

BERKELEY HEIGHTS PUBLIC SCHOOLS  
BERKELEY HEIGHTS, NEW JERSEY

**COLUMBIA MIDDLE SCHOOL  
COMPUTER DEPARTMENT**

**INTRODUCTION TO WEB DESIGN**

Curriculum Guide

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This curriculum may be modified through varying techniques, strategies, and materials, as per an individual student's Individualized Educational Plan (IEP).

Approved by the Berkeley Heights Board of Education  
at the regular meeting held on 12/5/19.

## **VISION STATEMENT**

STEM is the integrated approach to education in the areas of Science, Technology, Engineering, and Mathematics. Instruction is student centered and driven by an iterative design process, exploratory learning, problem-solving, and engagement in authentic contexts.

Through the process of engaging in authentic, hands-on, open-ended design challenges, students will become familiar with the steps and processes associated with successful problem solving in the context of the engineering design process. Students will gain proficiency in the application of relevant Math, Science, and Technology concepts while expanding their comprehension and understanding of the human-designed world, the nature of technology and engineered systems, and the skills, knowledge, and attitudes necessary to become well-rounded and successful twenty-first century problem solvers and innovators.

## **MISSION STATEMENT**

Intro to Web Design is a one quarter cycle class designed for 7th & 8th grade students at Columbia Middle school that addresses 21st century skills, career ready practices, and technology standards. Students are empowered to create and share content on their own web pages. They begin by thinking about the role of the web, and how it can be used as a medium for creative expression. As students develop their pages and begin to see themselves as programmers, they are encouraged to think critically about the impact of sharing information online and how to be more critical content consumers. They are also introduced to problem solving as it relates to programming, as they learn valuable skills such as debugging, commenting, and structure of language. At the conclusion of the unit, students compile their work to create a personal website they can publish and share.

Throughout this course, students will be engaged in an authentic problem-based learning environment working as a team. Students will learn to utilize feedback from peers to revise their designs and develop better solutions. Throughout the course students gain programming skills using code.org's CS Discoveries framework. They learn to represent computing processes both on and offline and consider the impact of technology in the world. Additionally, this course lays the foundational knowledge needed to solve real world problems across different areas of study and outside the classroom.

## **COURSE PROFICIENCIES**

### **COURSE OBJECTIVES**

Having a strategy for approaching problems can help you develop new insights and come up with new and better solutions. This process is generally useful for solving all kinds of problems.

#### The Problem Solving Process

##### Define

- What problem are you trying to solve?
- What are your constraints?
- What does success look like?

##### Prepare

- Brainstorm / research possible solutions
- Compare pros and cons
- Make a plan

##### Try

- Put your plan into action

##### Reflect

- How do your results compare to the goals you set while defining the problem?
- What can you learn from this or do better next time?
- What new problems have you discovered?

Similarly, the design process is a loop because although the steps are listed in sequential order, you will likely return to previous steps multiple times throughout a project. It is often necessary to revisit stages or steps in order to improve that aspect of a project.

In the design process,

- Ask (What are we trying to solve?, What are the constraints?, What are the requirements?, What questions do you have about the challenge?)
- Imagine (What are the possible solutions?, Brainstorm ideas, list materials needed, explain the ideas, create a sketch for you ideas)
- Plan (Choose a final solution, sketch a final solution, decide the steps you will take to create your solution, create a technical drawing to explain your design)
- Create (follow your plan and create your design, what changes did you make while creating your design? Why?, Self reflection)
- Improve ( What worked well? What could have gone better? What improvements could you make to allow your design to be more successful? Why is the redesign better than the original design?)

## **Career Ready Practices**

CRP1. Act as a responsible and contributing citizen and employee.

CRP2. Apply appropriate academic and technical skills.

CRP4. Communicate clearly and effectively and with reason.

CRP5. Consider the environmental, social and economic impacts of decisions.

CRP6. Demonstrate creativity and innovation.

CRP7. Employ valid and reliable research strategies.

CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.

CRP9. Model integrity, ethical leadership and effective management.

CRP11. Use technology to enhance productivity.

CRP12. Work productively in teams while using cultural global competence.

## **STUDENT PROFICIENCIES**

Students will understand:

- Compare the tradeoffs associated with computing technologies that affect people's everyday activities and career options.
- Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs.
- Discuss computing technologies that have changed the world and express how those technologies influence, and are influenced by, cultural practices.
- Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.
- Describe tradeoffs between allowing information to be public and keeping information private and secure.
- Discuss real-world cybersecurity problems and how personal information can be protected.
- Modify, remix or incorporate portions of an existing program into one's own work, to develop something new or add more advanced features.
- Incorporate existing code, media, and libraries into original programs, and give attribution.
- Evaluate licenses that limit or restrict the use of computational artifacts when using resources such as libraries.
- Use public domain or creative commons media and refrain from copying or using material created by others without permission.
- Describe tradeoffs between allowing information to be public and keeping information private and secure.
- Document programs in order to make them easier to follow, test, and debug.
- Seek and incorporate feedback from team members and users to refine a solution that meets user needs.
- Systematically test and refine programs using a range of test cases.
- Discuss issues of bias and accessibility in the design of existing technologies.
- Distribute tasks and maintain a project timeline when collaboratively developing computational artifacts.

## **METHODS OF EVALUATION**

1. Teacher observation/questioning/monitoring
2. Project Notebooks/Journals
3. Team evaluation rubrics
4. Self and peer evaluation
5. Performance tasks/assessments
6. Reports and presentations
7. Student created designs and models
8. Final presentations

## **MODIFICATIONS & ACCOMMODATIONS**

**Modifications and Accommodations for Special Education students, students with 504s, English Language Learners and Gifted and Talented students may include but are not limited to the following:**

### **Special Education**

- Individualized Education Plans (IEPs)
- Exemplars of varied performance levels
- Multimedia presentations
- Sheltered instruction
- Consultation with ESL teachers
- Manipulatives
- Tiered/Scaffolded Lessons
- Mnemonic devices
- Visual aids
- Modeling
- Guided note-taking
- Study Guides
- Modified homework
- Differentiated pre-typed class notes and example problems
- Use of the special education teacher to re-instruct in flexible small groups for the struggling learner
- Manipulatives
- Flipped Instruction
- Word banks
- Reduced choice on assessments
- Preferential seating
- Choice activities
- Modified time requirements
- Modified notes
- Modified lesson, assessment and study guide format
- Provide an enriched curriculum and activities
- Independent projects
- Contracts/behavior support plans
- Open-ended responses
- Project-based learning
- Group activities

- Guided Notes
- Functional learning incorporated into each lesson
- Exploration Activities
- Assessment read aloud
- Small group assessments
- Organizational Support
- Oral questioning assessments to supplement written response
- Pre-writing Structural Supports for extended writing tasks
- Ongoing teacher feedback as part of the writing process
- Interactive Study Guides
- Multi-sensory approach to instruction
- Written and spoken step-by-step directions
- Content-focused assessment (not grading for spelling/grammar)
- Graphic organizers
- Non-verbal cues to begin task/remain on task/refocus
- Individual monitoring for understanding/reinforced instruction
- Printed copies of class readings for application of Active Reading Strategies

### **Gifted & Talented**

- Provide one-to-one teacher support
- Curriculum Compacting
- Advanced problems to extend the critical thinking skills of the advanced learner
- Supplemental reading material for independent study
- Elevated questioning techniques using Webb's Depth of Knowledge matrix
- Curriculum Compacting
- Flexible grouping
- Tiered assignments
- Topic selection by interest
- Manipulatives
- Tiered Lessons
- Flipped Instruction
- Multimedia Presentations
- Open-ended responses
- Project-based learning
- Group activities
- Guided Notes
- Conclusions and analysis of exploratory activities
- Career based learning incorporated into each lesson
- Exploration Activities

- Student choice

### **ELLs**

- Exemplars of varied performance levels
- Multimedia presentations
- Sheltered instruction
- Consultation with ESL teachers
- Manipulatives
- Tiered/Scaffolded Lessons
- Mnemonic devices
- Visual aids
- Modeling
- Guided note-taking
- Study Guides
- Modified homework
- Differentiated pre-typed class notes and example problems
- Individualized instruction plans
- Manipulatives
- Flipped Instruction
- Words banks
- Reduced choice on assessments
- Preferential seating
- Choice activities
- Modified time requirements
- Modified notes
- Modify lesson, assessment and study guide format
- Provide an enriched curriculum and activities
- Contracts/management plans
- Open-ended responses
- Project-based learning
- Group activities
- Guided Notes
- Exploration Activities
- Assessment read aloud
- Small group assessments
- Oral questioning assessments to supplement written response
- Pre-writing Structural Supports for extended writing tasks
- Ongoing teacher feedback as part of the writing process
- Interactive Study Guides

- Multi-sensory approach to instruction
- Written and spoken step-by-step directions
- Graphic organizers
- Non-verbal cues to begin task/remain on task/refocus
- Individual monitoring for understanding/reinforced instruction
- Printed copies of class readings for application of Active Reading Strategies

### **504s**

- Exemplars of varied performance levels
- Multimedia presentations
- Sheltered instruction
- Tiered/Scaffolded Lessons
- Mnemonic devices
- Visual aids
- Modeling
- Guided note-taking
- Study Guides
- Differentiated pre-typed class notes and example problems
- Manipulatives
- Words banks
- Reduced choice on assessments
- Preferential seating
- Modified time requirements
- Modified notes
- Modify lesson, assessment and study guide format
- Modified homework
- Independent projects
- Contracts/management plans
- Open-ended responses
- Project-based learning
- Group activities
- Guided Notes
- Exploration Activities
- Assessment read aloud
- Small group assessments
- Organizational Support
- Oral questioning assessments to supplement written response
- Pre-writing Structural Supports for extended writing tasks
- Ongoing teacher feedback as part of the writing process
- Interactive Study Guides
- Multi-sensory approach to instruction
- Written and spoken step-by-step directions
- Content-focused assessment (not grading for spelling/grammar)
- Graphic organizers

- Non-verbal cues to begin task/remain on task/refocus
- Individual monitoring for understanding/reinforced instruction
- Printed copies of class readings for application of Active Reading Strategies

### **Students at Risk of Failure**

- Exemplars of varied performance levels
- Multimedia presentations
- Tiered/Scaffolded Lessons
- Modeling
- Guided note-taking
- Study Guides
- Differentiated pre-typed class notes and example problems
- Individualized instruction plans
- Words banks
- Reduced choice on assessments
- Preferential seating
- Choice activities
- Modified time requirements
- Modified notes
- Modified lesson, assessment and study guide format
- Modified homework
- Provide an enriched curriculum and activities
- Contracts/management plans
- Open-ended responses
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- Ongoing teacher feedback as part of the writing process
- Interactive Study Guides
- Multi-sensory approach to instruction
- Written and spoken step-by-step directions
- Graphic organizers
- Non-verbal cues to begin task/remain on task/refocus
- Individual monitoring for understanding/reinforced instruction
- Printed copies of class readings for application of Active Reading Strategies

## **SCOPE AND SEQUENCE**

### **COURSE OUTLINE/STUDENT OBJECTIVE**

#### **Unit 1: Web Content and HTML**

**Duration:** 15 days

**Overview:** Students use computing as a form of self expression as they design and develop basic web pages. Focusing on the tags, keywords, and syntax used to communicate instructions to the computer, students use HTML to structure the content of a web page. They also explore the privacy and intellectual property implications of publishing their work online.

**Standards:** 8.2.8.C.4; 8.2.8.E.3; 8.2.8.E.4; 8.2.8.C.7; 8.1.8.D.2; 8.1.8.D.3; 8.2.8.B.6

**21st Century:** CRP2; CRP4; CRP6; CRP8; 9.3.ST-ET.3; 9.3.ST-SM.2; 9.3.IT-PRG.5; 9.3.IT-PRG.6; 9.3.IT-PRG.7

**Cross-Curricular:** RST.6-8.3; RST.6-8.4; RST.6-8.9; RST.6-8.10; MP.1; MP.2; MP.4; MS-ETS1-2; MS-ETS1-3; MS-ETS1-4

#### **Essential Questions:**

- Why do people create websites?
- How can text communicate content and structure on a web page?
- How can I incorporate content I find online into my own webpage?
- What strategies can I use when coding to find and fix issues?

#### **Student Learning Objectives:**

*Students will know and be able to*

- Identify the reasons someone might visit a given website
- Identify the reasons someone might create a given website
- Identify websites as a form of personal expression
- Explain that HTML allows a programmer to communicate the way content should be structured on a web page
- Write a simple HTML document that uses opening and closing tags to structure content
- Understand how to use lesson resources provided in Web Lab
- Use heading tags to change the appearance of text on a web page.
- Structure content into headings, subheadings, and paragraphs.
- Understand and explain reasons that it is difficult to control who sees information published online.
- Understand and justify guidelines for safely publishing information online.
- Use the <ol>, <ul>, and <li> tags to create ordered and unordered lists in an HTML page.
- Create and name a new HTML page.
- Explain the purpose of copyright.
- Identify the rights and restrictions granted by various Creative Commons licenses

- Add an image to a web page
- Describe why using whitespace, indentation, and comments makes your code easier to maintain
- Develop a set of techniques for preventing bugs in HTML code and finding them when they occur
- Connect multiple web pages into one website using hyperlinks.

### **Possible Activities**

- Explore a handful of the most-used websites in the United States and discusses how each of those sites is useful for users and how it might also serve its creators.
- Discusses different ways that people express and share their interests and ideas, then looks at a few exemplar websites made by students from a previous course. Brainstorm and share a list of topics and interests to include; create a resource for developing a personal website in the rest of the unit.
- Engage in a brief unplugged activity demonstrating the challenges of effectively communicating the structure of a web page. Look at an HTML page in Web Lab and discusses how HTML tags help solve this problem, then uses HTML to write the first web pages of the unit.
- Practices using header tags to create page and section titles and learns how the different header elements are displayed by default. Plan how to organize content on a personal web pages that will be built across the unit and begins the first page of the project.
- Discuss what types of information are good to share with other people, then look at several sample social media pages to see what types of personal information could be shared intentionally or unintentionally. Develop a set of guidelines to follow when putting information online.
- Introduce ordered and unordered lists and the associated `<ul>`, `<ol>`, and `<li>` HTML tags. Practice using the tags, then go back to the personal web page project to add a new HTML page that includes the new tags.
- Explore how to use media such as images, video, or music created by others on a website while respecting the rights of the creator of that media. Study Creative Commons licensing, how to add images to web pages, and how to give proper attribution when doing so.
- Correct errors in a sequence of increasingly complex web pages found on Code Studio and learn the importance of comments, whitespace, and indentation as tools for making web pages easier to read.
- Link together all the previous pages into one project, and create navigation bars for each page before publishing the entire site to the Web.

## **Unit 2: Web Development**

**Duration:** 15 days

**Overview:** After covering the basics of HTML, students dive into improving their websites with CSS. They learn to use colors, fonts and margins to create a unique style of their own design. At the end of the chapter students publish a personal portfolio website that demonstrates use of HTML for content and CSS for a personalized.

**Standards:** 8.2.8.C.2; 8.2.8.C.7; 8.2.8.E.3; 8.2.8.E.4; 8.2.8.C.3; 8.1.8.B.1

**21st Century:** CRP2; CRP4; CRP6; CRP8; 9.3.ST-ET.3; 9.3.ST-SM.2; 9.3.IT-PRG.5; 9.3.IT-PRG.6; 9.3.IT-PRG.7

**Cross-Curricular:** RST.6-8.3; RST.6-8.4; RST.6-8.9; RST.6-8.10; MP.1; MP.2; MP.4; MS-ETS1-2; MS-ETS1-3; MS-ETS1-4

### **Essential Questions:**

- How do I modify the appearance and style of my web pages?
- How do I safely and appropriately make use of the content published on the Internet?

### **Student Learning Objectives:**

*Students will know and be able to*

- Use CSS selectors to style HTML text elements.
- Create and link to an external style sheet.
- Explain the differences between HTML and CSS in both use and syntax.
- Use CSS properties to change the size, position, and borders of elements.
- Create a CSS rule-set for the body element that impacts all elements on the page.
- Use basic web searching techniques to find relevant information online
- Identify elements that contribute to a website's trustworthiness or untrustworthiness
- Group elements using classes in order to create more specific styles on their website.
- Apply the `rgb()` color function to add custom colors to their website
- Apply CSS styles across an entire website
- Explain the design choices they made on their website to other people
- Prioritize and implement incremental improvements

### **Possible Activities**

- Learn the basic syntax for CSS rule-sets and then explore properties that impact HTML text elements. Work on an HTML page about Guinness World Record holders, adding style to the provided page. Apply what they have learned about styles for text elements to a personal web page.
- Look at a website about "Desserts of the World". Investigate and modify the new CSS styles on this website, add styles to the page. Work on the Desserts page and apply knowledge of CSS properties to do more styling of a personal website.

- Think critically about how web searches work and how to find relevant and trustworthy information online. View and discuss a video about how search engines work. Search for information about several unlikely animals. Analyze the sites' reliability in order to identify which of the animals is actually a hoax.
- Examine how to specify custom colors using their RGB (red, green, blue) values. Apply these colors to a new Four Seasons web page, using CSS classes. Add more styles to the Four Seasons web page and to style a personal website.
- Finalize a personal website. Work with peers to get feedback, put the finishing touches on the websites, review the rubric, and reflect on the process. Share the project and also an overview of the process taken to get to the final design

## **SUGGESTED MATERIALS AND RESOURCES**

### **Materials:**

- Design Journals
- Desktop computer
- iPad apps and peripherals

### **Websites:**

- <https://studio.code.org/s/csd2-2018>
- <https://curriculum.code.org/csd-18/standards/>
- [www.code.org](http://www.code.org)
- [www.Youtube.com](http://www.Youtube.com)
- [www.google.com/maps](http://www.google.com/maps)