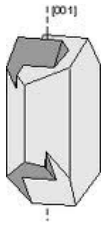
Taxonomic Key to the Silicate Minerals 2012

I. <u>Framework</u> <u>Structure</u> (Boxes 1 – 4, 17 – 19 and FT-A)

1. a) Mineral is **gray** or **white** – **go to 4**
   b) Mineral is **<u>not</u> gray** or **white** – **go to 2**
2. a) Mineral is **blue** or **blue-green** – **go to 5**
   b) Mineral is **<u>not</u> blue** or **blue-green** – **go to 3**
3. a) Mineral is **salmon-pink** (peach) with **2 directions** of **cleavage** at right angles (2⊥) – **<u>Orthoclase</u> <u>Feldspar</u>** (or **<u>K-Spar</u>**); very common in **granite**
   b) Mineral is a mixture of **pinkish-brown** and **white** crystals with **iridescent bronze-gold flashes** – **<u>Oligoglase</u> <u>Feldspar</u>** (polished specimens are called **<u>Sunstone</u>**); flashes are caused by imbedded mica inclusions.
4. a) Mineral is **light gray** (almost **white**) with 2 ⊥ cleavage – **<u>Albite</u>** (or **<u>Na-Spar</u>**); cleavage faces may show fine parallel lines called **striations**
   b) Mineral occurs as **radial crystals** (✳) in **black volcanic glass** – **<u>Snowflake</u> <u>Obsidian</u>** ("Snowflakes" are **radial** crystals of **albite feldspar**.)
   c) Mineral is **pure white** with a pale **luminous** (moon-like) **glow** on polished round surfaces – **<u>Moonstone</u>**
   d) Mineral is **dark gray** to **black** with 2 ⊥ cleavage and **iridescent** flashes of **blue** and **green** – **<u>Labradorite</u> <u>Feldspar</u>** (or **<u>Ca-Spar</u>**)
5. a) Mineral is **sea**-monoclinic crystal – **<u>Amazonite</u>** (semi-gem variety of **<u>K-Spar</u>**) ←
   b) Mineral is **dark blue** with **white veins** running throughout - **<u>Sodalite</u>**; **6-directions** of **cleavage** creates cleavage faces at unusual angles
   c) Mineral is **deep-sea blue** – **<u>Lapiz</u> <u>lazuli</u>** ; often has bright golden flecks of **pyrite** or **gold**; usually found in polished nuggets



II. <u>Sheet</u> <u>Structure</u> (Boxes 5 - 7, and 20 - 21)

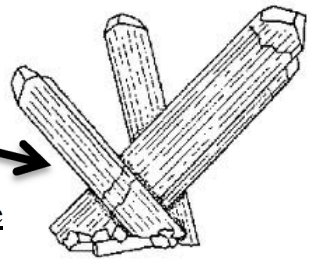
1. a) Mineral **splits** into **thin, flexible sheets** – **go to 3**
   b) Mineral **does not show thin, flexible sheets** – **go to 2**
2. a) Mineral is **creamy tan or off-white; dull luster, soft – <u>Kaolinite</u>**; earthy or conchoidal fracture; **sticks to tongue when licked** (made of fine powdered **clay**); used in ceramics, dinner plates, etc.
   b) Mineral is **very soft (H = 1)** with **waxy** or **pearly luster** and **soapy feel** – **<u>Talc</u>**; may be gray, white, pink or pale green
   c) Mineral has **silky luster** and **splintery fracture**; peels into soft greenish-gold **fibers** – **<u>Chrysotile</u> <u>Asbestos</u>;** causes **asbestosis** (lung disease) & **lung cancer** with **prolonged exposure**
3. a) Mineral is **black** with **pearly luster** and **golden** highlights and **1 perfect directions** of **cleavage** – **<u>Biotite</u> <u>Mica</u>**
   b) Mineral is **silvery-white** or **greenish-silver** with **pearly luster** and **silver** highlights and **1 perfect directions** of **cleavage** – **<u>Muscovite</u> <u>Mica</u>**
   c) Mineral is **pink** or **pale violet** with **pearly luster** and **1 perfect directions** of **cleavage** – **<u>Lepidolite</u> <u>Mica</u>**
   d) Mineral is **dark green** with **pearly luster** and **1 perfect directions** of **cleavage** – **<u>Chlorite</u> <u>Mica</u>**

III. <u>Chain</u> <u>Structure</u> (Boxes 8 - 11, and 22 – 23 and FT-B)

1. a) It forms **slender fibers** - **go to 6**
   b) It does **<u>not</u> form fibers** - **go to 2**
2. a) It is **dark green** or **black** - go to **4**
   b) It is **<u>not</u> green** or **black** - go to **3**
3. a) It forms **dull gray blocky crystals** - **<u>Diopside</u>**; often found with pale yellow calcite crystals
   b) It is **bright blue-green** with **dull luster** - **<u>Chrysacolla</u>**; **brittle** and **crumbly**; may be found with azurite and malachite
   c) It is **snowy white** with **light gray splotches** - **<u>Wollastonite</u>**; often found with tiny **red** and **green garnets** imbedded (looks like "dirty snow")
4. a) It shows **2 poor directions** of cleavage - **go to 5**
   b) It forms **dark green**, massive, **heavy** fragments - **<u>Jade</u>** (**Jadeite / Nephrite**); often cut & polished
5. a) It forms **black crystals** with **poor cleavage** at **124^{o} angle** () - **<u>Hornblende</u>**; may have some black **biotite flakes** on pitted surface.
   b) It forms **greenish-black** crystals with **93^{o} cleavage angles** () - **<u>Augite</u>**;
6. a) It forms white, silky radial fans of fibers - **<u>Pectolite</u>**
   b) It forms **long**, **slender green fibers** - **<u>Actinolite</u>**; fibers give actinolite **splintery fracture** and **silky luster** (longer fibers are somewhat dull compared to asbestos)

IV. Ring Structure

1. a) It forms **hexagonal** or **trigonal** crystals with **distinct striations** - **go to 2**
   b) If forms **bright green** or **bright blue hexagonal** crystals - **go to 3**
2. a) It is **black** with a **rounded triangular cross-section** - **<u>Tourmaline</u>**;
   b) It is **green** and **pink** - **<u>Watermelon Tourmaline</u>**
3. a) It forms **light blue-green barrel-shaped hexagonal** crystals - **<u>Aquamarine</u>** (often found with quartz or K-spar in **pegmatites**)
   b) It forms **deep green barrel-shaped hexagonal** crystals - **<u>Emerald</u>**; also found in **pegmatites**



V. Independent Tetrahedra

1. a) It forms crystals with **distinct faces** - **go to 3**
   b) **Crystal faces** are **<u>not</u> distinct** - **go to 2**
2. a) It has a mixture of **olive-green** and **dark green glassy granules** - **<u>Olivine</u>**; crumbly usually has a weathered outer surface and often has a **coating** of dark **basalt** lava
   b) It forms **sky-blue bladed** crystals - **<u>Kyanite</u>**; **softer along grain** of cleavage face **than across** it, **1 good cleavage** face and **splintery** fracture
   c) It has a mixture of **pistachio-green massive** crystals in a **brown rock** matrix - **<u>Epidote</u>**
3. a) It forms **reddish-brown**, **pale green** or **pink dodecahedral** crystals (**12-sided**) – **<u>Garnet</u>**; ( - shaped **faces**); heavy heft for a glassy mineral
   b) It forms **white**, **golden yellow** or **smoky brown orthorhombic** crystals - **<u>Topaz</u>**; **Basal cleavage** causes crystals to **snap off** with **flat** diamond-shaped () **bases**; **Golden yellow** variety is called **<u>Imperial Topaz</u>** - **striations run length** of the crystal **Basal cleavage** may also cause **round topaz nuggets** to form **flat**, **hard**, **clear disks**
   c) It forms **tiny**, **dark green** crystals with distinct, glassy **facets** - **<u>Epidote</u>**; crystals are often found **coating** the **surface** of a rock such as **limestone**, **granite** or **calcite**