

Geoscience Lesson #1: The Rock Hammering Lesson

Topic: Gemology

Total Time: 50 minutes

Location: 323 Wallace (aka "the first year lab")

Required materials:

- Enough newspaper to cover the front two rows of tables to make cleanup easier
- Hammers and chisels (8)
- Magnifying lenses (4)
- Tweasers (4)
- Metal plates to hammer on so we don't damage the tables (8 is perfect, 4 is doable)
- Safety Glasses (15)
- A bunch of rocks with large crystals (garnet chlorite schist is the best for the kids, but variety is important)
- plastic rings/magnets (60/day)
- hot glue gun & glue (two sticks is enough)
- water bowl (for rapid glue cooling and cooling of my burnt fingertips)
- Paper towels (rock dust cleanup)

Class Setup:

- Move projectors out of the way
- Lay newspapers on the front tables
- Put metal plates on tables, along with hammers/chisels near the plates
- Safety glasses at the door
- Gluegun & supplies at front counter
- On the board:
 - 5 rules
 - Education requirements:
 - High School Graduation
 - Take Math, Physics, Chemistry, Geography
 - Go to University: U of Manitoba or Brandon University have geology programs
 - Many additional trades related to gemology available from trade schools
 - Job name: Gemologist
 - Some gem shapes on the board to refer to inside the lecture:
 - Poor, Good and Excellent examples of cubic, di-pyramidal, and hex prism crystals with varying levels of symmetry/defects
 - Examples showing the same crystals skewed in different ways

Before entering class (3 minutes):

- Quick lesson summary before class begins
- Review rules with kids in the hallway
- Give our safety glasses
- No hammering until I say they can begin
- Please be careful with the hammers
- Let them into the lab

Lecture section (15-20 minutes):

- *Warm up the gluegun!*
- Review rules
- Review education requirements

- Need math to understand angles, and similar relationships
- Need physics to understand the properties of the rocks and minerals, like Hardness or Density
- Need chem to understand the molecular structure of the minerals
- Need geography to be able to understand maps, and think about things in terms of their position and orientations
- But, you don't really need to know the human geography portions, like history, etc.
- What is Geoscience?:
 - Geology, Geophysics, Earth Physics, Geological Engineering, Gemology and more!
 - Study of the Solid Earth and its processes -- basically, rocks and minerals
 - One of the two main suppliers of raw materials for the world. "If it can't be grown, it has to be mined."
 - Isn't looking at rocks boring? "Well, I hope to show how it can be interesting."
- Why Study Geoscience?:
 - Jobs/Money
 - Social Good: powers the economy
 - Like to travel
- What is Gemology?:
 - A subset of mineralogy and crystallography: The study of gemstones
 - Gems come from crystals which come from rocks
 - Some crystals are 'precious'
 - Ask class: "Does anyone know what their birthstone is?"
 - Talk about birthstones being semi-precious (like garnets) to precious (diamonds, alexandrite)
 - inform them that we won't be finding any precious gems today, except garnets perhaps, which are cool but not worth much
- What makes a good gem?:
 - Ask question to class: "What makes a good gem". Talk about shape, colour, lustre, size, durability, rarity.
 - Ask the class about various shapes of gems that would be better for a ring vs. a pendant
 - Long and skinny would be acceptable for a pendant but not a ring
- Where do gems come from?:
 - All rocks are made up of crystals - gems are just exceptional crystals
 - In order to find gems (without buying them from a store), we need to go look at rocks
 - Gems are usually chiseled from broken rocks
 - They are then cut and polished, and sold for a fortune

Activity (20 minutes):

- Inform them that they will have an easier time getting the crystals out if they hammer lightly and use the chisel
- Have kids select a rock from the container that they would like to extract a crystal from
- Have them take turns hammering or hammer+chiseling the crystals from the rocks
 - Kids will initially have a hard time, but over 20 minutes, each kid can usually succeed
 - Have group leaders/junior staff help kids where appropriate
- As they get their crystal, have them bring it up to the front to be 'appraised'
- Have them select a ring (or magnet, depending on availability of supplies) to glue

- their crystal to
- If they are done early, or are getting bored, talk to them about some of the more interesting crystals in the container: Halite (salt) is always a hit if you get them to check if it's halite by licking the rock
 - If the whole group is done early, have them look for some more interesting crystals to take home (but not glue)
 - *ONLY ONE RING PER STUDENT* otherwise they all want more than one

Teardown after class (7 minutes):

- Have kids return larger rocks to the container, and discard the small stuff
- *Unplug the gluegun*
- Review the education requirements, and the job description
- Talk about next week's lesson (Mapping, plus a chance to look at some new, precious crystals)

Teardown (end of day):

- Dump newspapers into garbage can, and wash tables down with wet paper towels
- Erase board
- Replace projectors