6. Gypsum (calcium sulfate dihydrate or $CaSO_4 \cdot 2H_2O$)

Gypsum is a common sedimentary mineral that is the same chemically as anhydrite ($CaSO_4$) with the addition of water in its crystal structure. It forms in large deposits where ocean and other waters with a high content of sulfate and calcium were concentrated and dried up to deposit the sulfate and calcium. Gypsum is usually white but can be clear also. Its monoclinic crystal system (three unequal axes with two of them perpendicular to each other) makes it easy to break gypsum into flat sheets along one direction, similar to the mineral mica. There are large gypsum mines in West Texas.

You live surrounded by gypsum: it is ground up and used to make the drywall or sheetrock on the walls of your home and other buildings. It is used as a fertilizer and soil conditioner for agriculture. Plaster of Paris is made from gypsum and is used in surgical splints for broken bones and casting molds. Gypsum is a very soft mineral that you can scratch with your fingernail. Likewise, the sheetrock made from it on the walls is also easily scratched or dented.

Activities:

K-2: Gypsum is commonly used in sidewalk chalk because it is so soft. Take some sidewalk chalk and draw a picture of a monoclinic crystal on the sidewalk, driveway, or chalk board:

K-2: Can you find a dent or a scratch in the sheetrock in your home? Circle one: Yes No

Do you know how it happened? _____.
If you don't find dents and scratches, you do a good job treating it gently to keep it in good shape.

4-7: Gypsum is one of the softest minerals, rated at 2 on the Moh's hardness scale of 1 for the softest (talc) to 10 for the hardest (diamond). Collect a bar of soap, a penny, and a nail to demonstrate relative hardness testing by scratching something soft with something hard. Try to scratch the soap with the nail, then try to scratch the penny with the nail.

Was it easy to scratch the soap with the nail? Circle your answer: Yes No

Was it easier or harder to scratch the penny with the nail? Circle your answer: Easier Harder

6. Gypsum continued

8+: Find calcium on the periodic table of the elements. What is its element number? _____ How many protons are in each atom of calcium? _____ What else do you know about calcium from its position on the table? _____

_____.

9+: One way of identifying gypsum is by its crystal system shape. It crystalizes in the monoclinic crystal system, which has a parallelogram for one of the faces. The description of a monoclinic crystal is that it has three unequal axes with two of them perpendicular to each other. Draw the three axes for this monoclinic crystal: