

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
- > Career Technical Education

<u>Note</u>: 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:	Building a Suitcase
Grade Level:	2
Learning Experience Description	In a unit that integrates social studies, math, reading, and writing, and ELD standards, second-grade students will explore their ancestry through the engineering design process. Using communication, collaboration, critical thinking, and creativity in a real-world scenario, students will build a prototype suitcase they could use for travel to their ancestors' home country that meets TSA carry-on requirements.
Prior Learning Needed:	How to use a ruler (Bridges, 2nd-grade unit 4, Measurement)
Weeded.	Understanding 3 dimensional shapes
	Frontloading of vocabulary
	Students should know what country their ancestors came from and why they made the journey to the USA.
	TSA regulations "linear inches"
	Engineer Design process language

Standards

Reading:

CCSS.ELA-LITERACY.RI.2.7

Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text.

Writing:

CCSS.ELA-LITERACY.W.2.8

Recall information from experiences or gather information from provided sources to answer a question.

Integrated ELD

ELD PI.2.1 Exchange Information and Ideas

- *Emerging* ask and answer yes/no/wh questions and use learned phrases
- Expanding ask relevant and detailed questions, affirm others,
- **Bridging** build on responses, add pertinent information, provide useful feedback

ELD PI.2.12 Selecting Language Resources

• Emerging - use a wide range of Tier I words, and a select range of Tier II words

- accurately to convey meaning
- **Expanding** use complete sentence including a range of Tier I and II words and select Tier III words
- **Bridging** use detailed sentences including antonyms/synonyms; words with ed, s, ing endings, and figurative language

<u>Link to ELD Standards and Objectives here</u>

Designated ELD

Math:

CCSS.MATH.CONTENT.2.MD.A.1

Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

CCSS.MATH.CONTENT.2.MD.A.2

Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.

CCSS.MATH.CONTENT.2.MD.A.4

Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

CCSS.MATH.CONTENT.2.G.A.1

Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.1 Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

Science:

- **2-ESS2-2**. Develop a model to represent the shapes and kinds of land and bodies of water in an area.
- **2-ESS2-3**. Obtain information to identify where water is found on Earth and that it can be solid or liquid.
- **K-2-ETS1-1**. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- **K-2-ETS1-2**. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

Social Studies:

2.1.1. Trace the history of a family through the use of primary and secondary sources, including artifacts, photographs, interviews, and documents.

GRADE 2

- 2.1.2 Compare and contrast their daily lives with those of their parents, grandparents, and/or guardians.
- 2.1. 3. Place important events in their lives in the order in which they occurred (e.g., on a time line or storyboard).
- 2.2 Students demonstrate map skills by describing the absolute and relative locations of people, places, and environments.
- *2.2.3 Locate on a map where their ancestors live(d) before coming to California, telling when the family moved to the local community California and how and why they made the trip.

*****This standard was altered in an effort to be more inclusive.

CTE Connection	Career Technical Education (CTE) Pathway: Engineering and Architecture 9.5 Understand that the modern world is an international community and requires an expanded global view. Potential Career Paths: Drafter- a person that makes detailed technical drawings Architect- they make plans, designs and oversee construction of		
	buildings Structural Designer- formulate, design and draw illustrations. Building Department Plan Examiner- interprets building codes, plans and engineering calculations. City Planner- long and short term goals for how the land is used. Surveyor- prepares sites for construction and makes precise measurements to determine property boundaries. Engineer- A person who designs, builds and maintains machines or public areas.		
Success Skills	Check the success skills that are present in the lesson.		
	☐ Curiosity ☐ Persistence		
	☐ Diversity ☐ Collaboration		
	☐ Empathy		
	☐ Critical Thinking		
Essential Question	How might we use measurement tools we know and the knowledge of the location of water and people to thoughtfully design a TSA approved suitcase that will allow us to visit destinations of our families' past?		
Learning Progression	1. Locate where your ancestors come from on a map		

Learning Intentions	 Use measurement skills to design and build a suitcase whose measurements are no more than 45 linear inches or 115 cm.(per TSA limits) Recall information from experiences or gather information from provided sources to answer the question, "How does your suitcase meet all of the TSA carry on requirements?". Put it into writing. Use English language tied to content to convey information 					
"I am learning"						
Success Criteria "I can" Surface, Deep, & Transfer	Build Knowledge (Surface) What/ How		Make Mean Why	ing (Deep)	(Trai	y Understanding nsfer) n, Where, Should
ELD English Language Objective "I canin speaking, listening, reading, writing"	Pull a small group of English learners at the same level (emerging, expanding, or bridging) to frontload academic vocabulary, language needed for group discussion, language for use in presentation, writing - 2nd grade ELD Objectives to plan designated ELD - Designated ELD Lesson examples:					
	Content Connection	For S Emer	tudents at ging	For Student Expanding	ts at	For Students at Bridging
	TSA Infographic discussion All group work conversation Slides class will discuss Suitcase Design Challenge Worksheet Brainstorm	vocal teach Tier I III vo teach need ask/c yes/r quest into ask/c wh qu	h Tier I culary, n select II and Tier ccabulary, n phrases ed to answer no tions, move answering uestions, students	Teach Tier vocabulary select Tier vocabulary teach full sentences needed to relevant questions a affirm othe practice Ti vocabulary needed.	, and III , ask and rs, er I	Teach Tier III vocabulary, teach Constructive Conversation skills and frames to build on responses, add pertinent information, provide useful feedback, teacher antonyms/synon yms; words with

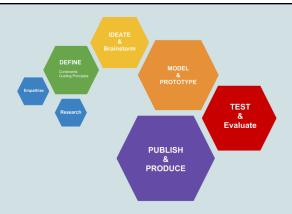
	Turn and Talk about Suitcase	to point if they do not yet have yes/no language.		ed, s, ing endings, and figurative language
Academic Vocabulary	Ancestors Asia Antarctica Angles Australia Africa Continents constraints Centimeters Dimension Europe Face Height Inches Length Linear inches North America Ruler South America Suitcase TSA Width Yard Stick Designated ELD, s	suggested vocabul	ary	
Culturally Responsive Practices		livities You From read alcooem activity	ud	
	More Extended: L	ink document with	extended activitie	es
SEL Practices				
Classroom Management Needs	·	terogeneous group cademic vocabular		

	Group ELs with students who will encourage their participation, when not in designated ELD ELs should be placed in heterogeneous groups, groups of 2 may elicit more language than groups of 4
Business / Industry Involvement (field trips guest speakers)	Field trip to the SLO Airport Travel Industry National Security Graphic Design Engineering Best Luggage ACI jet
Materials/ Innovation Lab Use	Print Out Ancestry Worksheet suitcase design challenge worksheet Consumable Materials Cardboard or poster board (easy to cut) Crayons Suitcase Design/TSA carry on travel requirements graph paper Painters tape Pencil Linker Cubes Ruler Scissors World map Resources Constructive Conversation Poster (teacher will modify for this lesson) Design Thinking Coloring Page Slideshow
	Learning Experience Design Plan

Learning Experience Design Plan

Before you begin, have students ask their parents where their ancestors are from as "homework". If they are from multiple places, they can choose one for the project.

Let's review the phases of the design process:



Research/Empathy: We learn about a topic.

Defining our problem: We define our problem.

<u>Ideate and brainstorm</u>: 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!

<u>Test:</u> This is where we test to see if your idea works!

Produce: If it is good, we can make more.

Recommended: <u>Design Thinking Coloring Page</u>



Empathy- What is the issue?

Empathy is understanding what another person is experiencing OR feeling what someone else is feeling.

Introduce history of a family, by sharing photographs, interviews and documents.

Resource: Looking at families of the past

Resource: Sharing family history (themselves)

How is your life different from the people in these photographs?

have students ask their guardian how they got to california and report back the next day.

How is your daily life different from your parents, grandparents or guardians? Write about it in your journal and share. With a partner.

Have students begin by creating a timeline of their life on a blank sheet of paper. Once completed, ask:

How did your ancestors end up in California?

In a group of four, students find the country or state that their ancestors came from.

Each student will color in that country on the map provided

In groups, students chat about where their ancestors are from before they got to California and why they made the trip to California.

Create a map of the state or country your ancestors came from. On the map, represent the shapes and kinds of land and bodies of water in an area. Identify if the water found there is in solid or liquid form. Will this map change depending on the time of year? Will the amount of water change? How do people in that area receive their drinking water?

Support with <u>mystery science</u>

Let's pretend we are going to go on an Airplane and visit the place in which our Ancestors came from before getting to California. What might we use to pack our stuff in?

Students brainstorm ideas of ways they could pack their stuff, and the teacher guides students to suitcases.



Research- What information is already out there on the topic? What do we know? What do other people know? What has already been done to help the problem?

<u>Suitcases</u>- are excellent tools to pack all of your belongings in. But suitcases come in many shapes and sizes. How do you know what the right suitcase to bring is?

The transportation security administration or TSA for short has put together some rules or regulations on what a suitcase should look like. They have these rules in order to make sure that everyone can fit their things on the airplane and for your overall safety. Here is what the TSA says (teacher reads TSA regulations off of the slide, or has a student read it. (Use this as an

opportunity to call on an EL student if this passage was pre-taught and practiced in designated ELD).

This terminology may be confusing to some of us so oftentimes informational writers will put information into an infographic or specific image to help clarify a text. Here is the infographic made by the TSA. (shows students infographic of rules)



Class discussion about infographics. What are the rules for a suitcase or carry-on bag?

If you have practiced this in designated ELD use this as an opportunity to call on ELs so they are a productive part of the conversation.

Teacher writes down identified rules on the white board.

TSA Carry on Bag Regulations:

Carry-on should not exceed the following size and weight restrictions: 45 linear inches (22 in x 14 in x 9 in) or 115 centimeters (56 cm \times 36 cm \times 23 cm) including handles and wheels.

Weight maximum: 18lbs

Use linker cubes to help students visualize the dimensions.



Define- Clearly define the need you are trying to solve, sharpen key questions.

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.

For example, if I was needing a pencil to write with, I could get one from the pencil fairy (in my imagination) or I could get a pencil from the pencil bin in our classroom. Knowing that the pencil fairy is not real, and that in my classroom we have a specific spot for pencils, I know that that is a constraint. As much as getting a pencil from a pencil fairy sounds fun!

According to TSA, the constraints are that:

Carry-on should not exceed the following size and weight restrictions: 45 linear inches (22 in x 14 in x 9 in) or 115 centimeters (56 cm x 36 cm x 23 cm) including handles and wheels.

Weight maximum: 18lbs

As a class, we are challenged to work together to design a suitcase that you could take with you if you were to visit your ancestors home country. Keep in mind, your suitcase must be TSA approved and meet all guidelines.

Lets see how expert suitcase companies choose to design their TSA approved suitcases. (teacher shows suitcases in slides)

Teacher stops at each slide asking students what they notice about each design. Highlighting design ideas they like or think will be useful for a traveler. Have sentence starters posted - ex: I noticed...I see...The slide shows...If you have tied designated ELD to this part of the lesson make sure to call on EL students.

We know that our suitcase has to be 45 linear inches (which means when you add up the length, width and height it doesn't go above 45 inches) or 115 centimeters.



Ideate and Brainstorm- Brainstorm and create solutions, no idea is a bad idea! Narrow your ideas.

Teacher explains that each group would need a ruler, pencil, <u>suitcase design challenge</u> <u>worksheet</u> and graph paper.

Teacher models how she would use the graph paper to make a prototype of a suitcase. Then once she agreed with her group she would draw it in the project packet.

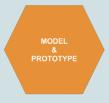
- Measure in inches and cm
- Choose appropriate unit to measure with
- Identify shapes needed to build 3d suitcase (angles and faces)
- Label all parts of suitcase measurements (top, bottom, side, side) any extras? -extension for advanced students
- Measure again on cardboard with group
- Have group check each other's work
- Cut graph paper
- Tape pieces together

My group loves cubes! We want our suitcase to be a cube. In order for something to be a cube, all of its dimensions (L W H) need to be the same length.

I know that 10 is a friendly number so I am going to choose 10 inches for the height, width and length for all of my faces. Let's draw our 3D model out together!

- Students copy the 3D model of the suitcase with the teacher on a piece of graph paper.
- Next teacher models how to break up the 3D drawing into parts.
- Teacher begins sketching out the front, back, left and right sides, top and bottom of the suitcase.
- Teacher makes sure to label each dimension with the appropriate unit (cm or in) depending on what they are using to model.

Once the prototype drawing is complete, I can draw out what my suitcase will look like after it is built on the paper provided. This is the aesthetic design. I can use crayons to add color or improve its aesthetic design.



Model and prototype- Build representations of one or more ideas

T- Once my linear dimensions are approved by the teacher my group can begin measuring out the dimensions on the cardboard.

If I have four people in my group, one person gets the top, one the bottom, one the left side, one the right side. Each person will contribute to the creation of the overall suitcase.

Once all the pieces are cut, we can use painters tape to put them together!

Students get with groups to discuss and plan out what their suitcase will look like, discussing the height, length and width of the top, bottom, sides, front and back of their suitcase.



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

Students complete <u>Student Design Challenge worksheet</u> forms independently. Proving they can accurately identify the length, width and height of their suitcase. In addition to being able to use their experience to explain the answer to the following question: "how does your suitcase meet all of the TSA carry on requirements?". In addition they will add their final suitcase product description (this will differ from their group because their aesthetic design may be different).

- ELs at emerging and expanding may not be able to do this independently. Make sure that some students are able to work in pairs and that ELs who need support are paired with a productive partner. Consider modifying the amount of work students at the emerging and expanding levels complete.



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

Once students' suitcases are completed, the teacher puts them all out for display in the classroom. As a class they go over to check that the length, width and height of each suitcase does not exceed 45 linear inches.

Did students add wheels? Those measurements count! It is important to point this out.

Students can fact check on the calculator or teachers can have students add the dimensions in their math journals by hand depending on the amount of time.

Closure

Exit tickets, feedback for next lesson

What were the dimensions of your group's suitcase? Remember this is the length, the width and the height.

Turn and talk to the person next to you. Provide example language on the board/model verbally Ex: My dimensions were...What are your dimensions....

Where in the world is your suitcase traveling? What continent is that country in? Provide example language on the board/model verbally Ex: My suitcase went to...Where did your suitcase go...

Turn and talk to the person next to you.

How does your suitcase meet all of the TSA carry on requirements? Provide example language on the board/model verbally Ex: Did your suitcase meet the carry-on requirements? My suitcase did/did not meet the requirements because...

Turn and talk to the person next to you.

Teacher calls on a student to share their answer or their designing a suitcase that stands out. partner's answer. If you taught Turn and Talk in designated ELD use this opportunity to call on an EL student.

Assessment

Ancestry Worksheet

	Suitcase Design thinking worksheet Project Rubric- Creativity and Innovation Presentation Rubric ELD Standards Rubrics
Extensions	





