED.1	Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.
8.2.12.ITH.1	Analyze a product to determine the impact that economic, political, social, and/or cultural factors have had on its design, including its design constraints.

W.WR.11–12.5	Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.
SL.PE.11–12.1	Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with peers on grades 11–12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

Essential Questions & Essential Understanding

- How are goals and deadlines adjusted mid process?
- How can a larger topic be broken up into smaller sequential pieces?
- What makes a resource a reliable, quality and appropriate for our project?
- What type of advanced topic will be covered by each individual student?

Objectives

Students Will Know

- What criteria to look for in evaluating resources to learn computer science topics independently.
- How to properly set up a proposal for defining a task and its deadlines.

Students Will Be Skilled At

- Evaluating resources' usefulness.
- Breaking down larger projects into meaningful smaller portions and evaluating the time needed to complete these smaller tasks.

Learning Plan

Present previous project ideas to inspire new ideas. Classroom discussion on potential paths for each of the projects.

Develop criteria for evaluating resources & create a template rubric for evaluations.

Assessment on rubric utilizing classroom resources.

Develop Proposal Guidelines and Structure based on student project topics

Presentation on proposals.

Materials

Core Resource(s)

- CodeHS

Supplemental Resource(s)

- Khan Academy
- Pygame Textbook
- other approved tutorial sites

Assessments

- Formative: Daily assessments using check ins and exit tickets
- Summative: Teacher-created assessments based on student rubrics.
- Benchmark: Setting benchmarks with rubrics and proposal criteria.
- Alternative Assessments: Presentations, playtesting, and discussions

Integrated Accomodations & Modifications

Possible accommodations/modification forAdvanced Topics in Computer Science