

Problem-Based Learning Plan

National University

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Problem-Based Learning Planner

Teacher Name: McKenna Hayden	Grade: 3
Content Standards Addressed:(Common Core and Math Practice Standards) Other Subject area standards (Please state the standard and unpack each standard below it.)	
<p><u>Math Standards:</u> CCSS.MATH.CONTENT.3.MD.C.5 Recognize area as an attribute of plane figures and understand concepts of area measurement.</p> <p>CCSS.MATH.CONTENT.3.MD.C.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).</p> <p>CCSS.MATH.CONTENT.3.MD.D.8 Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.</p> <p><u>Social Studies Standards:</u> Standard 3.2: Students describe the American Indian nations in their local region long ago and in the recent past.</p> <ol style="list-style-type: none"> 1. Describe national identities, religious beliefs, customs, and various folklore traditions. 2. Discuss the ways in which physical geography, including climate, influenced how the local Indian nations adapted to their natural environment (e.g., how they obtained food, clothing, tools). <p><u>Physical Education Standards:</u> Standard 5: Students demonstrate and utilize knowledge of psychological and sociological concepts, principles, and strategies that apply to the earning and performance of physical activity.</p> <ul style="list-style-type: none"> • 5.6 Work in pairs or small groups to achieve an agreed-upon goal. 	
Mathematical Goal: Students will be able to....	Standard for Mathematical Practice:
Students will be able to use key mathematics skills related to measurement and geometry, to design and create prototypes of Native American homes.	SMP: CCSS.MATH.PRACTICE.MP4 Model with mathematics.
Assessment: Completed Group presentation of Building Plan will be given to the teacher.	Assessment: Students use of correct formulas in building plan, along with detailed information about the budget will be collected.
Informal Math Knowledge: Students can...	Formal Math Knowledge: Students need to know...
recognize when to add, subtract, and multiply to find the area or perimeter of an object.	measurement, area, perimeter, operations, addition, subtraction, multiplication.

The Task & Hook: State the problem and how you will hook students

The Task: (State the task and how you will introduce to students): Have students take a minute and reflect on the life of Native Americans. Have them think of a specific tribe or group according to what you are learning about. Tell students that today we will be building Native American Houses. Show them images from the internet of Native American houses and the people who lived in them.

PBL Task:

Go over standards we are working towards. We are going to be working with partners to create Native American Houses. We are going to start by getting into groups of 2 and talking with our partner about what they think would be in the house. Once we have an idea of what should be on the inside, then we are going to create the blueprints for NA house. Once we have that done, we are going to build and decorate our houses and have a Show-and-Tell presentation to show them off! Before we can build our houses thought, we need to have blueprints. Review concepts of area and perimeter.

- A. If I put a bed in that is 2 units tall and 3 units wide, what is the perimeter? (10 units). What is the area? (5 units squared)
- B. If the outside of my house is 10 units by 10 units, what is the perimeter? (40 units). What is the area? (100 units squared)

Hook:

Students will use the provided worksheets to construct their own Native American house. The area and perimeter problems will be presented after students have interviewed the other student and created all the required items in the home. Once students have completed this, they will construct the final version of their Native American house.

Possible Solutions: (include all pictures, models, representations)

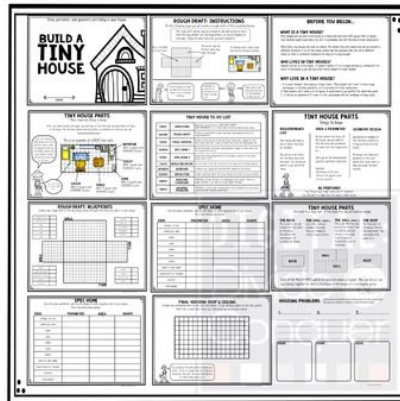
Questions for groups to answer: (Example)

- Where did *insert Native American group* live?
- What kind of food did they eat?
- What kinds of things did they wear?
- What kinds of activities did they do?
- What is this specific group known for?

Steps to completing:

1. After reviewing with their neighbor, create a rough draft of your Native American house and include all items on requirements list.
2. Create a final version of the house. There are 4 pages for the Base, Walls, and Roof. Check off each item from the requirement list.
3. Record the area, perimeter, and geometric shape of each item on the requirements list.
4. Record the area and perimeter of the major sections of the house (the base, walls, roof/ceiling).
5. Build the house by cutting out each of the sections and fitting them together
6. Continue to design and decorate the outside of the house
7. Reflect by answering questions about the house design and creation
8. Housing Problems: Create area and perimeter word problems for your house and have other students solve them.

Below are examples for a similar activity, however ours will be geared toward Native American establishments, not “tiny houses”.



Possible Errors & Misconceptions:

Students may incorrectly miscount the unit squares leading to the wrong answers. To avoid this, students can write the number inside each box as they go. You can also use geo-bands to help students visualize shapes in the boxes. Students may also count squares instead of multiplying. Teachers should have students write the number sequence out instead of counting. For example, 6 rows of 4 squares: $4+4+4+4+4+4=6 \times 4=24$ squares. Students may also face confusion when given a rectangle or with only two of the side lengths. To remedy this, have students write the dimension on the other sides of the rectangle. Additionally, students can become confused with area and perimeter. Provide additional support for students to discover that the concept of an object’s perimeter as a one-dimensional attribute and area as two-dimensional. Students should talk about the fact that area is expressed with square unit (Gojak & Miles, 2016).

Language Demand

Students may not be aware of the types of settlements Native Americans lived in. Teachers will need to show students examples of NA homes. Additionally, students may not know what blueprints are. Teachers will have to provide examples and construct their own house to show students.

Scaffolding Strategies (Accommodations for All Learners)

Provide students with formulas for area and perimeter on board or on math posters.
Provide multiplication rules on poster or page.

Time	Group Roles & Process	Evidence Collected How will you assess?
20 min	Students will take turns sharing ideas and thoughts about the aforementioned questions. This should take no more than 10 minutes. Once students have a basic understanding of what the other student wants, they will begin to create a draft of their house for 10 minutes.	The teacher will check for understanding by walking around and talking to pairs of students, asking questions and giving feedback.
Time	Individual Process	Evidence Collected How will you assess?
30 min	Individual students will create a final version of the house, making sure all the items on the requirements sheet are accounted for. They will then record the area, perimeter, and geometric shape of each item on the requirements list.	Students will be turning in individual pieces of assignments at the end of each day. They will also be completing a reflection piece that allows me to understand their thought process and how they feel they did. This is how I will check for comprehension.
Time	Share Out Roles & Process	Evidence Collected How will you assess?
10-15 min	Students will turn to their partner at the end of the lesson and share what has been accomplished on the house. Once all the sections of the project have been completed, the class will come together and have a Show-and-Tell to show off their work. At the end of the presentations, students will complete an exit ticket.	The teacher will check for understanding by listening to student presentations. Students will also complete an exit ticket.

Notes, Resources & Materials Needed:

Time Frame: The time frame for completing this project will vary greatly depending on how many items are on the requirements list, if you want to add more people to groups, etc.. The lesson can be completed in one day, but if you are planning on completing it in a week, give 45-60 minutes per day. All students will work at different rates, but by the end of the week students should be finishing the required steps (1-8) or trying some of the additional tasks.

Unit Measurement: The measurement used for this project will be a single unit per cube. You may choose to increase complexity by making each cube worth more. Use this with students to easily differentiate. Example: 1 square = 3 units or 1 square = 5 units. There are no feet, yard, or meters.**

Materials:

- computer paper
- card stock (optional for the house building)
- crayons and colored pencils

- scissors
- tape and glue
- books or magazines on building houses (optional)
- videos that show Native American houses from the internet (optional)
- videos that merge math and housing together (optional)

Designing Instruction Reflection:

- Based on what you know about your learners and class how does this lesson support their needs and integrate their assets?
 - For my specific class, this lesson will incorporate the various aspects of material they are working on. It offers a variety of problem types- word problems included- and allows them many different ways to creatively solve them. Additionally, the PBL assignment is “focused on complex, structured problems” in a “real-life” situation (Dickenson & Coddington). This lesson allows my students to rely on the information from previous lessons and builds upon it, but also integrates material from other lessons and helps to reach standards in other domains.
- What specifically will you do to support students with language acquisition throughout this lesson?
 - Teacher will check in with student frequently to check for understanding (before to front load, during after each step, and after). Students have several picture reminders and questions to help aid them.
- How will you make accommodations so that your student with an IEP can meet grade level standards?
 - Teacher will check in with student frequently to check for understanding (before to front load, during after each step, and after). Students have instructional aid to assist with on task behavior and one on one teaching. Students have visual and verbal reminders to help stay on task.
- How will your students with social-emotional issues feel supported throughout the lesson to ensure this is a safe learning environment?
 - Students with social-emotional needs will feel supported by the teacher first understanding their needs and partnering them with another student who can help meet those needs. Additionally, the teacher will help facilitate discussion, provide feedback, and check in with the student to see what can be done to help.
- In what ways does this lesson meet the principles of UDL (multiple means of action & expression, representation and engagement)?
 - Students are able to have free reign over the creation of their house. The only requirement is that they must include all of the items, but they will be able to add them wherever and however they see fit, allowing for multiple means of action and expression. The material will also be presented and showcased through math posters, images of N.A. houses, physical examples, and worksheets allowing for multiple means of representation. For multiple means of engagement, this lesson allows for students to work with partners and reflect on their experience. Overall, this activity allows students to focus on the real-world application of math concepts used in building and designing homes, while practicing problem solving skills, collaboration, and imagination (Dickenson & Coddington).

Works Cited

- Common Core State Standards Initiative. (2019, August 27). *Grade 3. Standards for Mathematical Practice*. Retrieved from <http://www.corestandards.org/Math/Practice/>
- (2000). *History–Social Science for California Public Schools California State Board: Kindergarten Through Grade Twelve*. Sacramento, CA: California Department of Education.
- (2009). *Physical Education Framework for California Public Schools: Kindergarten Through Grade Twelve*. Sacramento, CA: California Department of Education.