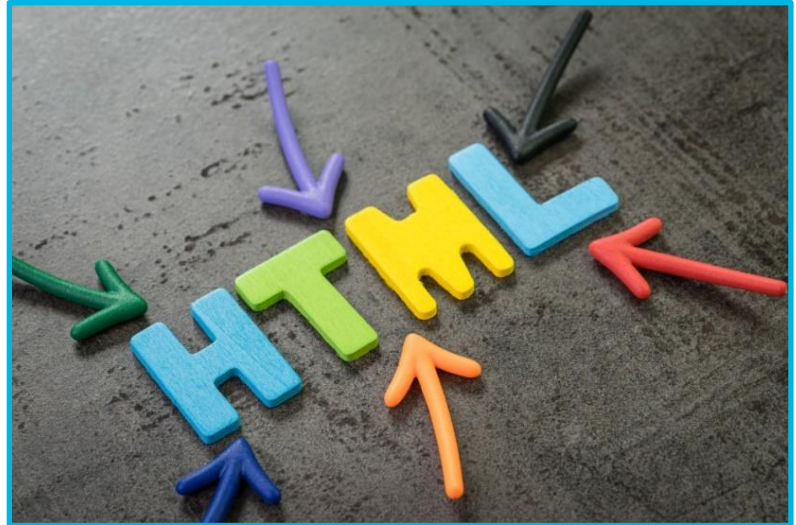


Explore other TryEngineering lessons at [www.tryengineering.org](http://www.tryengineering.org)

### Lesson Focus

Students will learn basic HTML and explore how code can translate into a final visual design, such as a web page. They will create a web page design, translate it into HTML, and then use the computer language to communicate their design to a partner. Their partner will then act as a web browser, converting the code into the original web page design.



### Age Levels

- ◆ 8-18

### Objectives

Introduce students to:

- ◆ Basic HTML code
- ◆ The general concept of computer languages
- ◆ How different elements of a website are expressed in HTML code.

### Anticipated Learner Outcomes

Students will be able to

- ◆ Write in basic HTML code.
- ◆ Understand how HTML functions as a language and how it translates into the visuals of a website.
- ◆ Code a basic website.

### Alignment to Curriculum Frameworks

See attached curriculum alignment sheet.

### Internet Connections

- ◆ TryEngineering ([www.tryengineering.org](http://www.tryengineering.org))
- ◆ W3Schools ([www.w3schools.com](http://www.w3schools.com))
- ◆ HTML.COM ([www.html.com](http://www.html.com))
- ◆ Code Academy ([www.codeacademy.com](http://www.codeacademy.com))
- ◆ Quackit ([www.quackit.com](http://www.quackit.com))
- ◆ Cascading Style Sheets ([www.w3schools.com/css/](http://www.w3schools.com/css/))

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### **Recommended Reading**

- ◆ Creating a Web Site: Design and Build Your First Site! (Dummies Junior) by Greg Rickaby (ISBN: 978-1119376514)
- ◆ How to Code: A Step-By-Step Guide to Computer Coding by Max Wainwright (ISBN: 978-1454921776)
- ◆ Hello World! Computer Programming for Kids and Other Beginners by Warren and Carter Sande (ISBN: 978-1617290923)
- ◆ Get Coding! Learn HTML, CSS & JavaScript & Build a Website, App & Game by Young Rewired State (ISBN: 978-0763692766)

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### **Optional Writing Activity**

- ◆ How are computer languages and spoken or written languages like English? How are they different? What problems can happen when communicating in a spoken or written language? How is that similar or different to problems that can occur when using a computer language?

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**For Teachers:  
Teacher Resource****◆ Anticipated Learner Outcomes**

Students will be able to:

- ◆ Code a basic website using HTML.
- ◆ Understand what HTML is and how it works.
- ◆ Understand the concept of computer languages and their relationship to spoken and written language.
- ◆ Communicate a visual design in HTML to another student.

**◆ Materials**

- ◆ Paper
- ◆ Pens, markers, crayons, or colored pencils
- ◆ Computers (optional but highly recommended)
- ◆ Text or html editing software (optional but highly recommended)  
(<https://www.quackit.com/html/online-html-editor/full/>,  
[https://www.w3schools.com/html/tryit.asp?filename=tryhtml\\_default](https://www.w3schools.com/html/tryit.asp?filename=tryhtml_default))

**◆ Procedure**

1. Divide the class into pairs, and hand out the Student Resource and Student Worksheet. Have students review the student resource, either in class or as homework the night before.
2. Either in class or as homework the night before, students design and draw/sketch out a simple one-page design that includes the text, image, and link provided. Then, using the HTML tags included in the Student Resource sheet, they will write out a page of HTML code to describe/code their visual page.
3. In class, student pairs will exchange their HTML code sheets. Students will then read through their partner's HTML source code and translate the HTML into a visual page. Using the art supplies provided, they will sketch out the page as described in the HTML source code.
4. Student pairs will compare their HTML-to-visual drawings to their partner's original visual page. Students should discuss what was successful and not successful in the visual communication completed via HTML. Students should work to find where mistakes were made—whether in the original writing of the HTML source code, or in the translation of the code into a visual page.
5. Students should complete the Student Worksheet to walk them through the activity and help them analyze their experience.
6. As an optional additional activity, students can use a text or HTML editing program to input their HTML and see how it really translates into a web page. They would need to create or find image files for the logo and dog image. If the page doesn't look like they expected, students should review their HTML source code, alone or with their partner, to see if they can find the problem and fix it.
7. Another optional follow-up activity is to have students create another website design entirely of their own choice. They can choose the topic (sports, design, personal, etc.) and create their own original content as well. Students could design and code them by hand, or use a HTML editing program to code and create a real, functional website.

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## For Students: Student Resource

### ◆ Computer Languages

Computer languages are ways of communicating with a computer. Just like a spoken or written language, computer languages have semantics (the meaning of the words, expressions, codes) and follow rules of syntax (the correct structure, form, or order of words, expressions, or codes) and grammar.

There are different kinds of computer languages. They include programming language, command language, markup language, and query language. HTML stands for Hypertext Markup Language, and is a kind of markup language.



### ◆ HTML

HTML, Cascading Style Sheets (CSS), and JavaScript are the three languages that together make up the World Wide Web. HTML is the standard markup language for creating web pages and applications. HTML describes the structure of a web page and its content.

### ◆ Elements

HTML is made up of elements, which describe the structure and appearance of a web page. HTML elements are contained in tags, which are written with angle brackets (<element>). Most elements require a pair of tags: a start tag (<element>) and an end tag (</element>). The content contained between the start tag and end tag is what will be affected by the element being used. Some elements, such as <br> (which inserts a line break) and <hr> (which inserts a horizontal line) do not require an end tag.

### ◆ Attributes

Attributes can be added to element tags to add more information to an element. A style attribute can be added to define the placement, color, size, or other characteristic or text or other content. The style attribute is a way to apply a Cascading Style Sheets (CSS) rule to a specific HTML element. Style attributes can be added to an element like this:

```
<tagname style="property:value;">
```

For instance, the <p> tag surrounds a paragraph of text. It defines that text as a paragraph and will create paragraph spacing above and below the text. It would be used like this:

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<p>This is a paragraph. It should be spaced separately from the text above and below. The paragraph needs an opening tag and a closing tag.</p>

<p>This is a new paragraph. It is separate from the text above.</p>

In a web browser, this text would appear like this:

This is a paragraph. It should be spaced separately from the text above and below. The paragraph needs an opening tag and a closing tag.

This is a new paragraph. It is separate from the text above.

Style attributes could be added to this text to change things like the color, size, font, or placement of the text. This would be done like this:

<p style="color:red;">This is a paragraph. It should be spaced separately from the text above and below.</p>

<p style="color:blue;" "font-size:160%;" "text-align:right;" "background-color:yellow;">This is a new paragraph. It is separate from the text above.</p>

In a web browser, this text would appear like this:

This is a paragraph. It should be spaced separately from the text above and below. The paragraph needs an opening tag and a closing tag.

This is a new paragraph. It is separate from the text above.

## ◆ Starting a Web Page

The basic structure of a web page is described by HTML. Here is the source code for a very basic website containing the website's title (which appears at the top of a web browser window) and some text.

```
<html>
<head><title>Page Title</title></head>
<body>
<h1>Header text</h1>
<p>This is a paragraph of text.</p>
<p>This is the next paragraph of text.</p>
</body>
</html>
```

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This basic code would result in this visual:

Page Title
<h1>Header text</h1> <p>This is a paragraph of text.</p> <p>This is the next paragraph of text.</p>

Elements used:

`<html>`: begins and ends an HTML document

`<head>`: the header; contains metadata for the site and is placed between the HTML tag and the BODY tag; contains the TITLE element

`<title>`: the title of the website; appears at the top of a browser window

`<body>`: contains the main content of the webpage

`<h1>`: a level 1 header (the largest size); `<h6>` is the smallest header size. Tags are wrapped around text.

`<p>`: a paragraph of text; separated by other paragraphs by a space above and below

As you can see in the HTML code above, each tag that is opened is closed once it is no longer needed. Some elements are nested inside other elements. The HTML tag contains the entire document. The BODY tag contains all the main content of the site.

If you would like to learn more HTML for future use, you can check out w3schools HTML5 Tutorial at [www.w3schools.com/html/default.asp](http://www.w3schools.com/html/default.asp).



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**For Students:**  
**Student Worksheet**

Deciding how a web site should look requires the web designer to make a lot of decisions. Web designers are often given the content that needs to be included by their client, but where that content goes and what it looks like are all choices for the designer to make. In this activity, you will create your own website design for the content below.

**◆ Design**

You are a web designer. Your client is a local dog walking company that needs a website design that is visually appealing and contains the following:

Text:

Pup Walkers

Serving the community since 2018.

We are a group of responsible, hard-working, dog lovers who are here to help with your pup. We are available seven days a week to walk your dog when you can't.

Call us today to schedule your pup's walk!

Design Elements:

A header title (Pup Walkers)

A logo, a small circle with a dog inside (logo.jpg)

A photo of a happy dog (dog.jpg)

A link around the "Call us today" text to a page file called contact.html

Think about how the content should be organized. What information is the most important? What would look best? How can you make sure visitors to your website get the information they need? You can make decisions about colors, the size and placement of text, and the size and placement of images. Use the following page and the art supplies provided to draw the design for your website.

For tips on good website design, check out the following articles:

[5 Crucial Web Design Tips for a Professional Site \(https://www.wix.com/blog/2017/10/5-design-tips-for-a-professional-site/\)](https://www.wix.com/blog/2017/10/5-design-tips-for-a-professional-site/)

[27 Research-Backed Web Design Tips: How to Design a Website That Works \(https://www.orbitmedia.com/blog/web-design-tips/\)](https://www.orbitmedia.com/blog/web-design-tips/)

[5 Tips for Creating a Beautiful Business Website \(https://www.inc.com/dan-scalco/5-website-design-tips-all-small-business-owners-should-consider.html\)](https://www.inc.com/dan-scalco/5-website-design-tips-all-small-business-owners-should-consider.html)

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***For Students:  
Student Worksheet (continued)***

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## **For Students:** **Student Worksheet (continued)**

### ◆ **Code: Write in HTML**

Choose from the HTML code below to create the source code for your webpage. Read and reference the Student Resource sheet for help in how to write the code. Remember that the basic set up of a webpage is:

```
<html>
<head><title>Page Title</title></head>
<body>
<h1>Header text</h1>
<p>This is a paragraph of text.</p>
<p>This is the next paragraph of text.</p>
</body>
</html>
```

### **Additional HTML Elements:**

Bold text: `<b>text</b>`

Center text: `<center>text or image</center>`

Underline text: `<i>text</i>`

Image: ``

Link: `<a href="pagename.html">Name of Page</a>`

### **Style Attributes:**

Style attributes are added to HTML element tags in this way: `<tagname style="property:value;">`

### **Properties:**

color: (Most common colors can be called out by name: Black, blue, brown, gray, green, orange, pink, purple, white, yellow, etc.)

text-align: (center, left right)

background-color: (Most common colors can be called out by name: Black, blue, brown, gray, green, orange, pink, purple, white, yellow, etc.)

size: (can be designated by percentage)

font-size: (can be designated by percentage)

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***For Students:  
Student Worksheet (continued)***

**◆ Swap: Read in HTML**

With your partner, swap the code for your website, but don't show them the drawing of your design. Reading through your partner's HTML source code, you will act as a web browser and translate the code into the visual webpage it describes. In the space below, draw what their website looks like based on the code provided. Then, swap sketches with your partner and compare them to the web designer's original sketch.

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***For Students:  
Reflection***

1. How did the sketches you and your partner made from the HTML code compare to the original sketch the web designer made? If there were differences, can you find what caused them? Was there a problem in how the code was written or in how it was read?
  
2. What thoughts or ideas drove the design decisions you made? Did you and your partner make different design decisions?
  
3. Are there elements of your partner's design that you liked? If you were to redesign your page, what would you change?
  
4. HTML is a type of computer language. What does it have in common with a spoken or written language like English?

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## **For Teachers:** **Alignment to Curriculum Frameworks**

**Note:** Lesson plans in this series are aligned to one or more of the following sets of standards:

- U.S. Next Generation Science Standards ([www.nextgenscience.org](http://www.nextgenscience.org))
- U.S. Common Core State Standards for Mathematics ([www.corestandards.org/Math](http://www.corestandards.org/Math))
- International Technology Education Association's Standards for Technological Literacy ([www.iteea.org/TAA/PDFs/xstnd.pdf](http://www.iteea.org/TAA/PDFs/xstnd.pdf))
- Computer Science Teachers Association K-12 Computer Science Standards (<https://www.csteachers.org/page/about-csta-s-k-12-nbsp-standards>)

### ◆ **Standards for Technological Literacy - All Ages**

#### **The Nature of Technology**

- ◆ Standard 1: Students will develop an understanding of the characteristics and scope of technology.

#### **Design**

- ◆ Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

#### **The Designed World**

- ◆ Standard 17. Students will develop an understanding of and be able to select and use information and communication technologies.

### ◆ **CSTA K-12 Computer Science Standards**

#### **Grades K-2 (Ages 5-7)**

- ◆ 1A-AP-14 Debug (identify and fix) errors in an algorithm or program that includes sequences and simple loops.
- ◆ 1B-AP-15 Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.
- ◆ 1B-AP-10 Create programs that include sequences, events, loops, and conditionals.