THE FUTURE IS A PLACE WE CREATE

iINNOVATE Learning Experience Design

iInnovate Learning Experiences Include:

- Content Standards
  - Priority Standards
  - Integrated - Cross-Curricular
- Success Skills
  - Curiosity, Diversity, Empathy, Critical Thinking, Persistence, **Collaboration**
- Personalization
  - Student voice and choice
- Relevancy
  - Real-world connections
- Assessment
  - Product, project, presentation
- Culturally Responsive Pedagogy
- English Language Development
- SEL
- Career Technical Education

Note: The features above help us be mindful of the elements to include when planning to make a lesson/unit more robust and aligned to iInnovate learning.

Design thinking elements are embedded throughout the lesson as a way to familiarize facilitators with the process, but it is not true design thinking.

Learning Experience Planning Template

Lesson Title:	Into the Unknown
Grade Level:	5
Learning Experience Description	In this unit, students will learn about explorers (comparing early explorers to space explorers). Students will discover the survival needs, technology required, transportation used in exploring new worlds.
Prior Learning Needed:	Introduction to volume Design thinking background How to work in collaborative groups

Standards

Reading:

CCSS.ELA-LITERACY.RI.5.1

Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

CCSS.ELA-LITERACY.RI.5.2

Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.

CCSS.ELA-LITERACY.RI.5.4

Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a *grade 5 topic or subject area*.

Writing:

CCSS.ELA-LITERACY.W.5.3

Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.

Integrated ELD

Designated ELD

Math:

CCSS.MATH.CONTENT.5.MD.C.3

Recognize volume as an attribute of solid figures and understand concepts of volume measurement.

Science:

5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Social Studies:
5.2 Students trace the routes of early explorers and describe the early explorations of the Americas.

1. Describe the entrepreneurial characteristics of early explorers (e.g., Christopher Columbus, Francisco Vásquez de Coronado) and the technological developments that made sea exploration by latitude and longitude possible (e.g., compass, sextant, astrolabe, seaworthy ships, chronometers, gunpowder).

2. Explain the aims, obstacles, and accomplishments of the explorers, sponsors, and leaders of key European expeditions and the reasons Europeans chose to explore and colonize the world (e.g., the Spanish Reconquista, the Protestant Reformation, the Counter Reformation).

CTE Connections	**Career Technical Education (CTE) Pathway :** Information and Communication Technology **Potential Career Paths:** **Information systems manager**- responsible for the secure and effective operation of all computer systems, related applications, hardware and software that is used within a wide range of public and private sector organisations. **Database administrator**- use specialized software to store and organize data. The role may include capacity planning, installation, configuration, database design, migration, performance monitoring, security, troubleshooting, as well as backup and data recovery. **Business intelligence analyst-** reviews data to produce finance and market intelligence reports **Web developer**- is a programmer who develops World Wide Web applications using a client—server model **Software developer**- use programming and design knowledge to build software that meets the needs of users
Success Skills:	CTE standards success skills link- ask Liz. Link skill descriptions

<table>
<tr><td></td><td>Check the success skills that are present in the lesson.
☐ Curiosity ☐ Persistence
☐ Diversity ☐ Collaboration
☐ Empathy
☐ Critical Thinking</td></tr>
<tr><td>Essential Question</td><td>What are the most essential items, skills and conditions for the survival of explorers and settlers in new worlds?</td></tr>
<tr><td>Learning Progression</td><td>1. Learn about explorers, their routes & technologies they used for travel (skills)
2. Survival of settlers (items)
3. Transportation of explorers
4. Settlement Locations (conditions)
5. Tell a story of an explorer listing items, needs and conditions for survival).</td></tr>
<tr><td>Learning Intentions
“I am learning”</td><td>I am learning about explorers characteristics and the technology needed to make exploration possible.</td></tr>
<tr><td>Success Criteria
“I can”</td><td>
<table>
<tr><th>Build Knowledge (S)</th><th>Make Meaning (D)</th><th>Apply Understanding (T)</th></tr>
<tr><td>Define explorer

Define Settler

Identifying explorers needs to survive.

Locate voyage routes

List technologies needed for the voyage and settlement</td><td>Analyze explorers and settlers from the past: were they successful?

Explain survival needs within identified constraints.

Compare voyage route possibilities

Critique technology</td><td>Become an explorer

Design and produce a plan and equipment necessary to survive the voyage.

Experience your selected voyage.

Evaluate technology usefulness in voyage success.</td></tr>
</table>
</td></tr>
<tr><td>ELD

English Language Objective “I can...in</td><td></td></tr>
</table>

speaking, listening, reading, writing"	
Academic Vocabulary	Astrolabe Astronaut Brackish water Caravan Circumnavigate Colony Compass Conquistador Drought Empire Epidemic Expedition Explorer Famine Fresh water Global positioning system Kingdom Latitude Longitude Merchant Navigation Profit Salt water Settlement Sextant Technology Volume
Culturally Responsive Practices	
SEL practices	
Classroom Management Needs	
Business / Industry Involvement **(field trips guest speakers)**	ACI Jet Space Industry Exploratorim Trust Automation Rantec Power Systems

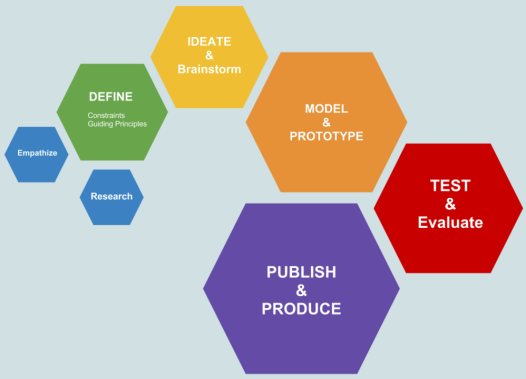
Materials/ Innovation Lab Use	**Print Out:** Early Explorers Note Page Early Explorer: Student worksheet- List of Items NASA Explorer: Student worksheet- List of Items Map of Jamestown/ Chesapeake area (modern) Clock Template **Consumable Materials:** Popsicle sticks Straws Paper Foil Cork- try using a packing peanut- watch this video Needle (safety pin) Magnet Water Cup Paper plate Toothpick Markers Crayons Glue stick Ruler Scissors Chalk Flashlight **Resources:** Design Thinking Coloring Page Co-construction Slides Explorer Research Overview: The Age of Exploration Columbian Exchange Activity (PBS) **Survival** NASA Article: Jamestown's location weather and soil NASA Article: Survival in Jamestown Early Explorer: Expert ranking answer sheet NASA Article: Survival on the Moon NASA Explorer: Expert ranking answer sheet Early Explorer Sphero game

	Transportation Atlantic crossings Build & Test and Design a Ship (45-60 min) Make an origami ship (45min) PBL Unit: Becoming an Explorer (180 min) Navigation article Location article **Time** NASA Article: Jamestown and Space Sun moving across the sky- video Laser cut sundial Mystery Science Lesson 2 Mystery Science Lesson 3 Mystery Science Lesson 4 Article: Ten things you may not know about Jamestown Article: Follow the water Article: Who were the powhatans Website: historic jamestown Age of Discovery website Age of Exploration (ducksters)

Learning Experience Design Plan

Today we will begin the design process. The design thinking process is a process we use to solve difficult or hard problems. Each step helps us to look at the problem from a different perspective or way.

Lets review the phases of the design process:



Research/Empathy: We learn about a topic.
Defining our problem: We define our problem.
Ideate and brainstorm: This is where you come up with ideas with your partner or team.
Prototype: This is where you sketch or draw what your ideas would look like.

Model: This is where you build the best idea!
Test: This is where we test to see if your idea works!
Produce: If it is good, we can make more.

Recommended: Design Thinking Coloring Page

Empathy- What is the issue?
Empathy is understanding what another person is experiencing OR feeling what someone else is feeling.

Opening Day- Co-construction activity
Co-Construction Slides

4 graphics (astronaut, sun in horizon, deep-sea submarine, road trip car)

What do these 4 images have in common?
- students think quietly for two minutes
- then come together in a small group to discuss ideas together
- groups share out their thinking

Give students the topic- **Explorers and Settlers**

How do explorers and settlers of long ago relate to these pictures? Have a class discussion to make this connection. (only show the first three slides)

Brainstorm ideas with students

Ask students- What do you know about explorers and settlers?

List what students know.

Definition:
Explorers are people who explore an unfamiliar area. They are adventurers who enter into the unknown.

Settlers are people that move with a group to live in a new area or country.

Share with students the essential question for the unit: **What are the most essential items, skills and conditions for the survival of explorers and settlers in new worlds?**

Break down the question:
What is an explorer? S
What needs to be prepared? S
What is a voyage? Where did explorers go? S
Why did they go? D
How can we use our knowledge of explorers and settlers to compare Jamestown to space? T

Surface	Deep	Transfer
Define explorer Define Settler Identifying explorers needs to survive. Locate voyage routes List technologies needed for the voyage and settlement	Analyze explorers and settlers from the past: were they successful? Explain survival needs within identified constraints. Compare voyage route possibilities Critique technology	Become an explorer Design and produce a plan and equipment necessary to survive the voyage. Experience your selected voyage. Evaluate technology usefulness in voyage success.

As we move through this unit, we will answer these questions so that you will have the ability to create a voyage to a new land and establish a settlement. You will also compare that settlement to a space settlement.

Beginning in the late 1200's exploration began to expand because of trade. In the 1400's trade and travel became more prevalent. Important changes took place in Europe in 1300-1400s. This period of time was called the Renaissance, which means rebirth. It was the rebirth in learning and knowledge. Europeans took interest in reading, writing, art and science. Because of trade, they learned new ideas from people from Africa and Asia. During the Renaissance, technology in Europe changed. Technology is the use of scientific knowledge and tools to do things better and more rapidly. Some technologies that were created were the printing press, astrolabe (tool that measures the height of a star above the horizon) (Reference- student social studies book)

Research- What do we know about the topic? What do we need to learn?

Define Explorer

Who were the explorers?
Explorer Research

Remind students that we will begin our research about early explorers with some reading and writing. Students should take notes about each explorer.

Students use the Early Explorers Note Page to record information.

Additional References for Research:

- Website for students to learn about different explorers.
- Chapter 3 in social studies book (pages 78-117)

What new technologies were discovered during the renaissance?
Use the Early Explorer Technology research slides to describe technology that helped explorers navigate.

- Astrolabe
- Compass
- Sextant
- Gun powder

Overview: The Age of Exploration

Define- What is the problem we are trying to solve?
What do we need to do to solve the problem?

Revisit the essential question: What are the most essential items, conditions and skills for the survival of explorers and settlers in new worlds?

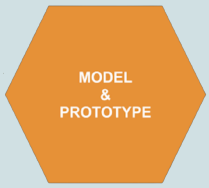
Being an explorer requires one to think through constraints and problems in advance. You do not always know what you are going to face, but it is important to anticipate potential obstacles in advance.

Every explorer must be well prepared for their voyage. An explorer must think about things they will need to survive, how they will get there, the amount of time their voyage will take and the skills and knowledge they will need to survive.

Being an explorer requires you to be adaptable to change and problem solve as unpredicted problems arise.

Together we will investigate the constraints explorers face on their journeys, whether it is in the 1600's or 2025.

Constraints- Just like we have rules for sharing that have consequences if we break them, design thinking projects have rules that must be followed. When we identify constraints, we are looking to see all the rules we need to follow for the project. Constraints are also known as limitations. We do not have endless supplies, so the supplies we have to work with are constraints. Constraints help us separate what is real from what is in our imagination.
The three modules below have the following phases of the design process embedded throughout.

		
This is where you come up with ideas with your partner or team.	This is where you sketch or draw what your ideas would look like.	This is where we test to see if your idea works!

Students begin the survival module.

Survival

- Learn about Jamestown & space
- Students choose essential items for survival & compare to expert ranking
- Students code the rescue mission

Students should have a basic understanding of the essential items explorers/settlers need to survive in a new world. (then and now)

(see notes teacher notes throughout the slides)

Once the survival module is complete, begin the transportation module.....

Students begin the transportation module.

Transportation

- Lear about settlers transportation modes
- Compare explorer transportation then and now

- Explore the constraints of volume on a voyage
- Design and build a ship replica (**optional choice of hands on activity**)
- Explore mapping and navigation (gps, compass)

Teacher choice: Optional hands on learning extensions
STEM Challenge- Build and test their own ship (45-60 min)
Make an origami ship (45min)
PBL Unit: Becoming an Explorer (180 min)

Once students complete the transportation module, hae students begin the time module.

Students begin the time module

Time

- Students track the sun and shadows in the sky to tell time and season
- Mystery science grade 5 unit 2, 3, and 4

Mystery Science Lesson 2: Who set the first clock?

Mystery Science Lesson 3: How can the sun tell you the season?

Mystery Science Lesson 4: Why do the stars change with the seasons?

Test and Evaluate- Test your prototype. Validate ideas and get feedback to improve. Make adjustments as necessary

Publish and Produce- If it works, share it with the world!

After students have done the three modules, revisit the essential question:
What are the most essential items, conditions and skills for the survival of explorers and settlers in new worlds?

Open Co-Construction Slides

Show slide 3

Students should answer the essential question above through writing or a technological platform.

Suggested culminating activity: Use slide 3 students will select one image -to write a short narrative about an explorer and the items, skills, and conditions they needed to survive as they discover a new world - make a commercial - create a "Would you Rather" list	
Assessment	
Extension	Settlement of Jamestown https://www.nasa.gov/audience/foreducators/5-8/features/F_Exploration_Then_and_Now.html