\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_’s Mineral Notes (Lesson 1)

1. What do minerals have in common?
	1. Not all minerals are sparkling gems, but they all have certain characteristics in common.
	2. A **mineral** is a naturally occurring, inorganic solid with a definite crystalline structure and chemical composition.
	3. All minerals contain one or more **elements**,which are pure substances that cannot be broken down into simpler substances by chemical means.
	4. Each element is made up of one kind of **atom**, the building block of matter.
	5. Stable particles that are made up of strongly bonded atoms are called *molecules*.
	6. A substance made up of molecules of two or more elements is called a **compound**.
	7. The chemical composition of a mineral is determined by the element or compound that makes up the mineral.
	8. A mineral composed of only one element is called a *native element*.
	9. In the mineral quartz, each silicon atom forms a bond with up to four oxygen atoms.
	10. **Matter** is anything that has mass and volume.
	11. *Volume* refers to the amount of space something takes up.
	12. All minerals are solid, meaning each has a definite volume and shape.
	13. All minerals are inorganic, which means they are not produced by living things or from the remains of living things.
	14. All minerals are naturally occurring.
	15. All minerals form **crystals**,which are solid geometric forms produced by a repeating pattern of atoms or molecules.
2. How are minerals formed?
	1. The type of mineral that forms depends on the elements present in the area and the temperature and pressure.
	2. Many minerals form from magma, which is molten rock inside Earth. As magma cools, the atoms join together to form different minerals.
	3. Minerals also form from lava, which is molten rock that has reached Earth’s surface.
	4. Many minerals form by metamorphism.
	5. High temperature and pressure within Earth cause new minerals to form as bonds between atoms break and reform with different atoms.
	6. Minerals also form from solutions.
	7. Water usually has substances dissolved in it. As it evaporates, these substances form into solids and come out of solution, or *precipitate.*
	8. As hot water cools, dissolved substances may precipitate out of solution.
3. How are minerals classified?
	1. Minerals are usually classified based on their chemical composition as silicate or nonsilicate minerals.
	2. Most common minerals are *silicate minerals*, containing a combination of silicon and oxygen.
	3. Most silicate minerals are formed from *silicate tetrahedrons*, each made of one silicon atom bonded to four oxygen atoms.
	4. *Nonsilicate minerals* are minerals that do not contain the silicate tetrahedron building block.
	5. Groups of nonsilicate minerals include native elements, halides, sulfates, carbonates, oxides, and sulfides.
4. What properties can be used to identify minerals?
	1. Color is helpful, but not the best way to identify a mineral.
	2. The color of the powdered form of a mineral is its **streak**, found by rubbing it against a white tile *streak plate*.
	3. The way a surface reflects light is called **luster**. Two major types of luster are metallic and nonmetallic.
	4. The tendency of a mineral to split along specific planes of weakness to form smooth, flat surfaces is called **cleavage**.
	5. A mineral with cleavage breaks along flat surfaces that generally run parallel to planes of weakness in the crystal structure.
	6. Minerals that don’t have cleavage will fracture, or break unevenly, along curved or jagged surfaces.
	7. *Density,* which is the amount of matter in a given amount of space, can be used to tell many similar-looking minerals apart.
	8. A mineral’s resistance to being scratched is called its *hardness*. Mineral hardness is compared using the Mohs hardness scale.
	9. A few minerals exhibit special properties such as magnetism.
5. Made from Minerals
	1. Many useful substances come from minerals.
	2. The metal titanium comes from several minerals, including rutile.
	3. Titanium is very valuable because it resists corrosion and is as strong as steel, but is much lighter than steel.