



Hour of Code: Teacher Guide

Before the Hour of Code:

- Make sure student computers have an up-to-date browser (Chrome, Safari, or Firefox).
- Read through teacher notes in this document. Download notes to have exercise solutions ready.

During the Hour of Code:

1. Direct students to codehs.com/hoc_VR
2. Allow students to work through Hour of Code at their own pace, providing encouragement and support when needed. See tips below for handling student questions.
3. Tweet pictures or stories at @CodeHS #ReadWriteCode #HourOfCode!
4. If time allows at the end of the period, facilitate a discussion around the Hour of Code using the following guiding questions:
 - Before today, what did you think about programming or coding?
 - Did any of these ideas change during the Hour of Code?
 - What was your favorite part of the Hour of Code?
 - Did any parts of the Hour of Code challenge you? How?

Hour of Code Tips:

If students get stuck or have questions, it is okay if you don't have the answer! Ask questions to activate their problem-solving skills such as:

- What can we try differently?
- What do you want the program to do? What are you telling the program to do?
- How can we break this problem into smaller steps?

Thank you for your dedication to Computer Science Education!

**Interested in going beyond the Hour of Code?
Reach out to us at hello@codehs.com.**

Creating Virtual Worlds Teacher Notes

In this Hour of Code, students will learn about virtual reality and how it is currently being used for entertainment as well as in various professions. Students will be introduced to HTML and how to use the A-Frame framework in an HTML page.

Objective

Students will be able to ...

- Explain what virtual reality is
- Identify how virtual reality is being used for purposes other than entertainment

Link to Activity: codehs.com/hoc_VR

Standards: CCSS.MATH.CONTENT.HSG.MG.A.3

Discussion Questions

- What is your impression of virtual reality? Is it useful, or is it a toy?
- What would you like to use virtual reality for?
- What was the most challenging part of using A-Frame? Why?
- What attributes are important to set when creating spheres and planes?
- What impact do you think virtual reality will have on our lives in the near future? What about in 100 years?
- How would you describe virtual reality to someone who has never heard about it before?

Exercise Solutions

Transform Your Sphere	
Description	Students modify an existing sphere to have the color limegreen and a radius of 4.
Motivation	Students get their first hands-on introduction to creating shapes.
Solution	<pre><!DOCTYPE html> <html> <head> <script src="https://aframe.io/releases/0.5.0/aframe.min.js"></script></pre>

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	<pre> </head> <body> <a-scene> <!-- Change this sphere --> <a-sphere position="-1 0 -5" radius="4" color="limegreen" > </a-sphere> </a-scene> </body> </html> </pre>
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Ring a Ring o' Roses	
Description	Students set attributes for a set of circles to create a ring of spheres that alternate in color.
Motivation	Students must read the provided code and implement the correct attributes for the blank spheres.
Solution	<pre> <!DOCTYPE html> <html> <head> <script src="https://aframe.io/releases/0.5.0/aframe.min.js"></script> </head> <body> <a-scene> <!-- Circle of Spheres --> <a-sphere radius="4" color="green" position="-2 4 -20"> </a-sphere> <a-sphere radius="4" color="purple" position="5 4 -24"> </a-sphere> <a-sphere radius="4" color="green" </pre>

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	<pre> position="13 4 -28"> </a-sphere> <a-sphere radius="4" color="purple" position="21 4 -24"> </a-sphere> <a-sphere radius="4" color="green" position="28 4 -19"> </a-sphere> <!-- Ground --> <a-plane color="black" position="0 0 0" width="60" height="60" rotation="-90 0 0"> </a-plane> </a-scene> </body> </html> </pre>
Common Questions	<p>How big are the spheres supposed to be? Every sphere should have a radius of 4.</p> <p>What color are the spheres supposed to be? The spheres should alternate colors - green, purple, green, purple, etc</p>

Create the Floor	
Description	Create the floor of a world with a brown horizontal plane that is 10 by 10 at 0 0 0.
Motivation	This exercise introduces the concept of having “ground” in a VR world.
Solution	<!DOCTYPE html>

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	<pre> <html> <head> <script src="https://aframe.io/releases/0.5.0/aframe.min.js"></script> </head> <body> <a-scene> <a-plane color="brown" position="0 0 0" height="10" width="10" rotation="-90 0 0"> </a-plane> </a-scene> </body> </html> </pre>
Common Questions	<p>My plane is the wrong color/size.</p> <p>Make sure “color”, “width”, “height”, “rotation”, and “position” are set as attributes of the a-plane tag. The options must go inside of the opening tag.</p>

Make A Scene	
Description	Use what you have learned to create your own virtual reality scene
Motivation	Students are able to creatively explore what they have learned throughout the hour of code.
Solution	Varies
Common Questions	<p>Why can't I see my shapes?</p> <p>The camera starts at (0,0,0). The field of vision when the program is about 10 meters in the x direction and y direction. Hence, x values greater than about 5 or less than about -5 are out of the field of vision. Y values greater than about 5 or less than about -5 are</p>

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out of the field of vision. In order to move the shape “back” to see it, the z coordinate needs to be negative. A positive z coordinate will place the shape behind the camera.

My shapes won't line up.

All shapes are positioned using the very center of the object.