

TECHNICAL MATERIALS

A NEED TO KNOW

Metals: Types and characteristics

Stones: Types and characteristics

Plastics: Types and characteristics

Glass: Types and characteristics

We want to learn how to build efficiently and safely (and saving money if it is possible)

EXECUTIVE FUNCTION SKILLS

- Organization
- Goal – directed persistence
- Sharing knowledge

CALP

Strength
Conductance
Resistance
Waterproof
Lightness
Stability
Tenacity
Fragility
Beans
Pillar/post
To recycle

Steel
Tin
Aluminium
Copper
Gold
Silver
Lead
Titanium
Plastic
Gypsum
Plaster

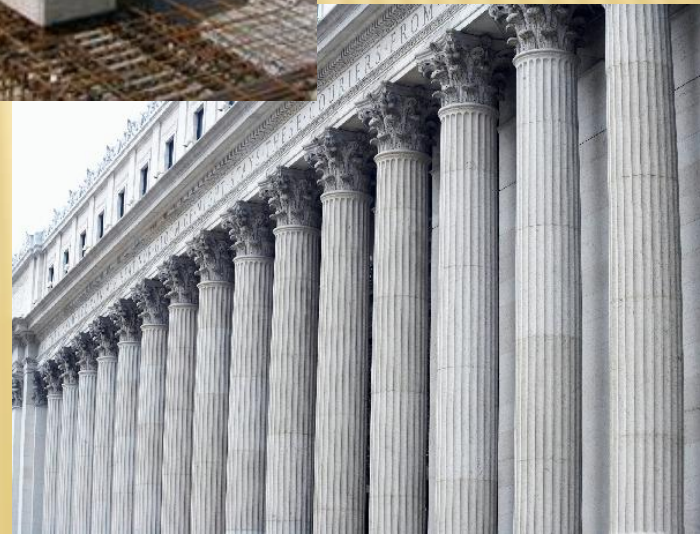
Stone
Slate
Limestone
Granite
Marble
Concrete
Cement
Glass
Fiberglas
Refractory materials
Abrasive materials



A DRIVING QUESTION

- ✖ Your house or the school are made of very diverse kinds of material. Why are they chosen and used?

EXAMPLES OF BUILDINGS MADE WITH CONVENTIONAL MATERIALS.



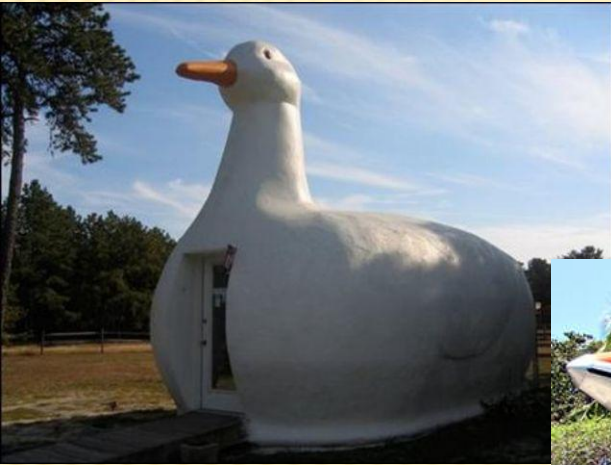
EXAMPLES OF BUILDINGS MADE WITH CONVENTIONAL MATERIALS.



EXAMPLES OF HOUSES MADE WITH UNCONVENTIONAL MATERIALS.



EXAMPLES OF HOUSES MADE WITH UNCONVENTIONAL MATERIALS.



PROJECT. FIRST IDEA.

- ✗ Choose one of the most representative buildings of Oviedo and change at least one of its material

PROJECT

- ✗ Choose one of the buildings what need reappearing of Oviedo and try to recover the building using an unusual material.

Explain your decision in a inform (including advantages and disadvantages respect the normal material) and try to make a picture or a photocomposition of the final aspect of it.



- ✖ You can choose the building you want. This is an example.

HOTS

- ✖ Analyze the buildings that need to be repaired in your city or neighbourhood. What parts need to be replaced and why the original materials didn't resist over time.
- ✖ Evaluate the materials you can choose to recover the building and try to choose the most efficient
- ✖ Create an inform with your election, with the advantages and disadvantages, and include a picture or photocomposition with the new aspect of the building.

TEACHING SEQUENCE

- × Session 1. Advance Organizer and introduce the first section of the unit. Properties of materials.
- × Session 2. Classification of materials according their properties.
- × Session 3. Start with the project. Second section of the unit: Types of metals. **Problem BL: What about steel structures and the Asturian rain / weather?**
- × **INQUIRY: What are the main differences between steel and the rest of metals?**
- × Session 4. Second step of the project. Third part of the unit: Types of plastics. **Cooperative learning: Jigsaw**
- × **INQUIRY: Is it possible recycle all types of plastic?**
- × Session 5. Continue with the project. Fourth part of the unit: Types of natural stones.
- × **INQUIRY: Are natural and artificial stones used for building today? In that way?**
- × Session 6. Continue with the project. Fifth part of the unit: Types of stones (ceramics). **Cooperative learning: Think-pair-share.**
- × **INQUIRY: Do you know when ceramics were discovered?**
- × Session 7. Continue with the project. Sixth part of the unit: Types of stones (cement and derivatives).
- × **INQUIRY. Why the concrete is called “the artificial stone”?**
- × Session 8. Continue with the project. Seventh part of the unit: Types of stones (gypsum and derivatives). **Cooperative learning: Think-pair-share.**
- × **INQUIRY. Gypsum is used a lot in Arabic buildings and mosques. Why?**
- × Session 9. Continue with the project. Eight part of the unit: Types of glass.
- × **INQUIRY: Where can you find glass in your daily life? Can you identify it?**
- × Session 10. Continue with the project. Ninth part of the unit: Abrasives and refractory. **Cooperative learning: Think-pair-share.**
- × Session 11. Prepare final presentation of the project
- × Session 12. Public presentation of the project

PROBLEM-BASED LEARNING: WHAT ABOUT STEEL STRUCTURES AND THE ASTURIAN RAIN / WEATHER? WHAT CAN WE DO?



SECOND STEP OF THE PROJECT

- ✖ Looking for a building to be restored (gathering information)
 - + Google
 - + Personal knowledge
 - + Asking friends and relatives
 - + Local newspapers...

- ✖ Students need to know: (task based instructions)
 - + Location
 - + Part of the building what need to be replaced
 - + Size
 - + A picture

- ✖ Sharing with your classmates your election (performance)
 - + Communicating using your CALP and BICS
 - + Obtaining some feedback
 - + Improving the original idea

TEACHING SEQUENCE

- ✖ Session 1. Advance Organizer and introduce the first section of the unit. Properties of materials.
- ✖ Session 2. Classification of materials according their properties.
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- ✖ Session 4. Continue with the project. Third part of the unit: Types of plastics.
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- ✖ Session 12. Public presentation of the project

CHECK LIST FOR THE PROJECT

- ✖ Exemplars. Houses made with unconventional materials. HOTS
- ✖ Task 1. In groups. Looking for a building to be restored, for its location and size. Decide what part of the building is going to change.
- ✖ Task 2. Analyze what material is the best for the house, and write a list with advantages and disadvantages.
- ✖ Task 3. Estimate the cost of the reform.
- ✖ Task 4. Include all the information in a report. Add a picture or photocomposition.
- ✖ Task 5. Present the inform to your classmates.

BENCHMARKS AND CHECKLIST FOR THE PROJECT

1. Looked for a building to be restored, for its location and size . Decided what part of the building is going to change.
2. Analyzed what material is the best for the house, and written a list with advantages and disadvantages of this material.
3. Estimated the cost of the reform. Surfing Internet for information or/and called different providers.
4. Included all the last information in a report. Added a picture or photocomposition of the final result.
5. Presented the inform to their classmates.

RUBRICS (POSSIBILITY ONE)

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Research Report Rubric

Research Report Rubric

Name: _____ Topic: _____

Teacher's comments: _____



Content and Details	Content is very informative and accurate. Report has many supporting details and is interesting to read.	Content is informative and mostly accurate. Report has adequate details.	Content is not always related to the topic. Many inaccuracies. Few supporting details.	Content is not relevant or accurate. No details.
Organization	Report is well organized with a strong beginning, middle, and ending.	Report shows adequate organization. It has a beginning, middle, and ending.	Report is poorly organized and confusing at times.	Report has no organization.
Writing Mechanics and Readability	Report has few or no errors in spelling, punctuation, and/or grammar. Report is easy to read.	Report has a few to several errors in spelling, punctuation, and/or grammar. Report is readable.	Report has many errors in spelling, punctuation, and/or grammar. Report is difficult to read.	Report is unreadable.
Notecards	Notecards are completed and labeled correctly.	Most notecards are completed and labeled correctly.	Some notecards are completed and labeled correctly.	No notecards.
Bibliography	Bibliography is completed and written in correct form.	Bibliography is done but incomplete in parts. Some errors in form.	Bibliography is incomplete. Many errors in form.	No bibliography.
(Other)				

RUBRICS (POSSIBILITY TWO)

	Criteria				Points
	4	3	2	1	
Introduction/ topic	Student properly generates questions and or problems around a topic.	Student generates questions and or problems.	Student requires prompts to generate questions and or problems.	Questions or problems are teacher generated.	
Conclusions reached	Numerous detailed conclusions are reached from the evidence offered.	Several detailed conclusions are reached from the evidence offered.	Some detailed conclusions are reached from the evidence offered.	A conclusion is made from the evidence offered.	
Information gathering	Information is gathered from multiple electronic and non-electronic sources and cited properly.	Information is gathered from multiple electronic and non-electronic sources.	Information is gathered from limited electronic and non-electronic sources.	Information is gathered from non-electronic or electronic sources only.	
Summary paragraph	Well organized, demonstrates logical sequencing and sentence structure.	Well organized, but demonstrates illogical sequencing or sentence structure.	Well organized, but demonstrates illogical sequencing and sentence structure.	Weakly organized.	
Grammar and spelling	Punctuation and capitalization are correct.	There is one error in punctuation and/or capitalization.	There are two or three errors in punctuation and/or capitalization.	There are four or more errors in punctuation and/or capitalization.	
				Total	

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