KENAN FELLOWS PROGRAM
FOR TEACHER LEADERSHIP

STEAM CoILABOration

OVERVIEW

Students will gain hands-on experience to learn what the world of virtual reality has to offer as not only an entertainment platform, but an expansive doorway to transforming the educational experience.

AUTHOR	GRADE LEVEL	CONTENT AREA
Maggie Gaines-Hackney	K-5	

ESSENTIAL QUESTIONS

What is one use of virtual reality technology that could help solve a problem in the world today?

TIME NEEDED

This lesson should take approximately two to three 90-minute class periods, depending on the student learning process and time needed for reflection throughout the lesson.

STANDARDS

International Society for Technology in Education (ISTE) Standards:

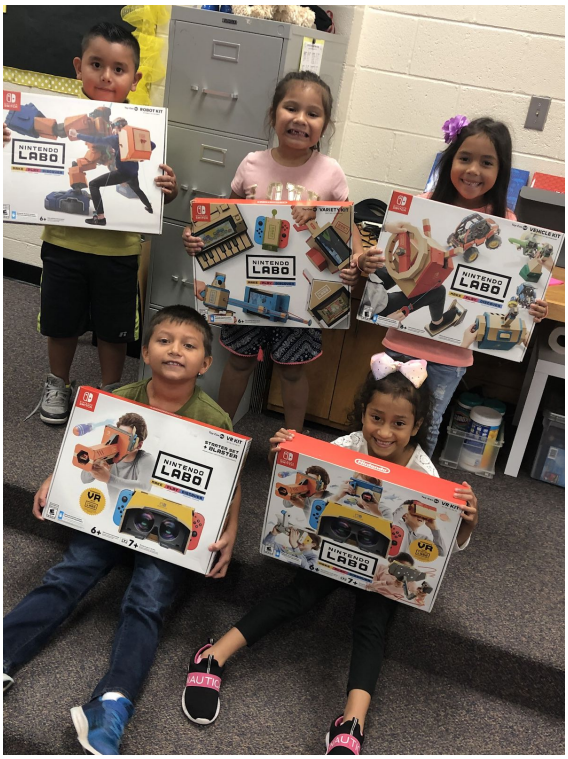
1.1B - Students build networks and customize their learning environments in ways that support the learning process.

4.4B - Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.

6.6A - Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.

Making Connections

Today's students live in a digital world. From entertainment to education, they are constantly exposed to information in a digital format. While many students see technology as a form of play, there are many ways to transform this play into a learning experience that opens doors to pathways of engagement. In this digital age, it is imperative to spark student interest in a collaborative, virtual learning that may, in fact, lead to the start of a career pathway.



Background

Students will learn about functional applications of virtual reality technology outside of the context of video games. They will be given the opportunity to research such uses and work in a team to build their own virtual reality simulator. Through research, discussion, hands-on experience, and reflection, students will make connections to how virtual reality can truly impact how things happen in their real world.

Materials

- Nintendo Switch
- Nintendo LABO, an engineering and design kit for Nintendo Switch
- Virtual reality facts for kids

  (good for students to read)
- 10 amazing uses of virtual reality

  (maybe just teacher use)
- YouVisit (hook video)
- Nintendo Labo Website

  (explore and build background for upcoming project)
- Handout for Engineering Design Process (found on student pages)

Teacher **Tips**

- Front load with a lesson on the engineering design process. My students have been learning about this concept all year with our STEM/STEAM units. This process plays a huge role in the planning and development of this project.
- One thing I cannot stress enough with this project, or any hands on project with technology, is modeling. Students need to have a clear idea of what a projected outcome should be.
- Include any aspects of your experience that you or your students had difficulty with or sometimes needed more time to complete. Give advice on how to deal with these issues.
- Explore the world of Virtual and Augmented reality with some online field trips without leaving your classroom. There are tons of great and free ideas online (aquariums, Disney World, etc.) Google Earth can be used with this platform.

The **Activity**

Part 1: Engage and Expose

- Introduce the concept with this question: *What is virtual reality?*
- After students volunteer answers, talk about how it is often seen as something that is used for play (gaming), but that it is growing into something much more.
- **Today, we are going to learn about how virtual reality can be used for much more than just video games.**
- Tell students that by the end of the lesson, they will be able to answer the following essential question: **What is one use of virtual reality technology that could help solve a problem in the world today?**
- Show hook video and have a brief informal discussion about VR and its uses.

Part 2: Student Research and Sharing

- Students will work in pairs to research virtual reality and its uses outside of gaming. They will be asked to create a one pager (AVID Strategy) about what they find to share with another set of partners in the class.
- Big ideas and takeaways can be discussed as a whole class.

Part 3: Team up for LABO Activity

- Ask students if, in their research, anyone saw anything about using virtual reality in classrooms (unless that has already come up, then just reference it).
- Talk about how all of the uses of virtual reality that they have read about involve a team of people that work together to solve a problem.
- Tell students that today they will be working together to build a virtual reality experience with a team.
- Separate students into teams (either combining research pairs or creating new teams) and go over guidelines and expectations for Nintendo LABO materials.

Part 4: Build, Explore, Present

- Students will establish roles in their teams. They must develop a plan and process for the creation of their LABO kit.
- As their creations come together, each student will have the opportunity to use their kit. They will also get the chance to model and explain it to other groups.

- General discussion about the activity and process can take place throughout/after each group has completed their kit construction.

Part 5: Reflect and Connect

- Students will reflect on the overall process, individually.
- They will brainstorm practical applications that virtual reality technology, like Nintendo LABO, could have.
- Challenge them to think of a use outside of school that could solve a common problem or advance the way jobs are done.
- Have students respond to the essential question posed at the beginning of the lesson.

WRAP UP **AND** ACTION

Student learning will be measured throughout the lesson. There will be checks for understanding at the summary of each part of the lesson and a reference to the essential question multiple times. Students' ability to form an answer to the essential question will serve as verification of their ability to apply the knowledge they gained from this lesson.

Extensions

A designated area in the classroom could be created for students to post the problems they would solve using virtual reality. This area could remain up all year, with students adding things to it as they read about, experience, or think up more applications for virtual reality.

Students can transform their finished product and add their own DIY creation to their design. Extend the project by allowing students to decorate the cardboard creation into a best decorated design. (Nintendo hosts a creation contest for the best decorated designs from a Labo kit, some examples are below)

Prior to this unit, plan on providing background information on the engineering process.

If there are robotics companies, engineering companies, virtual designing, or other companies in your area that can be linked to the ITSE standards, consider taking a field trip to those places in order to build background.

Bring in a guest speaker (I brought in an engineer from Mertek) to come in and discuss different aspects of robotics and the engineering process. (With my class, my speaker was about to share about robotics, engineering, building, and scientific background)

To get students familiar with the Virtual and Augmented reality worlds, it is recommended to explore some of the attached VR/AR field trips as a whole group discussion and activity prior to the implementation of this project.

About the **Author**

Maggie Gaines-Hackney is a 2019 - 2020 Kenan Fellow. She is an English as a Second Language teacher at an elementary school in Sanford, North Carolina.

About the **Fellowship**

Jerry Pedley is the owner of Mertek Solutions, Inc., a family owned business that serves a worldwide market. Mertek Solutions provides machine design for manufacturing automation and engineering as well as manufacturing equipment design.

The internship at Mertek has opened my eyes to a world of endless possibilities. I never knew what the world of STEM offered before now and I would not have if it was not for Mertek and their wonderful employees. Being able to network and gather ideas from employees was amazing.

Resources

Nintendo Labo

Virtual Reality Facts for Kids

10 Amazing Uses for Virtual Reality

YouVisit

Virtual Field Trips

Student **Pages**

Engineering Design Process

Name: _____ Teacher: _____

STEAM Challenge: _____

Ask: What's the problem?	Imagine: Brainstorm some ideas. 
Plan: Draw your design.	
Create: Follow design and build.	

Engineering Design Process

Test: test design. Did it work? ▫ Yes ▫ No	Improve: What works? What doesn't work? How can you make it better?

Appendix

Steam CoLLABOration Project Rubric

Team Members: _____

Project Name: _____

CATEGORY	4	3	2	1
Planning	Plan is neat with clear steps and labeling for all components.	Plan is neat with clear steps and labeling for most components.	Plan provides clear steps and labeling for most components. Lacks neatness.	Plan does not show steps clearly or is otherwise inadequately labeled. Lacks neatness.
Collaboration	Team works well with assigning roles and all members of the team contribute to the finished product.	Team works well with assigning roles and some members of the team contribute to the finished product.	Team works reasonably well but struggles with assigning roles. Some members contribute to the finished product.	Team does not work well with assigning roles and the finished product is created by 1-2 members.
Process/Design	The process for designing the team\'s specified product is followed and evidence of research and understanding is evident.	The process for designing the team\'s specified product is followed somewhat and evidence of research and understanding is present.	The process for designing the team\'s specified product is not followed and evidence of research and understanding is lacking.	The process for designing the team\'s specified product is not followed and evidence of research and understanding is not present.
Function	The LABO device works exactly as it was intended to and is modeled correctly by the team.	The LABO device works exactly as it was intended to and is modeled correctly by the team with assistance.	The LABO device works somewhat as it was intended to and is modeled correctly by the team with assistance.	The LABO device does not work as it was intended to and cannot be modeled.

Total Score: _____