

Build a Mineral House

*adapted from an activity in *Exploring Geology* by Reynolds, Johnson, Kelly, Morin and Carter; 2008

Teacher Notes

Objectives:

- Students will be able to identify the use of different minerals
- Students will demonstrate knowledge on how minerals are chemically formed
- Students will demonstrate knowledge of how minerals chemically react in different situations

Standards:

Science as Inquiry:

1. Identifies questions and concepts that guide scientific investigations
4. Formulates and revises scientific explanations and models using logic and evidence
5. Recognizes and analyzes alternative explanation and models

Physical Science:

2. Understands and applies knowledge of the structure and properties of matter
3. Understands and applies knowledge of chemical reactions

Essential Questions:

1. How are minerals formed?
2. How are minerals used to benefit human civilization?

Engage:

Using your mineral kits, have the students test each mineral in the kit. Keep the minerals unlabeled. They will need to use all the testing options (cleavage/fracture, color, luster, hardness, magnetism, streak, density, crystal shape, effervescence and fluorescence). They will need to fill out a chart with their data found.

Next, they will be given a list of minerals and their characteristics. They will need to try to name each mineral using this sheet (see attached). After the list is complete, they may look at the answer sheet to check their answers. They will need to retest each mineral they miss and explain in their composition notebook what could have gone wrong in their testing and answers.

Explore/Elaborate:

They will need to create a feasible house made of entirely of minerals and mineral products. They cannot use any organic materials, such as wood.

To begin, they will need to write out all the possibilities that could be used for their mineral house. After they have compiled a list, they will go to the computer lab for further ideas and research.

Either back in the classroom or in the computer lab, they will need to illustrate a house. This can be done by hand or computer generated. The illustration needs to be very detailed and all parts are labeled. They will also need to list all of the material used and needs to include:

- mineral name and properties
- general uses
- what will it be used for
- why is it used
- cost of using
- reliability of using
- availability of minerals

Hints

Their house should include everything that would be found in a regular household. This includes all exterior and interior parts, framework, piping (ventilation, water, gas, heat/air conditioning and electricity), insulation and all other amenities (carpet, windows, walls, doors, etc.).

Extension:

Try to create this house to be as sustainable as possible. Make changes accordingly.

Evaluation:

	5	3	2	1
Mineral List	Mineral list is thorough and accurate	Mineral list is thorough and 1-2 inaccurate conclusions	Mineral list is not thorough and 1-3 inaccurate conclusions	Mineral list not thorough and more than 4 inaccurate conclusions
House Blueprints/Models (x2)	Blueprints are very detailed with all requirements met	Blueprints are detailed and all requirements are met	Blueprints are not detailed and 1-2 requirements are not met	Blueprints are not detailed and more than 3 requirements are not met
New List	Is very detailed and accurate	Detailed and 1-2 inaccurate conclusions	Is not detailed and 1-3 inaccurate conclusions	Is not detailed and more than 4 inaccurate conclusions
Sales Pitch	Creative and all requirements are met	Creative but 1-2 requirements are not met	Not creative and 1-2 requirements are not met	Not creative and more than 3 requirements are not met
Follow-Up Questions	Strong reasoning and provides ample support	Strong reasoning but provides no support	Weak reasoning and provides ample support	Weak reasoning and provides no support

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Purpose:

You will be investigating all the uses of minerals and mineral products that can be used in human civilization. You will then be creating a house made completely of minerals. Your house needs to be feasible and practical to the general home buyer.

Exploration:

Step 1:

In class, you will be contriving a list of all the minerals discussed in class. Your list needs to include:

- name of mineral
- chemical composition of mineral
- products made by this mineral
- general uses for this mineral

We will then be going to the computer lab to expand your list.

Step 2:

With your list of minerals and their products, you will need to design a house made completely of minerals. There can be no non-mineral materials used (ex. wood). You will need to write out all the minerals you decide to use and explain why you choose those particular minerals.

Step 3:

Next, you will make blueprints/models of your house, either by hand or computer generated. Your blueprints/models need to include:

- All aspects of the house
 - o Exterior (siding, utility box, etc.)
 - o Interior (walls, doors, flooring, carpets)
 - o The guts of the house (insulation, piping, plumbing, electrical work, framework)
 - o Roofing
 - o Heat/Air conditioning
 - o Ventilation ducts
 - o Any amenities
- There should be several views of the blueprints/model
 - o Top view for each floor
 - o North, south, east and west views
- Every aspect labeled properly with mineral and mineral product used

Step 4:

Create a new list that associates with your house. This list should now include:

- mineral name and properties
- general uses
- what was it used for

- why is it used
- cost of using
- reliability of using
- availability of minerals

Come up with a price on the house. Price range needs to be between \$150,000 and \$300,000. This price ranges needs to include both materials and labor. Keep this range in mind when creating your house.

Step 5:

Write a sales pitch for why your home should be bought. You may do this in any fashion; TV commercial, newspaper classified article, magazine advertisement, bill board, etc.

Include:

- price
- square footage
- why it should be bought
- amenities

Step 6:

Answer the following in your composition notebook.

- Explain if this is realistic or not and why.
- What problems did you come across in creating this house?
- Is this feasible in the given price range?

Evaluation:

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