

Student Worksheet

Answer Key & Notes to Educator

STOP 1 Read the introductory panel to the hall

What are two characteristics of the ideal gem?

Answers: (1) hard enough to resist scratching

(2) durable enough to resist breaking

STOP 2 Explore the “Rough and Cut” case

Learn about how people transform rough mineral crystals into cut and polished mineral crystals we call gems.

STOP 3 Find the case that features your birthstone

First, review the list below to identify your birthstone. (If the name of a gem is different from the name of its mineral it was fashioned from, the mineral’s name is listed in parenthesis.) Then, look for the case in the Hall of Gems that features your birthstone gem/mineral.

- | | | |
|------------------------------------------------------|-----------------------------------------------------|---------------------------------------------------------|
| <input type="checkbox"/> January: garnet | <input type="checkbox"/> May: emerald (beryl) | <input type="checkbox"/> September: sapphire (corundum) |
| <input type="checkbox"/> February: amethyst (quartz) | <input type="checkbox"/> June: moonstone (feldspar) | <input type="checkbox"/> October: tourmaline |
| <input type="checkbox"/> March: aquamarine (beryl) | <input type="checkbox"/> July: ruby (corundum) | <input type="checkbox"/> November: citrine (quartz) |
| <input type="checkbox"/> April: diamond | <input type="checkbox"/> August: peridot (olivine) | <input type="checkbox"/> December: zircon |

Observe the gems and describe them (e.g. size, color, shape).

Answers will vary

Observe the rough crystals in the same case (e.g. color, shape). How do the minerals compare to the gems?

Answers will vary, but in general students should notice that the rough crystals are less polished and have irregular shapes.

STOP 4 Find the periodic table interactive

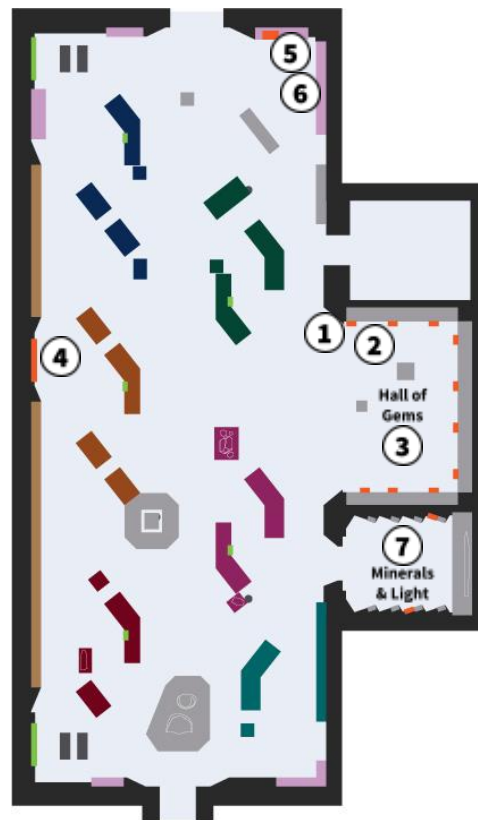
Make minerals by combining atoms of different elements. What do you notice about the atoms that bond together, and those that don’t?

Answers will vary

STOP 5 Go to the “What Causes Mineral Properties?” case

Observe the different types of bonds and compare the diamond and graphite specimens and models. How does the strength of a bond impact a mineral?

Answers may include: bonds impact a mineral’s hardness, strength, durability



STOP 6 Explore the “Physical Properties” case

Examine this physical property	What does this property tell you about a mineral’s strength or bond arrangement?	How does this property help determine if a mineral should be made into a gem?
Cleavage/Fracture	<i>Answers will vary</i>	<i>Answers will vary</i>
Hardness	<i>Answers will vary</i>	<i>Answers will vary</i>

STOP 7 Go into the “Minerals and Light” room to explore the optical properties of gems

Explore these four cases. Write and/or draw about one way the interaction of light is important to gems.

<p>What Causes Color?</p> <p><i>Answers may include: When you shine a light on an object, it absorbs, reflects, and returns certain wavelengths of visible light. Our eyes see the returned wavelengths as color. The variety, hue, and richness of a gem’s color is an important factor in assessing its value.</i></p>	<p>Why Do We Cut and Shape Gems?</p> <p><i>Answers may include: The cuts and shapes of gems amplify their innate beauty and increase their value. Transparent gems are generally faceted so that light reflects from the gem’s interior back to the viewer.</i></p>
<p>How Does Light Pass Through Gems?</p> <p><i>Answers may include: The ability of minerals to transmit light helps gems shine. Light travels through transparent minerals and reflects off facets, making them sparkle. Light traveling through transparent materials remains mostly unchanged, as if through a window.</i></p>	<p>What Makes a Gem Sparkle?</p> <p><i>Answers may include: A gem’s brilliance comes from its capacity to bend, or refract light. Some gems show strong dispersion, the effect of light splitting into individual wavelengths of color as it refracts inside a gem.</i></p>

STOP 8 Revisit your birthstone case in the Hall of Gems (from Stop 3)

In this case, find your birthstone’s data chart. Record its chemical composition, hardness, and cleavage/fracture information.

Answers will vary

Pick a gem and draw it:

Why is the mineral that this birthstone was fashioned from suitable to be used as a gem? Infer using your observations and what you’ve learned in previous stops; be sure to discuss both its physical and optical properties.

Answers may include: this mineral is hard enough to resist scratching

and it’s durable enough to resist breaking
