

Envisioning a Better World in VR

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Duration: 2 hours

LEVEL	SUBJECTS	PROVINCES / TERRITORIES	TOOL
Grades 4-6, 7-8	Visual Arts, Mathematics	Across Canada	CoSpaces, VR

Overview

Learners use CoSpaces to build our own 3D creations, animate them with code (using block coding), and explore them in Virtual Reality. Learners will practice testing and debugging, and create a virtual space that solves an issue that they are passionate about.

Prep Work

- Create a Teacher Account for CoSpaces
 1. Go to: <https://cospaces.io/edu/>
 2. "Sign up" > "As Teacher"
- Have students Sign Up for CoSpaces
 1. In CoSpaces: "My Classes" > "Create Class"
 2. Share the class code with your students
 3. Have them create an account at <https://cospaces.io/edu/> > "Sign up" > "As Student" and enter the class code
- For stretch goal: Cardboard VR Viewers + phones with CoSpaces Edu app installed.

Key Coding Concepts

- ✓ Algorithms
- ✓ Debugging
- ✓ Events

Terminology

Virtual Reality is an interactive computer-generated ('virtual') world that you can explore.

An **Algorithm** is a step-by-step set of operations to be performed to help solve a problem.

Debugging is finding problems in code and solving them.

Lesson

Introduction

Ask: What is 'VR' or virtual reality? (A: See Terminology)

Say: We usually know VR as being used for gaming and storytelling, but VR can also be used to help others!

Some examples include:

- VR Therapy: Using VR to face fears like arachnophobia or public speaking.
- VR + Healthcare: As a tool for surgical training, or to help patients manage pain.
- VR + Education: Providing students access to new places and experiences via tools like Google Expeditions

Post a "How Might We" statement to the class to guide their project. You can use a topic you are already learning about, or choose one of the following:

How might we use VR to...

- a) Prevent ocean pollution?
- b) Reduce stress?
- c) Improve education?

Brainstorm possible solutions as a class or in groups. Keep in mind that we are going to create prototypes (or drafts) of what a solution could look like.

Optional: Have learners work in groups to create paper prototypes of their virtual worlds before designing them in CoSpaces. See "Extensions" for a link to the "Paper Prototyping in VR lesson" plan.

Building in CoSpaces

What is CoSpaces? (A: Cospaces is a tool that we can use to create virtual environments, then add code to bring these worlds to life)

- 1) Have learners create a new project. ("Create

Events is when one thing causing another thing to happen.

Curricular Connections

Example: Grade 4

Visual Arts

D1.1 create two- and three-dimensional works of art that express feelings and ideas inspired by their interests and experiences

D1.4 use a variety of materials, tools, and techniques to determine solutions to design challenges

Mathematics

Geometry and spatial sense: construct three-dimensional figures, using two-dimensional shapes;

References

CoSpaces Edu Resources

<https://cospaces.io/edu/onboarding.html>

CoBlocks Reference Guide

<https://cospaces.io/edu/CoBloc>

CoSpace" > Select "3D Environment")

[ks-Reference-Guide.pdf](#)

2) Select an environment.

3) Practice navigating CoSpaces. As a class, try the following:

- Use the arrow keys to move around
- Rotate your view by clicking and dragging
- Hold the spacebar WHILE clicking and dragging to move around
- Scroll to zoom in and out

CoSpaces Youtube Channel

<https://www.youtube.com/channel/UC6VsnmaKQ9MNRpJbFslh0Gw>

4) Add a character

5) Demonstrate how to move + transform the character (Click > rotate, translate, drag, or lift)

6) Demonstrate how to customize (Right-click > select Material)

7) If learners can't find the objects they need for their VR solution, use the Web Search option. ("Upload" > "3D Models" > Type word into Web Search)

8) Show learners how to test out their space by clicking "Play (top, right), then how to go back to the editor using the back arrow (top, left). Encourage them to test often!

Coding Interactions

Review: What is Code? (A set of instructions that tells the computer what to do)

Say: We are going to Code the characters in our CoSpaces project.

- 1) Right-click on character > "Code" > "Use in CoBlocks"
- 2) Show learners how to open and close the code menu and how to stretch and shrink it.
- 3) Show them how to click and drag the blocks onto the workspace, and how to drag unwanted blocks to the trash can, which is on the left side of the screen.
- 4) Add a "Say" block together (under "Actions") and have learners type in an explanation of their solution in the editable section of the block.
- 5) Add an Event, and wrap it around the "Say" block so that it doesn't appear until you click on the character (e.g.)

Work Session

Provide time for learners to continue adding to and customizing their virtual spaces.

Encourage them to continue exploring the different coding options and to 'code' additional characters.

Remind learners to continue testing as they code, to help them debug or troubleshoot their projects as they go.

If you have VR viewers: Introduce viewers + how to use. Encourage learners to test using

the viewers as they build their spaces. See the CoSpaces Demo Guide for steps on how to share and access projects from the CoSpaces app: <http://bit.ly/cospaces-demo-guide>

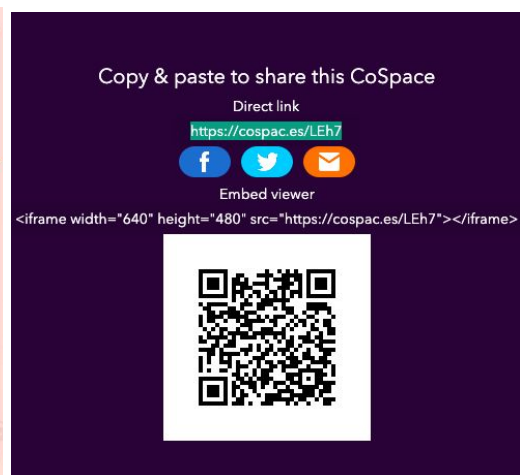
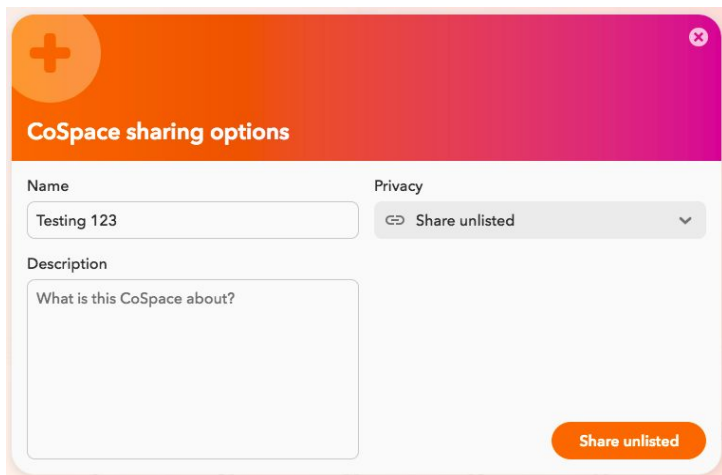
Closing

Provide time for learners to share their projects and explain how they tried to solve the issue that was presented. Set up a gallery walk where learners run their projects and tuck in their chairs, then walk around to explore each others' projects at their own pace.

If you have VR viewers: Provide time for learners to explore each others' projects in VR. Set up stations for learners to rotate through. Remind learners to remain seated while testing out projects on the viewer (safety first!).

Assessment

Learners can submit their projects by "sharing" them:



Success Criteria:

- I created digital 3D environment using code.
- I gave the computer instructions to tell it what to do.
- I used code to move characters in the landscape.
- I explained my solution using text bubbles or voice recording.
- I kept testing and debugging to make my projects better.

Extensions

Incorporate Paper Prototyping via this "Paper Prototyping for VR" lesson plan before jumping into CoSpaces. This can help learners better plan out their space including where to place their characters in 3D space:

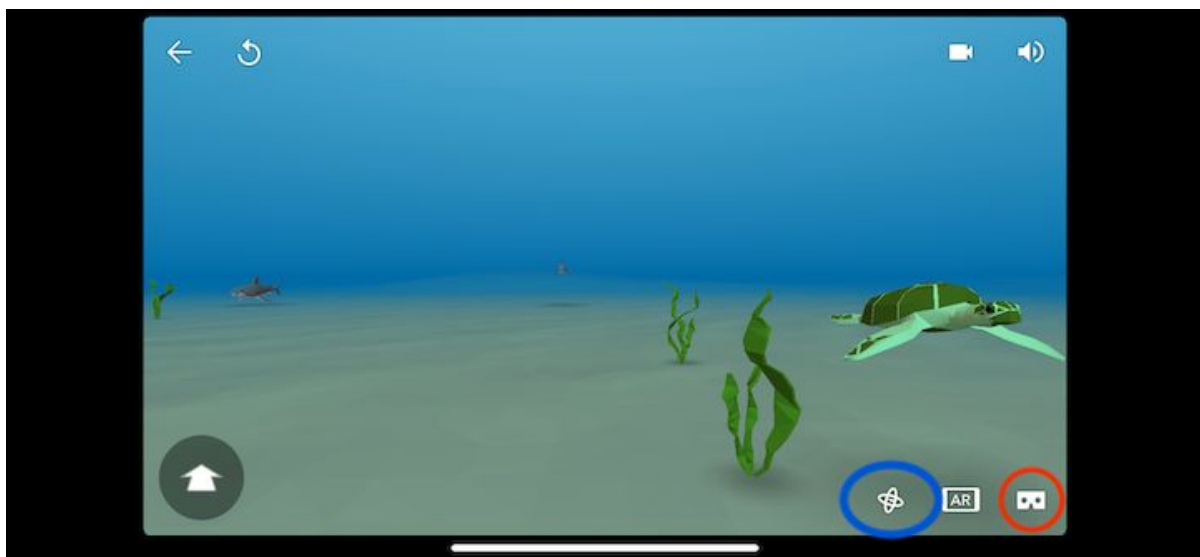
<https://www.canadalearningcode.ca/lessons/paper-prototyping-for-vr/>

Use VR viewers + phones to test and explore projects in VR - see notes in Lesson portion. Here is a list of viewers with different pricing options:

https://vr.google.com/intl/en_ca/cardboard/get-cardboard/

Important Note:

Using VR headsets can cause motion sickness. If learners experiences discomfort during the demo process have them demo their projects without the VR headsets and without using the "split screen" mode. Use the icon in the blue circle and tilt and move the phone around.



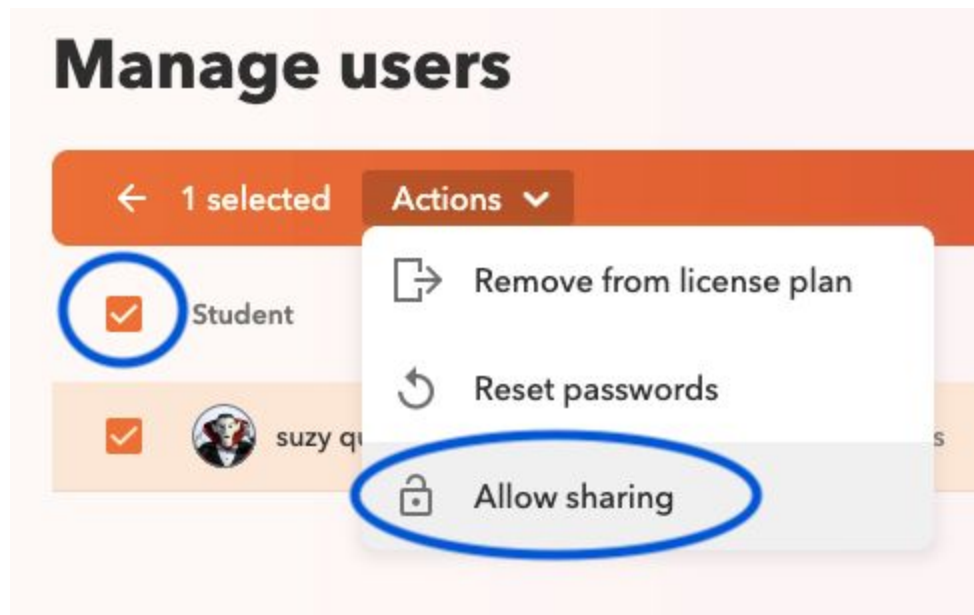
Getting Ready to Demo Your VR

In order to see the CoSpaces projects we built in VR we need VR headsets and phones. ***Test your phones before the lesson as not all phones can run VR projects. We can connect to our CoSpaces projects on the phones using QR codes to save a lot of time. (The students will not have to sign into their accounts in order to see their projects.)

Step 1: Allow Sharing

For the Teacher:

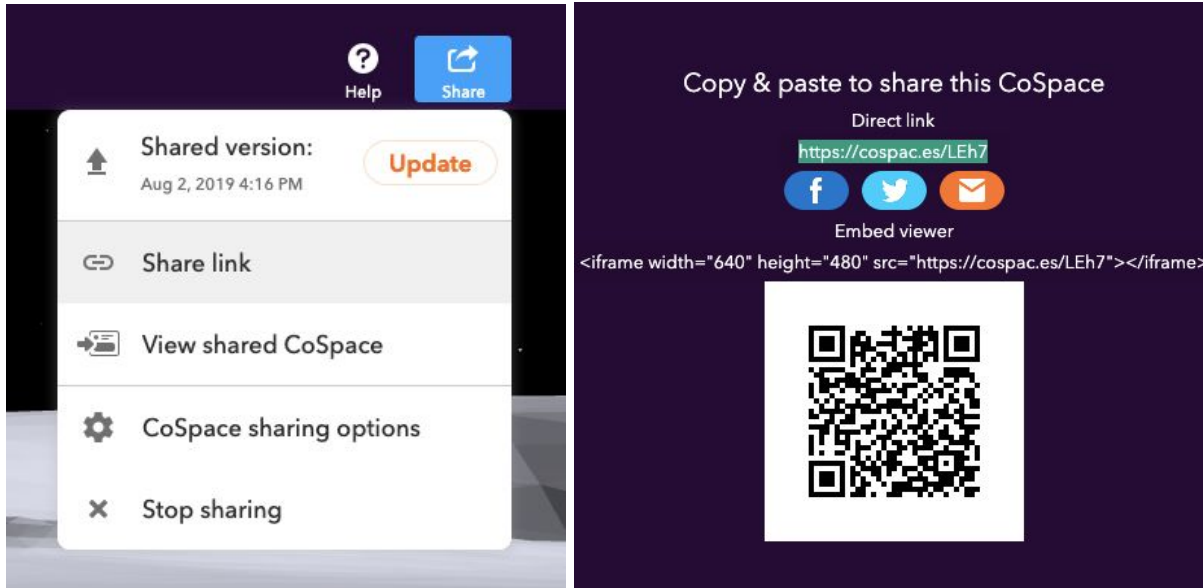
1. While the students are creating their spaces you need to go into your Teachers Account and go to 'Manage Users'
2. Select all students
3. Then go to 'Actions' and 'Allow Sharing'



Step 2: Share Project

For the learners, on the laptops we have to do a few things to prepare.

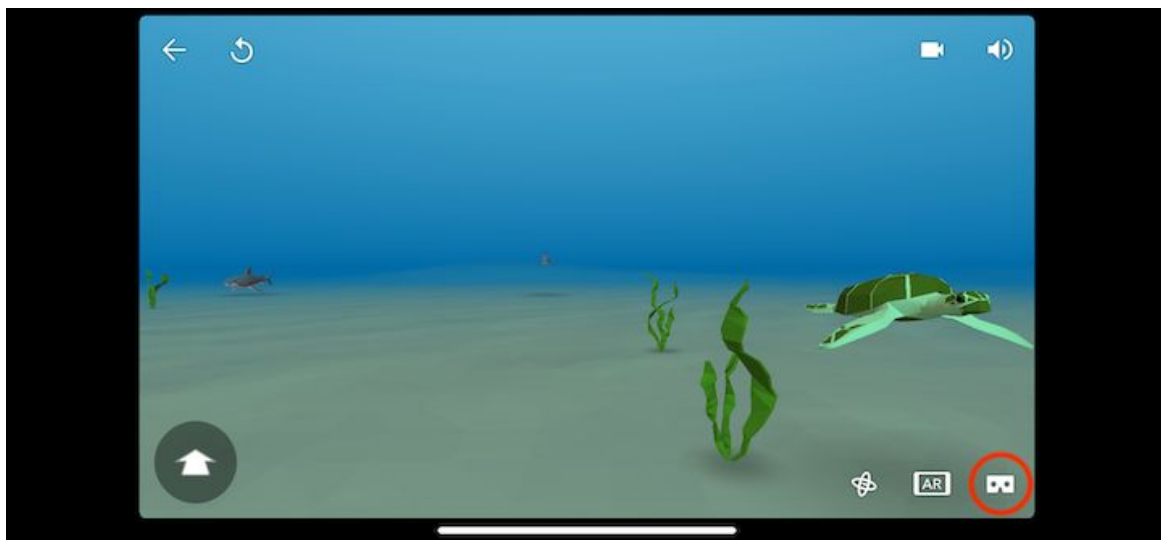
1. Go to the 'Share' icon along the top right of the project
2. Then select 'Share link' and a QR code will be generated



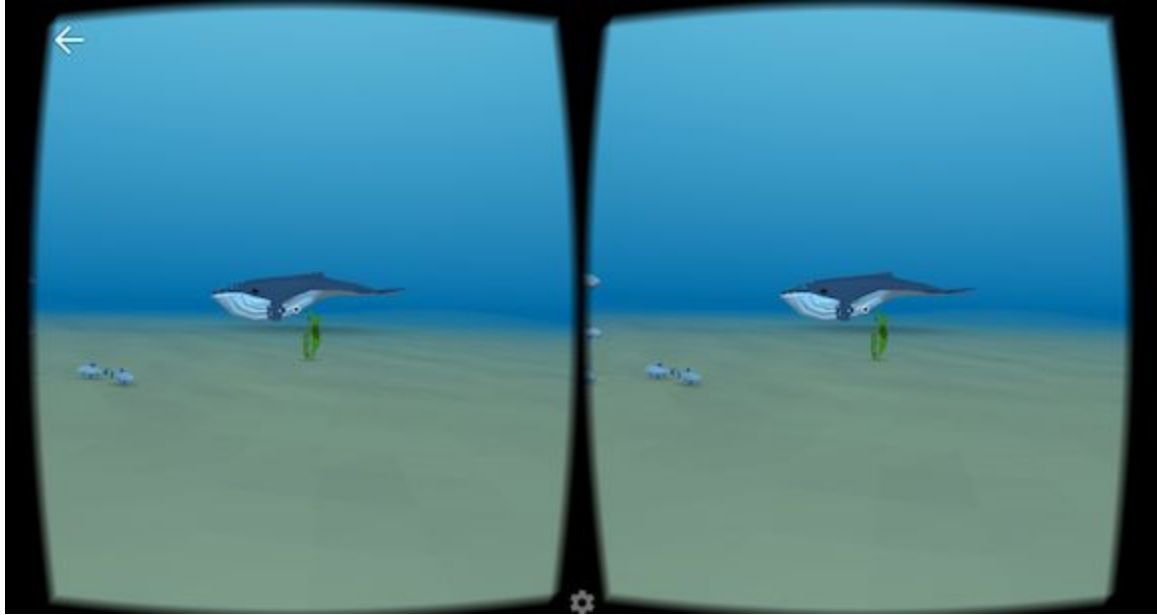
Step 3: Open the CoSpaces App

Now you need to go to the phones and open the CoSpaces App

1. Choose 'Scan QR Code' at the bottom of the Login screen
2. You may need to allow access to the camera. Click Ok. Then aim you camera at the QR code on the laptop screen.
3. Click 'Play' on your project once it has loaded, then you will need to select the VR icon on the lower right corner of your screen.



4. Your screen should now have a split view like below.



5. Now you can place your phone into the VR headset.

Step 4: Reset Project to View Changes

During the demo if students make any changes to their projects while the project is open, they can only see the changes in the VR headsets if they reset their projects.

1. To do this aim your headset to the floor. A menu screen will appear, click on 'Menu'
2. Then tilt your headset up and click 'Play'