

Solar House Design Challenge Lesson Plan

Context (InTASC 1,2,3)

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Created:

Lesson Topic: Pencil quality comparison

Grade Level: Grade 4

Duration: 2 to 3 days

Kit Contents: http://odin-primo.hosted.exlibrisgroup.com/nmy:NMY_ALEPH:ODIN_ALEPH007757521

Desired Results (InTASC 4)

Purpose: The purpose of this lesson is to compare different housing products (flooring, windows, siding) based on quality, price, and advantages/disadvantages. (This activity would work best to do BEFORE doing the Solar House Kit)

North Dakota English Language Arts & Literacy Content Standards:

- Speaking and Listening Standards: Presentation of Knowledge and Ideas
 - SL.4 (Grade 3 - Grade 5) Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.
- Writing Standards: Text Types and Purposes
 - W.2 (Grade 3 –Grade 5) Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
 - W.7 (Grade 3 –Grade 5) Conduct short research projects that build knowledge through investigation of different aspects of a topic.

North Dakota Library and Technology Content Standards

- Information and Inquiry: Develop and Share
 - IAI.9 (Kindergarten- Grade5) Organize information using technology and other tools.
- Media and Technology Literacy: Technology Operations and Concepts
 - MTL.3 (Kindergarten- Grade 5) Perform grade-appropriate operations using technology to accomplish a goal.
- Media and Technology Literacy: Creative and Innovative Processes and Products
 - MTL.7 (Kindergarten- Grade 5) Create original products by using teacher-selected digital resources, tools, and formats.

North Dakota Mathematics Content Standards:

- Number and Operations – Fractions: Understand decimal notation for fractions, and compare decimal fractions
 - NF.7 (Grade 4) Compare two decimals to hundredths by reasoning about their size.

Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols $>$, $=$, or $<$ and justify the conclusions.

North Dakota Engineering Design Standards

- Engineering Design Standards: Engineering Design
 - ETS 1.2 (Grade 3- Grade 5) 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.
 - ETS 1.3 (Grade 3- Grade 5) 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.

Objectives:

The students will be able to:

1. Identify the attributes of 3 different brands of pencils as well as some poor qualities.
2. Categorize and rank the products by price from least to greatest.
3. Assess and select the best of the three products based on what it offers in relation to the cost.
4. Design a brochure persuading buyers to purchase each of the pencils based upon experimental investigation of each.
5. Select the best pencil for a specific buyer within the buyer's constraints and criteria.

Assessment Evidence (InTASC 6)

Evidence of meeting desired results: The students will have a clear pro/con list and the criteria tested for each pencil by the end of the first day. Their work and the teacher's informal assessment of each group from walking around and listening in on discussions will be an informal formative assessment. The end result of the brochure and buyer constraints will identify if the students understand how their brochure applies to a real world situation. This will be used as a formal formative assessment.

Learning Plan (InTASC 4,5,7,8)

Instructional Strategy: (Check all that apply)

Direct Indirect Independent Experiential Interactive

Technology Use(s): (Check all that apply)

Student Interaction Align Goals Differentiate Instruction Enhance Lesson

Collect Data N/A

Hook and Hold:

- Have a brown bag with a mystery item in it. With lots of expression explain that this is the new "IT" thing to have as a 4th grader. If you don't have one of these, then BOY you should feel pretty silly, because everyone that is anyone has one! The President of the United States owns at least one of these and you should too! This is the greatest of its kind in the entire world! Peek into the bag and with excitement say I just can't wait to show you guys what is in this bag! Once they are on the edge of their seats reveal to them what is in the bag...and the mystery item is!... THE WORLD'S GREATEST...Pencil!!

Materials:

- Brown paper bag with pencil in it
- 3 different brands of pencils
- Pencil information sheets
- Chromebooks or computers
- Microsoft Word
- Paper and Pencils
- Active Board and Computer

Procedures:

Day 1:

1. Today is the observation day. The students will be gathering information about each of the different types of pencils. There will be sheets that list the price of each pencil, but they will be conducting mini-experiments to rank them based upon the one that erases the best, sharpens the best, writes the smoothest, etc. They will come up with these categories on their own and will be in charge of conducting the experiments that they want in order to find out the best quality pencil. It is not always the case that the best has to be the most expensive.
2. Group the students into groups of 2-3. Hand out the three different pencils out to each group. Give them scratch paper and blank writing paper.
3. When everyone has all the materials allow them time to work and experiment with the three pencils. Let them know that they need to come up with the categories that define a quality pencil. If they struggle with thinking of things have them step back and think about what they think of when they picture a poor pencil.

Days 2-3:

1. And the construction of the brochure begins! The students will need their information they collected yesterday from the experiments as well as a laptop or Chromebook that has the Microsoft Word program on it.
 2. Before they begin have them follow along with you step by step with how to properly open and begin creating a brochure.
 3. When they have logged into their computer have them open up Microsoft Word. They will then type 'brochure' into the online templates bar. They need to select the trifold option on the right-hand side and from there they can select whichever brochure they like the best. Give them a minute or two to choose the template. Explain that they are able to change out the pictures once they begin designing the brochure.
 4. Have the students save their brochures to whatever file on the computer you would like them to save it to. Guide them through that process step by step so there is no possibility of losing or forgetting to save their projects at the end of each day.
 5. The rest of the time for these two days will be for them to construct their brochure. They should have the qualities of each of the three pencils in their brochure and the pros and cons of each. They may include pictures and any other information that they feel is important.
1. The final product needs to be printed off and handed in to the teacher. Upon being handed in the teacher will take on the role of a buyer in search of a pencil. Change up your role for each group and the qualities you are looking for in each pencil (best eraser, cheapest, bang for your buck, etc.). The students then need to sell one of the pencils in their brochure to you and have legitimate reasons for why they are recommending that pencil to you.

Summary: None given

Reflection (InTASC 9)

Reflect On:

- *Preparation*
- *Planning*
- *Teaching*
- *Student Engagement and Participation*
- *Evidence of Student Learning*

Standards

Council of Chief School Officers. (2011, April) *Interstate Teacher Assessment and Support Consortium (InTASC) model core teaching standards: a resource for state dialogue*. Washington DC. Retrieved from http://www.ccsso.org/documents/2011/intasc_model_core_teaching_standards_2011.pdf

North Dakota Department of Public Instruction. (2011) *North Dakota English language arts & literacy content standards*. Bismarck, ND. Retrieved from https://www.nd.gov/dpi/uploads/87/ELA_JUN0811.pdf

North Dakota Department of Public Instruction. (2011) *North Dakota English mathematics content standards*. Bismarck, ND. Retrieved from <https://www.nd.gov/dpi/uploads/87/math.pdf>

North Dakota Department of Public Instruction. (2012) *North Dakota library and technology content standards*. Bismarck, ND. Retrieved from https://www.nd.gov/dpi/uploads/87/lib_tech.pdf

North Dakota Department of Public Instruction. (2014) *North Dakota Engineering design content standards*. Bismarck, ND. Retrieved from

https://www.nd.gov/dpi/uploads/132/NDScienceStandardsDraftFormat2_Gr3_5_EngineeringDesign.pdf

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