



# CodeHS

## Web Design

### Common Core State Standards for Mathematics Standards Alignment Overview

The Web Design course is a first computer science course introducing the basics of designing a web page, how information and images are rendered on the Web, and designing user interfaces. This document is an overview of how the Web Design course aligns with the Common Core State Standards for Mathematics.

## Standards for Mathematical Practice

### 1. **Make sense of problems and persevere in solving them.**

In the CodeHS Web Design course, students continually design and test the websites that they build, and these sites will invariably have bugs, performance issues, browser rendering differences, deprecated code, and more. Students are encouraged during testing to start by explaining to themselves the context of a problem on their site and looking for entry points to its solution. They plan a solution pathway rather than jumping into a solution attempt with the issues on their sites. They persevere in solving them by using different browsers, checking their HTML, CSS, and Bootstrap code for errors, and looking up specific issues on the Internet or consulting others, as needed until their sites are usable and presentable.

### 2. **Reason abstractly and quantitatively.**

The Web Design course encourages students to make sense of quantities and their relationships in problem situations. Students need to consider layouts in design using HTML and CSS, which means that every pixel counts and any shift can throw off the entire look and feel and usability. When designing user interfaces, students need to think abstractly and conceptually about their designs, and drill down to details and consider the same designs quantitatively within the site code.

### 3. **Construct viable arguments and critique the reasoning of others.**

Web Design students are able to analyze situations by breaking them into cases so they can create websites that are user-friendly for all. They justify their conclusions and decisions for choices that they make on their sites, communicate them to others, and respond to the arguments of others about advantages and disadvantages for designing and developing their site in a certain way.

Computing has had significant impacts in several fields, and students critique the reasoning of others when discussing various topics. In this course, students learn about the positive and negative impacts the Internet has had on culture, social interactions, safety, and privacy. Students also learn the ethical considerations of sharing their code with others, and finding solutions to CodeHS exercises online. Students learn about the importance of cybersecurity and the various security measures we take to protect information and privacy on the Internet.

**4. Model with mathematics.**

Students in the CodeHS Web Design course use geometry to solve website design layout problems. Students in the course can also apply what they know and are comfortable making assumptions and approximations to simplify a complicated designs, realizing that these may need revision later.

**5. Use appropriate tools strategically.**

Students might use pencil and paper, concrete models, a ruler, a calculator, a spreadsheet, and other tools to create their sites and apps in the Web Design course. Students detect possible errors in their code by strategically using estimation and other mathematical knowledge.

**6. Attend to precision.**

The Web Design course teaches students how to make choices about how data elements are organized and where data is stored on websites. Students can consider these choices in terms of speed, reliability, accessibility, privacy, and integrity and how those choices impact their own site development.

**7. Look for and make use of structure.**

Students look closely to discern a pattern or structure in websites and applications. Complex websites are designed as systems of interacting or nested modules, each with a specific role, coordinating for a common overall purpose. These modules can be combinations of data (images, text, etc.) which allow for better management of complex sites. In the Web unit, students learn about network communication and organization, basic Internet protocols, and Internet addressing, which all also make use of structural elements.

**8. Look for and express regularity in repeated reasoning.**

In the Web Design course, students notice if calculations are repeated, and look both for general methods and shortcuts to make make their code more concise and reusable.

# Standards for Mathematical Content

## Web Design (Picasso)



In today's world, web pages are the main medium for sharing ideas and information. Learning to design websites is an incredibly useful skill for any career path.

The CodeHS Web Design course is a project-based course that teaches students how to build their own web pages. Students will learn the languages HTML and CSS, and will create their own live homepages to serve as portfolios of their creations. By the end of this course, students will be able to explain how web pages are developed and viewed on the Internet, analyze and fix errors in existing websites, and create their very own multi-page websites.

## Standards for Mathematical Content Addressed

**6.RP.1** Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

**6.NS.5** Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

**6.NS.6c** Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

**6.EE.6** Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

**7RP.2** Recognize and represent proportional relationships between quantities.

**7.NS.1** Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

**7.NS.1b** Understand  $p + q$  as the number located a distance  $|q|$  from  $p$ , in the positive or negative direction depending on whether  $q$  is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.

**7.EE.4** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

**8.F.1** Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.

**N-Q.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

**A-SSE.1** Interpret expressions that represent a quantity in terms of its context.