



**Mathematics**  
**Grade 10 - 12**  
**Web Development**

Dr. Mark Toback, Superintendent  
Committee: Bruce McNutt

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

**Approved by the Wayne Township Board of Education at the regular  
meeting held on Month, Day, 2021.**

# New Jersey Student Learning Standards For Mathematics

## Standards for Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council’s report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately) and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one’s own efficacy).

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

Mathematically proficient students:

- explain to themselves the meaning of a problem and looking for entry points to its solution.
- analyze givens, constraints, relationships, and goals.
- make conjectures about the form and meaning of the solution attempt.
- consider analogous problems, and try special cases and simpler forms of the original problem.
- monitor and evaluate their progress and change course if necessary.
- transform algebraic expressions or change the viewing window on their graphing calculator to get information.
- explain correspondences between equations, verbal descriptions, tables, and graphs.
- draw diagrams of important features and relationships, graph data, and search for regularity or trends.
- use concrete objects or pictures to help conceptualize and solve a problem.
- check their answers to problems using a different method.
- ask themselves, “Does this make sense?”
- understand the approaches of others to solving complex problems.

### 2 Reason abstractly and quantitatively.

Mathematically proficient students:

- make sense of quantities and their relationships in problem situations.
- ✓ *decontextualize* (abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents and

- ✓ *contextualize* (pause as needed during the manipulation process in order to probe into the referents for the symbols involved).
- use quantitative reasoning that entails creating a coherent representation of quantities, not just how to compute them
- know and flexibly use different properties of operations and objects.

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

Mathematically proficient students:

- understand and use stated assumptions, definitions, and previously established results in constructing arguments.
- make conjectures and build a logical progression of statements to explore the truth of their conjectures.
- analyze situations by breaking them into cases
- recognize and use counterexamples.
- justify their conclusions, communicate them to others, and respond to the arguments of others.
- reason inductively about data, making plausible arguments that take into account the context
- compare the effectiveness of plausible arguments
- distinguish correct logic or reasoning from that which is flawed
- ✓ elementary students construct arguments using objects, drawings, diagrams, and actions..
- ✓ later students learn to determine domains to which an argument applies.
- listen or read the arguments of others, decide whether they make sense, and ask useful questions

### **4 Model with mathematics.**

Mathematically proficient students:

- apply the mathematics they know to solve problems arising in everyday life, society, and the workplace.
- ✓ In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community.
- ✓ By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another.
- simplify a complicated situation, realizing that these may need revision later.
- identify important quantities in a practical situation
- map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas.

- analyze those relationships mathematically to draw conclusions.
- interpret their mathematical results in the context of the situation.
- reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

## **5 Use appropriate tools strategically.**

Mathematically proficient students:

- consider available tools when solving a mathematical problem.
- are familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools
- detect possible errors by using estimations and other mathematical knowledge.
- know that technology can enable them to visualize the results of varying assumptions, and explore consequences.
- identify relevant mathematical resources and use them to pose or solve problems.
- use technological tools to explore and deepen their understanding of concepts.

## **6 Attend to precision.**

Mathematically proficient students:

- try to communicate precisely to others.
- use clear definitions in discussion with others and in their own reasoning.
- state the meaning of the symbols they choose, including using the equal sign consistently and appropriately.
- specify units of measure and label axes to clarify the correspondence with quantities in a problem.
- calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the context.
- ✓ In the elementary grades, students give carefully formulated explanations to each other.
- ✓ In high school, students have learned to examine claims and make explicit use of definitions.

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

Mathematically proficient students:

- look closely to discern a pattern or structure.
- ✓ Young students might notice that three and seven more is the same amount as seven and three more.

- ✓ Later, students will see  $7 \times 8$  equals the well-remembered  $7 \times 5 + 7 \times 3$ , in preparation for the distributive property.
- ✓ In the expression  $x^2 + 9x + 14$ , older students can see the 14 as  $2 \times 7$  and the 9 as  $2 + 7$ .
- step back for an overview and can shift perspective.
- see complicated things, such as some algebraic expressions, as single objects or composed of several objects.

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

Mathematically proficient students:

- notice if calculations are repeated
- look both for general methods and for shortcuts.
- maintain oversight of the process, while attending to the details.
- continually evaluate the reasonableness of intermediate results.

## Wayne School District Curriculum Format

<b>Content Area/ Grade Level/ Course:</b>	<b>Mathematics 9-12 Web Design</b>
<b>Unit Plan Title:</b>	<b>Unit 1. What is the World Wide Web and the Internet</b>
<b>Time Frame</b>	<b>2 Weeks</b>
<b>Anchor Standards/Domain*    *i.e: ELA: reading, writing i.e.: Math: Algebra</b>	
21st Century Life Skills: Career Preparation Career & Technical Education: Information Technology	9.2.12.C 9.3.IT-PRG
<b>Unit Overview</b>	
<b>Unit 1.What is the World Wide Web and the Internet</b> <ol style="list-style-type: none"> <li>A. What is the World Wide Web?</li> <li>B. What is the internet?</li> <li>C. How are websites stored by the webmaster and accessed by the user?</li> <li>D. What are the languages of the internet?</li> <li>E. What careers exist in web design?</li> <li>F. Explore what problems can be solved through the internet and the World Wide Web.</li> </ol>	
<b>Standard Number(s)    * i.e: Math: F.LE.A.4    i.e.: NJLSA.R4.</b>	
<ul style="list-style-type: none"> <li>● 8.1.12.CS.4: Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.</li> <li>● 8.1.12.NI.2: Evaluate security measures to address various common security threats.</li> <li>● 8.1.12.NI.3: Explain how the needs of users and the sensitivity of data determine the level of security implemented.</li> <li>● 8.1.12.NI.4: Explain how decisions on methods to protect data are influenced by whether the data is at rest, in transit, or in use.</li> <li>● ● 8.1.12.IC.1: Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices</li> <li>● 8.1.12.IC.2: Test and refine computational artifacts to reduce bias and equity deficits.</li> <li>● 8.1.12.DA.2: Describe the trade-offs in how and where data is organized and stored.</li> <li>● 8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms.</li> <li>● 8.1.12.AP.2: Create generalized computational solutions using collections instead of repeatedly using simple variables.</li> <li>● 8.1.12.AP.3: Select and combine control structures for a specific application based upon performance and readability, and identify trade-offs to justify the choice.</li> <li>● 8.1.12.AP.4: Design and iteratively develop computational artifacts for practical intent, personal</li> </ul>	

expression, or to address a societal issue.

- 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.7: Collaboratively design and develop programs and artifacts for broad audiences by incorporating feedback from users.
- 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.
- 9.2.12.CAP.6: Identify transferable skills in career choices and design alternative career plans based on those skills.
- 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
- 9.4.12.CI.3: Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).
- 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).
- 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a)
- 9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other project and determine the strategies that contribute to effective outcomes.
- 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem (e.g., 7.1.AL.IPERS.6).
- WHST.11-12.4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- WHST.11-12.5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
- WHST.11-12.6. Use technology, including the Internet, to produce, share, and update writing products in response to ongoing feedback, including new arguments or information.
- NJLSA.SL1. - Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
- SL.11-12.4 - Present information, findings and supporting evidence clearly, concisely, and logically. The content, organization, development, and style are appropriate to task, purpose, and audience.
- HS-ETS1-2. - Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
- HS-ETS1-4. - Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

#### **Intended Outcomes - {Essential Questions}**

- What is a website?
- What is hosting?
- What is the internet?
- How are computers connected?

- How do websites communicate effectively?
- What is a server?
- What is the difference between “server side” and “client side”?

### Enduring Understandings

- Technology and programming languages are constantly evolving.
- Technology has impacted virtually every industry and field of endeavor in our society.
- The internet is an extremely powerful way to share information and connect the world.

### In this unit plan, the following 21<sup>st</sup> Century themes and skills are addressed.

<i>Check all that apply.</i> <b>21<sup>st</sup> Century Themes</b>		<i>Indicate whether these skills are E-Encouraged, T-Taught, or A-Assessed in this unit by marking E, T, A on the line before the appropriate skill.</i> <b>21<sup>st</sup> Century Skills</b>	
x	<b>Global Awareness</b>	E,T,A	<b>Creativity and Innovation</b>
	<b>Environmental Literacy</b>	E,T,A	<b>Critical Thinking and Problem Solving</b>
	<b>Health Literacy</b>	E,T,A	<b>Communication</b>
	<b>Civic Literacy</b>	E,T,A	<b>Collaboration</b>
x	<b>Financial, Economic, Business, and Entrepreneurial Literacy</b>		

### Student Learning Targets/Objectives (Students will know/Students will understand)

- The Internet and the World Wide Web are two different things.
- The Internet is a collection of millions of connected networks allowing computers to communicate.
- The World Wide Web is a way of accessing information over the internet.
- Websites are the primary way that information is disseminated on the World Wide Web.

### Assessments (Pre, Formative, Summative, Other)

*Denote required common assessments with an \**

The majority of this course in Web Design is Project Based Learning. Students will work from a program specification to build their own creative solutions to problems. By its very nature the course is highly differentiated and each student is free to develop advanced features and enhancements beyond those required for a basic solution. Backwards Design in the discussion of website design will be featured regularly as we carefully consider which type of designs will provide for optimal solutions given the tools that students have acquired to date.

Formative and summative evaluations in the form of worksheets, quizzes and tests - both paper based and computer based will be utilized as needed to reinforce learning objectives and evaluate student progress.

### Teaching and Learning Activities

*Activities*

- Lecture and class discussion.



	<ul style="list-style-type: none"> <li>• Video and multimedia presentations.</li> <li>• Build a console, applet and GUI based application.</li> <li>• Review and extend program functionality.</li> <li>• Group and collaborative work.</li> <li>• Student presentations of projects.</li> </ul>
<i>Differentiation Strategies</i>	<ul style="list-style-type: none"> <li>• Individual and collaborative research, design and problem solving</li> <li>• Student interest and skill level assessment</li> <li>• Individual, small group, and large group instruction</li> <li>• Media presentations and guest speakers</li> <li>• Student presentations and Flipped Lessons</li> </ul> <p><a href="#">Differentiation Strategies for Special Education Students</a></p> <p><a href="#">Differentiation Strategies for Gifted and Talented Students</a></p> <p><a href="#">Differentiation Strategies for ELL Students</a></p> <p><a href="#">Differentiation Strategies for At Risk Students</a></p>
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• <a href="http://www.state.nj.us/education/cccs/">http://www.state.nj.us/education/cccs/</a></li> <li>• <a href="http://www.corestandards.org/ELA-Literacy">http://www.corestandards.org/ELA-Literacy</a></li> <li>• <a href="http://www.state.nj.us/education/cccs/">http://www.state.nj.us/education/cccs/</a></li> </ul>	

**Wayne School District  
Curriculum Format**

<b>Content Area/ Grade Level/ Course:</b>	Mathematics 9-12 Web Design
<b>Unit Plan Title:</b>	Unit 2. Coding Websites using HTML and XHTML
<b>Time Frame</b>	7 Weeks
<b>Anchor Standards/Domain*</b> *i.e: ELA: reading, writing i.e.: Math: Algebra	

## Unit Overview

### Unit 3. Coding in HTML

- A. Code a basic web page using HTML
- B. Link multiple web pages to form a website
- C. Link to external web pages
- D. Include images in a website
- E. Create tables
- F. Format pages using HTML
- G. Optimize output for the web
- H. Understand the difference between HTML and XHTML

## Standard Number(s) \* i.e: Math: F.LE.A.4 i.e.: NJLSA.R4.

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- HS-ETS1-4. - Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

### Intended Outcomes - {Essential Questions}

- What is the best way to organize information?
- How do you effectively interact with a user on the World Wide Web?
- How do you optimize a website for the internet?
- What can't websites do using only HTML?
- How could websites be more dynamic than just using HTML?

### Enduring Understandings

- HTML is the main language for communicating on the internet.
- HTML is always evolving and other languages may eventually replace it.
- Websites are powerful ways to share information.
- Website design is limited only by your imagination.

**In this unit plan, the following 21<sup>st</sup> Century themes and skills are addressed.**

<p><i>Check all that apply.</i></p> <p><b>21<sup>st</sup> Century Themes</b></p>		<p><i>Indicate whether these skills are E-Encouraged, T-Taught, or A-Assessed in this unit by marking E, T, A on the line before the appropriate skill.</i></p> <p><b>21<sup>st</sup> Century Skills</b></p>	
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<input type="checkbox"/>	<b>Civic Literacy</b>	E,T,A	<b>Collaboration</b>
x	<b>Financial, Economic, Business, and Entrepreneurial Literacy</b>		

**Student Learning Targets/Objectives (Students will know/Students will understand)**

- Create a functional website using HTML.
- Familiarize yourself with XHTML and be aware of the latest improvements in web design programming languages.
- Code using all the primary components of HTML. Tables, links, images, paragraphs, lists etc.
- Develop a plan before coding in order to develop a process to your solutions.
- Identify problems that can be solved using HTML coding.

**Assessments (Pre, Formative, Summative, Other)**

*Denote required common assessments with an \**

The majority of this course in Web Design is Project Based Learning. Students will work from a program specification to build their own creative solutions to problems. By its very nature the course is highly differentiated and each student is free to develop advanced features and enhancements beyond those required for a basic solution. Backwards Design in the discussion of website design will be featured regularly as we carefully consider which type of designs will provide for optimal solutions given the tools that students have acquired to date.

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**Teaching and Learning Activities**

<i>Activities</i>	<ul style="list-style-type: none"> <li>• Lecture and class discussion.</li> <li>• Video and multimedia presentations.</li> <li>• Build a console, applet and GUI based application.</li> <li>• Review and extend program functionality.</li> <li>• Group and collaborative work.</li> <li>• Student presentations of projects.</li> </ul>
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**Resources**

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**Wayne School District  
Curriculum Format**

<b>Content Area/ Grade Level/ Course:</b>	Mathematics 9-12 Web Design
<b>Unit Plan Title:</b>	Unit 3. Styling Websites using Cascading Style Sheets (CSS)
<b>Time Frame</b>	8 Weeks
<b>Anchor Standards/Domain*</b>	*i.e: ELA: reading, writing i.e.: Math: Algebra
21st Century Life Skills: Career Preparation	9.2.12.C
Career & Technical Education: Information Technology	9.3.IT-PRG
<b>Unit Overview</b>	
<b>Unit 3. Coding using CSS</b>	
<ul style="list-style-type: none"> <li>A. Style a basic web page into something beautiful using CSS</li> <li>B. Incorporate CSS through inline, internal and external style sheets</li> <li>C. Learn the various styles available to CSS coding.</li> <li>D. Learn the Box model and how to code and style it.</li> <li>E. Learn how and when to use Class and ID selectors.</li> <li>F. Learn how to use Bootstrap to style webpages.</li> <li>G. Identify responsive design and how to incorporate it into your coding.</li> <li>H. Explore Free Templates to design more efficiently.</li> </ul>	

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### Intended Outcomes - {Essential Questions}

- How much does styling affect the effectiveness of website design?
- How do you create a website people will want to visit?
- Why is it important to code for various devices?
- How do you create websites efficiently?

### Enduring Understandings

- CSS is the language for making websites beautiful.
- CSS is always evolving and other languages may eventually replace it.
- Bootstrap is the most popular free CSS framework and many websites use it to style their pages.
- Creating websites efficiently is often an exercise in using open sourceware effectively.

### In this unit plan, the following 21<sup>st</sup> Century themes and skills are addressed.

Check all that apply. 21 <sup>st</sup> Century Themes		Indicate whether these skills are E-Encouraged, T-Taught, or A-Assessed in this unit by marking E, T, A on the line before the appropriate skill. 21 <sup>st</sup> Century Skills	
<input checked="" type="checkbox"/>	Global Awareness	<input type="checkbox"/> E,T,A	Creativity and Innovation
<input type="checkbox"/>	Environmental Literacy	<input type="checkbox"/> E,T,A	Critical Thinking and Problem Solving
<input type="checkbox"/>	Health Literacy	<input type="checkbox"/> E,T,A	Communication
<input type="checkbox"/>	Civic Literacy	<input type="checkbox"/> E,T,A	Collaboration
<input checked="" type="checkbox"/>	Financial, Economic, Business, and Entrepreneurial Literacy		

### Student Learning Targets/Objectives (Students will know/Students will understand)

- Style websites using CSS to make them more beautiful and more impactful for the user.
- Use open source frameworks like Bootstrap to simplify the coding process.
- Style using all the primary components of CSS, colors, borders, box model, links, icons, etc.
- Develop a plan before coding in order to develop a process to your solutions.
- Identify problems that can be solved using CSS coding.
- Understand that visual appeal is an important component of effective design.

- Responsive design is an integral part of good web design.

### Assessments (Pre, Formative, Summative, Other)

*Denote required common assessments with an \**

The majority of this course in Web Design is Project Based Learning. Students will work from a program specification to build their own creative solutions to problems. By its very nature the course is highly differentiated and each student is free to develop advanced features and enhancements beyond those required for a basic solution. Backwards Design in the discussion of website design will be featured regularly as we carefully consider which type of designs will provide for optimal solutions given the tools that students have acquired to date.

Formative and summative evaluations in the form of worksheets, quizzes and tests - both paper based and computer based will be utilized as needed to reinforce learning objectives and evaluate student progress.

### Teaching and Learning Activities

#### *Activities*

- Lecture and class discussion.
- Video and multimedia presentations.
- Build a console, applet and GUI based application.
- Review and extend program functionality.
- Group and collaborative work.
- Student presentations of projects.

#### *Differentiation Strategies*

- Individual and collaborative research, design and problem solving
- Student interest and skill level assessment
- Individual, small group, and large group instruction
- Media presentations and guest speakers
- Student presentations and Flipped Lessons

[Differentiation Strategies for Special Education Students](#)

[Differentiation Strategies for Gifted and Talented Students](#)

[Differentiation Strategies for ELL Students](#)

[Differentiation Strategies for At Risk Students](#)

### Resources

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## Curriculum Format

<b>Content Area/ Grade Level/ Course:</b>	<b>Mathematics 9-12 Web Design</b>
<b>Unit Plan Title:</b>	<b>Unit 4. Manipulating Images using Photoshop, GIMP and/or Fireworks</b>
<b>Time Frame</b>	<b>6 Weeks</b>
<b>Anchor Standards/Domain*      *i.e: ELA: reading, writing i.e.: Math: Algebra</b>	
21st Century Life Skills: Career Preparation	9.2.12.C
Career & Technical Education: Information Technology	9.3.IT-PRG
<b>Unit Overview</b>	
<p><b>Unit 4. Manipulating Images</b></p> <ul style="list-style-type: none"> <li>A. Adjust both the actual size and file size of images to optimize them for the web and/or a specific website</li> <li>B. Use the toolbox</li> <li>C. Use the various selection tools</li> <li>D. Use color and color palettes effectively</li> <li>E. Alter an image</li> <li>F. Use the drawing tools</li> <li>G. Crop images effectively</li> <li>H. Saving images in various web formats</li> </ul>	
<b>Standard Number(s)      * i.e: Math: F.LE.A.4      i.e.: NJLSA.R4.</b>	
<ul style="list-style-type: none"> <li>● 8.1.12.CS.4: Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.</li> <li>● 8.1.12.NI.2: Evaluate security measures to address various common security threats.</li> <li>● 8.1.12.NI.3: Explain how the needs of users and the sensitivity of data determine the level of security implemented.</li> <li>● 8.1.12.NI.4: Explain how decisions on methods to protect data are influenced by whether the data is at rest, in transit, or in use.</li> <li>● ● 8.1.12.IC.1: Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices</li> <li>● 8.1.12.IC.2: Test and refine computational artifacts to reduce bias and equity deficits.</li> <li>● 8.1.12.DA.2: Describe the trade-offs in how and where data is organized and stored.</li> <li>● 8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms.</li> <li>● 8.1.12.AP.2: Create generalized computational solutions using collections instead of repeatedly using simple variables.</li> <li>● 8.1.12.AP.3: Select and combine control structures for a specific application based upon performance and readability, and identify trade-offs to justify the choice.</li> <li>● 8.1.12.AP.4: Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue.</li> </ul>	

- 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.
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- 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
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- 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).
- 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a)
- 9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other project and determine the strategies that contribute to effective outcomes.
- 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem (e.g., 7.1.AL.IPERS.6).
- WHST.11-12.4. Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- WHST.11-12.5. Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
- WHST.11-12.6. Use technology, including the Internet, to produce, share, and update writing products in response to ongoing feedback, including new arguments or information.
- NJSLSA.SL1. - Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
- SL.11-12.4 - Present information, findings and supporting evidence clearly, concisely, and logically. The content, organization, development, and style are appropriate to task, purpose, and audience.
- HS-ETS1-2. - Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
- HS-ETS1-4. - Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

### Intended Outcomes - {Essential Questions}

- What is image optimization and how does it affect web design?
- How do images affect the effectiveness of a website?
- How can images be altered to improve their effect?
- Is it unethical to manipulate images?

### Enduring Understandings

- Images are an important part of an effective website.

- Images can be a very powerful way to convey information.
- Images can be manipulated to tell a different story.

**In this unit plan, the following 21<sup>st</sup> Century themes and skills are addressed.**

<i>Check all that apply.</i> <b>21<sup>st</sup> Century Themes</b>		<i>Indicate whether these skills are E-Encouraged, T-Taught, or A-Assessed in this unit by marking E, T, A on the line before the appropriate skill.</i> <b>21<sup>st</sup> Century Skills</b>	
x	<b>Global Awareness</b>	E,T,A	<b>Creativity and Innovation</b>
<input type="checkbox"/>	<b>Environmental Literacy</b>	E,T,A	<b>Critical Thinking and Problem Solving</b>
<input type="checkbox"/>	<b>Health Literacy</b>	E,T,A	<b>Communication</b>
<input type="checkbox"/>	<b>Civic Literacy</b>	E,T,A	<b>Collaboration</b>
x	<b>Financial, Economic, Business, and Entrepreneurial Literacy</b>		

**Student Learning Targets/Objectives (Students will know/Students will understand)**

- Use a photo editing tool to manipulate an image.
- Optimize images for use on websites.
- Use images effectively to tell a story or convey a message
- Use images effectively to increase the accessibility of a website
- Use images effectively to increase the look of a website.

**Assessments (Pre, Formative, Summative, Other)**

*Denote required common assessments with an \**

The majority of this course in Web Design is Project Based Learning. Students will work from a program specification to build their own creative solutions to problems. By its very nature the course is highly differentiated and each student is free to develop advanced features and enhancements beyond those required for a basic solution. Backwards Design in the discussion of website design will be featured regularly as we carefully consider which type of designs will provide for optimal solutions given the tools that students have acquired to date.

Formative and summative evaluations in the form of worksheets, quizzes and tests - both paper based and computer based will be utilized as needed to reinforce learning objectives and evaluate student progress.

**Teaching and Learning Activities**

*Activities*

- Lecture and class discussion.
- Video and multimedia presentations.
- Build a console, applet and GUI based application.
- Review and extend program functionality.
- Group and collaborative work.
- Student presentations of projects.

### *Differentiation Strategies*

- Individual and collaborative research, design and problem solving
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### Resources

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- <http://www.corestandards.org/ELA-Literacy>
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## **Wayne School District Curriculum Format**

<b>Content Area/ Grade Level/ Course:</b>	<b>Mathematics 9-12 Web Design</b>
<b>Unit Plan Title:</b>	<b>Unit 5. Using JavaScript to Make Webpages Interactive</b>
<b>Time Frame</b>	<b>11 Weeks</b>
<b>Anchor Standards/Domain*</b>	<b>*i.e: ELA: reading, writing i.e.: Math: Algebra</b>
21st Century Life Skills: Career Preparation	9.2.12.C
Career & Technical Education: Information Technology	9.3.IT-PRG

## Unit Overview

### Unit 5. Using JavaScript

- A. Know what JavaScript is and how it's used to make webpages interactive
- B. Link external JavaScript files to a webpage
- C. Write JavaScript code
- D. Create interactive web pages
- E. Use open source JavaScript like jQuery to make web pages interactive

### Standard Number(s) \* i.e.: Math: F.LE.A.4 i.e.: NJLSA.R4.

- 8.1.12.CS.4: Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.
- 8.1.12.NI.2: Evaluate security measures to address various common security threats.
- 8.1.12.NI.3: Explain how the needs of users and the sensitivity of data determine the level of security implemented.
- 8.1.12.NI.4: Explain how decisions on methods to protect data are influenced by whether the data is at rest, in transit, or in use.
- ● 8.1.12.IC.1: Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices
- 8.1.12.IC.2: Test and refine computational artifacts to reduce bias and equity deficits.
- 8.1.12.DA.2: Describe the trade-offs in how and where data is organized and stored.
- 8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms.
- 8.1.12.AP.2: Create generalized computational solutions using collections instead of repeatedly using simple variables.
- 8.1.12.AP.3: Select and combine control structures for a specific application based upon performance and readability, and identify trade-offs to justify the choice.
- 8.1.12.AP.4: Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue.
- 8.1.12.AP.5: Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.
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- 8.1.12.AP.9: Collaboratively document and present design decisions in the development of complex programs.
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- 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
- 9.4.12.CI.3: Investigate new challenges and opportunities for personal growth, advancement, and transition (e.g., 2.1.12.PGD.1).
- 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).
- 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a)

- 9.4.12.CT.4: Participate in online strategy and planning sessions for course-based, school-based, or other project and determine the strategies that contribute to effective outcomes.
- 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem (e.g., 7.1.AL.IPERS.6).
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- NJSLSA.SL1. - Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.
- SL.11-12.4 - Present information, findings and supporting evidence clearly, concisely, and logically. The content, organization, development, and style are appropriate to task, purpose, and audience.
- HS-ETS1-2. - Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
- HS-ETS1-4. - Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

#### Intended Outcomes - {Essential Questions}

- What does it mean for a web page to be interactive?
- How does JavaScript allow a page to be interactive?
- How does the “interactiveness” of a website make it more powerful?
- What pre-planning needs to go into designing an effective website?

#### Enduring Understandings

- JavaScript is a very powerful computer language that revolutionized the way we interact with web pages and the World Wide Web.
  - JavaScript coding is an algorithmic process that is best done by creating a plan and then adjusting as needed.
  - JavaScript is the most popular scripting language but could be replaced with the next new language.

In this unit plan, the following 21<sup>st</sup> Century themes and skills are addressed.

Check all that apply. 21 <sup>st</sup> Century Themes		Indicate whether these skills are <b>E</b> -Encouraged, <b>T</b> -Taught, or <b>A</b> -Assessed in this unit by marking <b>E, T, A</b> on the line before the appropriate skill. 21 <sup>st</sup> Century Skills	
<input checked="" type="checkbox"/>	Global Awareness	E,T,A	Creativity and Innovation
<input type="checkbox"/>	Environmental Literacy	E,T,A	Critical Thinking and Problem Solving
<input type="checkbox"/>	Health Literacy	E,T,A	Communication

x

Civic Literacy  
Financial, Economic, Business, and  
Entrepreneurial Literacy

E,T,A

Collaboration

**Student Learning Targets/Objectives (Students will know/Students will understand)**

- Use JavaScript to make a page interactive.
- Learn the syntax of JavaScript
- Create and use variables
- Use operators
- Write conditional statements
- Write basic loops
- Output information to a user as an alert and through a webpage
- Use jQuery or another open source JavaScript Library to code user interactivity

**Assessments (Pre, Formative, Summative, Other)      Denote required common assessments with an \***

The majority of this course in Web Design is Project Based Learning. Students will work from a program specification to build their own creative solutions to problems. By its very nature the course is highly differentiated and each student is free to develop advanced features and enhancements beyond those required for a basic solution. Backwards Design in the discussion of website design will be featured regularly as we carefully consider which type of designs will provide for optimal solutions given the tools that students have acquired to date.

Formative and summative evaluations in the form of worksheets, quizzes and tests - both paper based and computer based will be utilized as needed to reinforce learning objectives and evaluate student progress.

**Teaching and Learning Activities**

*Activities*

- Lecture and class discussion.
- Video and multimedia presentations.
- Build a console, applet and GUI based application.
- Review and extend program functionality.
- Group and collaborative work.
- Student presentations of projects.

*Differentiation Strategies*

- Individual and collaborative research, design and problem solving
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**Resources**

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## Wayne School District Curriculum Format

<b>Content Area/ Grade Level/ Course:</b>	<b>Mathematics 9-12 Web Design</b>
<b>Unit Plan Title:</b>	<b>Unit 6. Using Software to Create Web Pages</b>
<b>Time Frame</b>	<b>6 Weeks</b>
<b>Anchor Standards/Domain*    *i.e: ELA: reading, writing i.e.: Math: Algebra</b>	
21st Century Life Skills: Career Preparation	9.2.12.C
Career & Technical Education: Information Technology	9.3.IT-PRG
<b>Unit Overview</b>	
<b>Unit 6. Using Software</b>	
<ul style="list-style-type: none"> <li>A. Use a software program like Dreamweaver to code a website.</li> <li>B. Investigate other web design software packages</li> <li>C. Create a website using an online web builder like GoDaddy</li> </ul>	
<b>Standard Number(s)    * i.e: Math: F.LE.A.4    i.e.: NJLSA.R4.</b>	
<ul style="list-style-type: none"> <li>● 8.1.12.CS.4: Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.</li> <li>● 8.1.12.NI.2: Evaluate security measures to address various common security threats.</li> <li>● 8.1.12.NI.3: Explain how the needs of users and the sensitivity of data determine the level of security implemented.</li> <li>● 8.1.12.NI.4: Explain how decisions on methods to protect data are influenced by whether the data is at rest, in transit, or in use.</li> <li>● ● 8.1.12.IC.1: Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices</li> <li>● 8.1.12.IC.2: Test and refine computational artifacts to reduce bias and equity deficits.</li> <li>● 8.1.12.DA.2: Describe the trade-offs in how and where data is organized and stored.</li> <li>● 8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms.</li> </ul>	



- 8.1.12.AP.2: Create generalized computational solutions using collections instead of repeatedly using simple variables.
- 8.1.12.AP.3: Select and combine control structures for a specific application based upon performance and readability, and identify trade-offs to justify the choice.
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- HS-ETS1-4. - Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

#### **Intended Outcomes - {Essential Questions}**

- How does software simplify the web design process?
- Are websites better if you use software to code them?

## Enduring Understandings

- Hosting opens your website up to the world.
- Software can simplify the coding process.
- Software can't do everything, knowing the code behind the software is important to get the most benefit from the software.

In this unit plan, the following 21<sup>st</sup> Century themes and skills are addressed.

Check all that apply. 21 <sup>st</sup> Century Themes		Indicate whether these skills are E-Encouraged, T-Taught, or A-Assessed in this unit by marking E, T, A on the line before the appropriate skill. 21 <sup>st</sup> Century Skills	
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<input type="checkbox"/>	Health Literacy	<input type="checkbox"/> E,T,A	Communication
<input type="checkbox"/>	Civic Literacy	<input type="checkbox"/> E,T,A	Collaboration
<input checked="" type="checkbox"/>	Financial, Economic, Business, and Entrepreneurial Literacy		

## Student Learning Targets/Objectives (Students will know/Students will understand)

- Use software to code websites.
- Learn different software packages for web design.
- Learn what software can and can't do.
- Host a website on an online server.
- Identify poor coding that is sometimes created by software and fix it by hand.
- Create a fully functional, interactive website using all the information they have learned during the year.

## Assessments (Pre, Formative, Summative, Other)

*Denote required common assessments with an \**

The majority of this course in Web Design is Project Based Learning. Students will work from a program specification to build their own creative solutions to problems. By its very nature the course is highly differentiated and each student is free to develop advanced features and enhancements beyond those required for a basic solution. Backwards Design in the discussion of website design will be featured regularly as we carefully consider which type of designs will provide for optimal solutions given the tools that students have acquired to date.

Formative and summative evaluations in the form of worksheets, quizzes and tests - both paper based and computer based will be utilized as needed to reinforce learning objectives and evaluate student progress.

## Teaching and Learning Activities

*Activities*

- Lecture and class discussion.

	<ul style="list-style-type: none"><li>• Video and multimedia presentations.</li><li>• Build a console, applet and GUI based application.</li><li>• Review and extend program functionality.</li><li>• Group and collaborative work.</li><li>• Student presentations of projects.</li></ul>
<i>Differentiation Strategies</i>	<ul style="list-style-type: none"><li>• Individual and collaborative research, design and problem solving</li><li>• Student interest and skill level assessment</li><li>• Individual, small group, and large group instruction</li><li>• Media presentations and guest speakers</li><li>• Student presentations and Flipped Lessons</li></ul> <p><a href="#"><u>Differentiation Strategies for Special Education Students</u></a></p> <p><a href="#"><u>Differentiation Strategies for Gifted and Talented Students</u></a></p> <p><a href="#"><u>Differentiation Strategies for ELL Students</u></a></p> <p><a href="#"><u>Differentiation Strategies for At Risk Students</u></a></p>
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<ul style="list-style-type: none"><li>• <a href="http://www.state.nj.us/education/cccs/"><u>http://www.state.nj.us/education/cccs/</u></a></li><li>• <a href="http://www.corestandards.org/ELA-Literacy"><u>http://www.corestandards.org/ELA-Literacy</u></a></li><li>• <a href="http://www.state.nj.us/education/cccs/"><u>http://www.state.nj.us/education/cccs/</u></a></li></ul>	