Mineral Unit Framework

Keith Olive created this unit framework for his mineral unit. It illustrates how he scaffolds his instruction to build students’ understanding.
1. “The Hook”
   a. Show students gemstones.
   b. Explain their weight, “carat”, an ancient unit of weight from a seed.
   c. 1 gram = 5 carats.
   d. Give them prices for gems by the carat.
   e. Have them calculate the worth of the gems.
   f. Share where they can find and collect gems
   g. Share my collecting stories.

2. The Structure
   a. Review Atoms
   b. Electrons, Protons and Neutrons
   c. Ions electrically charged Atoms
   d. Ionic Bonds

3. Mineral Definition
   a. Naturally occurring inorganic solids with regular repeating patterns of packed ions.

4. Mineral Properties
   a. Luster-how light is reflected off a mineral. Metallic, Non-metallic light and non-metallic dark.
   b. Hardness-resistance to being scratched.
   c. Streak-the color of the powdered mineral on unglazed porcelain.
   d. Cleavage & Fracture-how a mineral breaks.
   e. Color-the least reliable property.
   f. Use the Mineral Identification PowerPoint for notes.

5. Crystals
   a. Have students build paper models of the different Crystal Systems from the GEMS book “Stories In Stone”.
   b. After building the models, have them join together models of the same system and explain that the single crystal represents the smallest atomic unit for that mineral and as the models get bigger, they resemble the mineral we can see.
   c. Show the potential for a clean break or a jagged break by pointing out how the edges line up or stagger on the models.
   d. Grow crystals with a solution of 20 Mule Team Borax and water. Use pipe cleaners suspended in the solution.
   e. Try to identify which crystal system the borax crystal is.
6. Mineral Identification Lab
   a. Groups of 3 work on 4 samples.
   c. Set up a competition between groups.
   d. Day 2 – 15 samples around the room, groups of 2.
   e. Day 4 individual Mineral identification of samples.

7. Assessments
   a. Informal & un-graded – groups of 2 and groups of 2
   b. Graded – individual performance lab and written exam over notes.

8. Extensions
   a. Bring in Jeweler from Dunbar Jewelers to show gems and Jewelry
   b. Mineral powders and Makeup night for Mothers and Daughters
   c. Making toothpaste in class from mineral powders.
   d. Teaching students to facet gems after school.

9. Vocabulary
   a. Atoms
   b. Ions
   c. Mineral
   d. Opaque
   e. Translucent
   f. Transparent
   g. Conchoidal
   h. Cleavage
   i. Fracture
   j. Streak
   k. Ionic Bond
   l. Inorganic
   m. Protons
   n. Neutrons
   o. Electrons
   p. Plane
   q. Crystal

10. Video Resources
    a. Gems of North America
    b. Splendid Stones