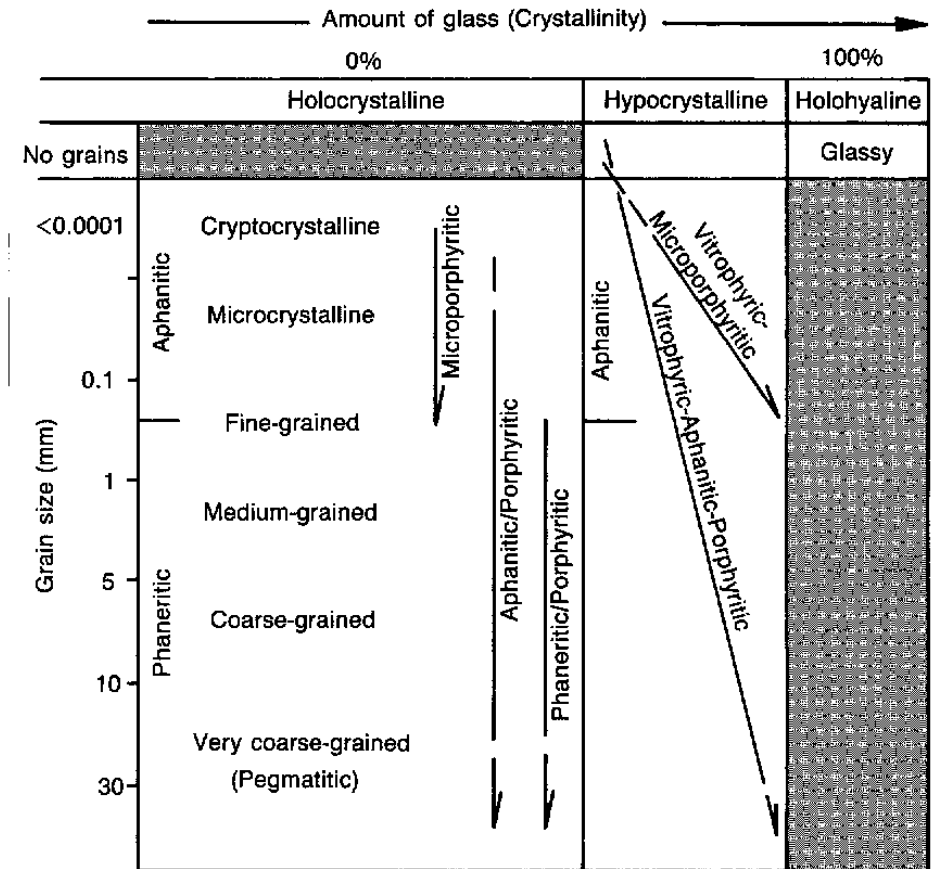


Figure 1

Igneous rock textures plotted in terms of crystallinity and grain size. Arrows indicate a range of grain sizes within a single rock.



Mineralogy

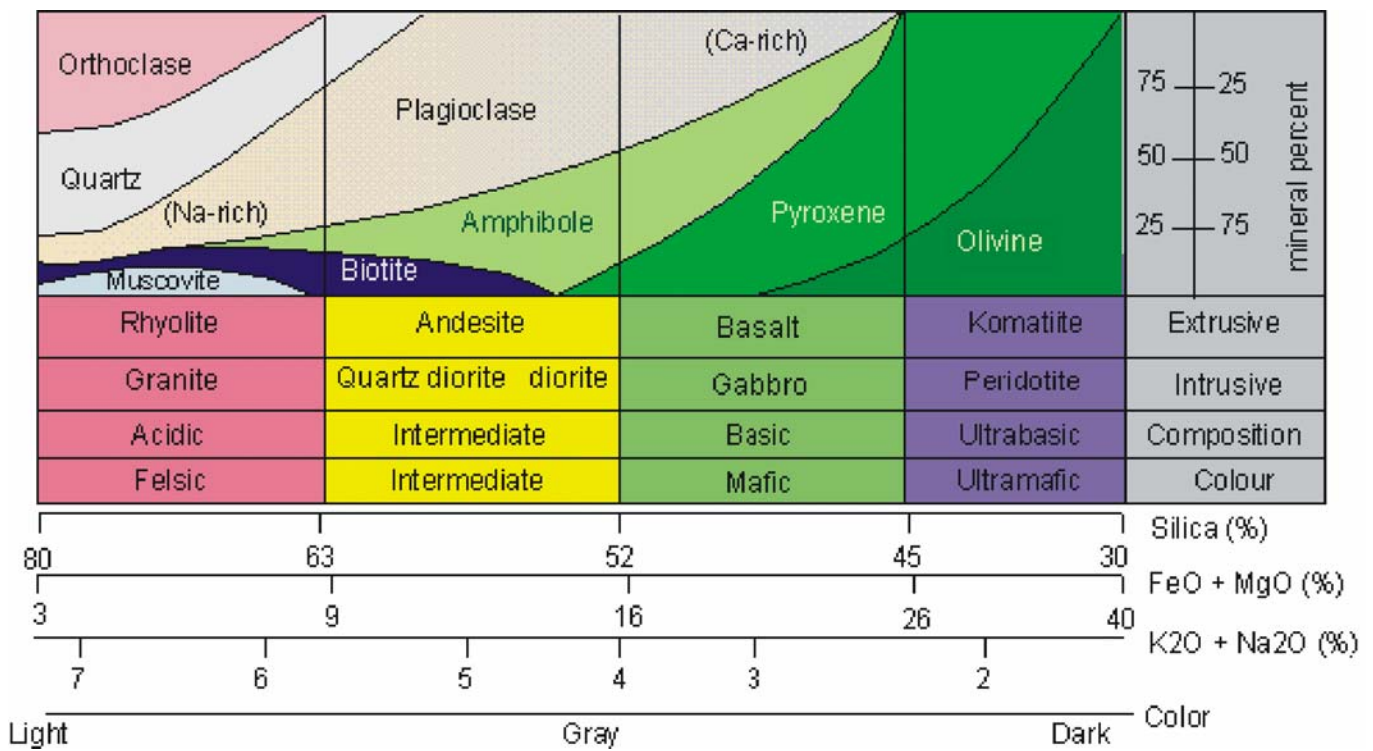
The classification of igneous rocks on the basis of mineral composition is dependant on the **Primary Minerals** (igneous, not alteration) that are present (see Figure 2). Also present are **accessory minerals** (which occur in proportions of 5% or more) which may be used to define more specialized names (we are **not** concerned with these myriad of goofy names such as olpybinemelite, leeuwfonteinite, bogusite... just made this up!!, etc, etc!!) and minor accessory minerals (minerals that occur in abundance of <math><5\%</math>).

We will divide igneous rocks into two broad groups: **1) Feldspathic rocks**: in which quartz, feldspar, and/or feldspathoids are the main minerals, and **2) Ferro-magnesian rocks** in which olivines, pyroxene, amphibole, and dark mica are the main mineral components. For our purposes we may use the concept of “**color index**” (CI) to distinguish these two main mineralogical rock groups. Color index refers to the proportion (0 to 100) of ferro-magnesian minerals (listed above) present, basically the proportion of dark minerals present in an igneous rock. This determination is a lot easier in phaneritic rocks than in volcanic rocks! A CI of 0-89 is a feldspathic rock; a color index of 90-100 is a ferro-magnesian rock. A more detailed classification of rocks on the basis of CI is as follows:

	“Granitoids”	“Gabbroids/Dioritoids”	“Ultramafics”	
CI 0-5 →	hololeucocratic	CI 35-65 →	mesocratic	
CI 5-35 →	leucocratic	CI 65-90 →	melanocratic	
			CI 90-100 →	ultramafic

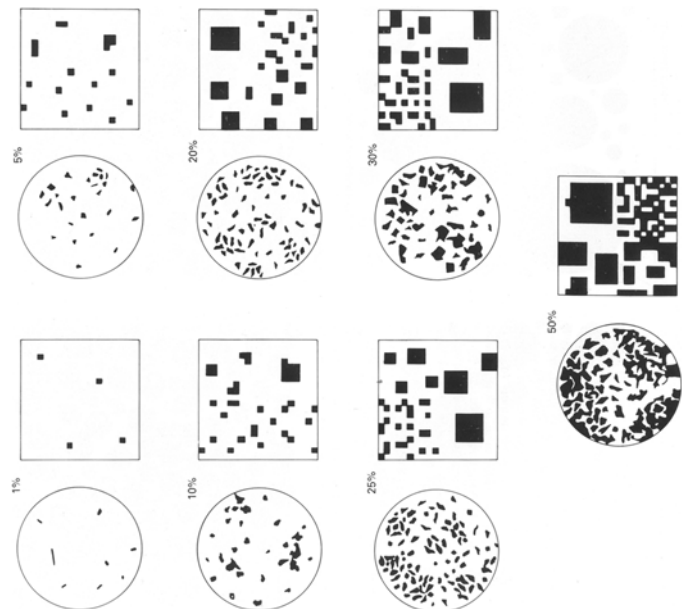
Typically “Granitoids” are described as leucocratic to hololeucocratic rocks; “Dioritoids” as mesocratic; “Gabbroids” as melanocratic, and then the ultramafic rocks (see the various more complex classification diagrams that follow, Figure 4 through 7).

Figure 2 from: UBC Petrology WWW site:
http://www.eos.ubc.ca/courses/eosc221/rock_cycle/igneousrx.html



To the right is a percentage estimation chart that you can use to estimate relative proportions of minerals in rock samples.

Figure 3



Percentage estimation comparison charts (from Folk et al., 1970). This chart combines the visual comparator of Terry & Chilingar (1955) with computer-generated visual comparators.

Classification: Igneous Phanerites

There are millions (well not quite) of rock names, so we will try to keep it simple through the use 1) a texture, 2) a color index (in approximate %), and 3) a rock name on the basis of approximate primary mineral composition as shown in the following classification diagrams.

A general presentation of igneous phanerite classification schemes (Figure 4) and three more detailed classification diagrams (Figures 5, 6 and 7) refer to “granotoids” (figure 5), “gabbroids” (Figure 6), and ultramafic (Figure 7) intrusive phanerites. You may not be able to determine the “specific” rock names for your unknowns to this degree of discrimination without the aid of a petrographic microscope. Use color index to determine which of these three charts to use then take a stab at essential mineral composition.

Figure 4 (from <http://www.eos.ubc.ca/courses/eosc221/igneous/intru/genphan.html>)

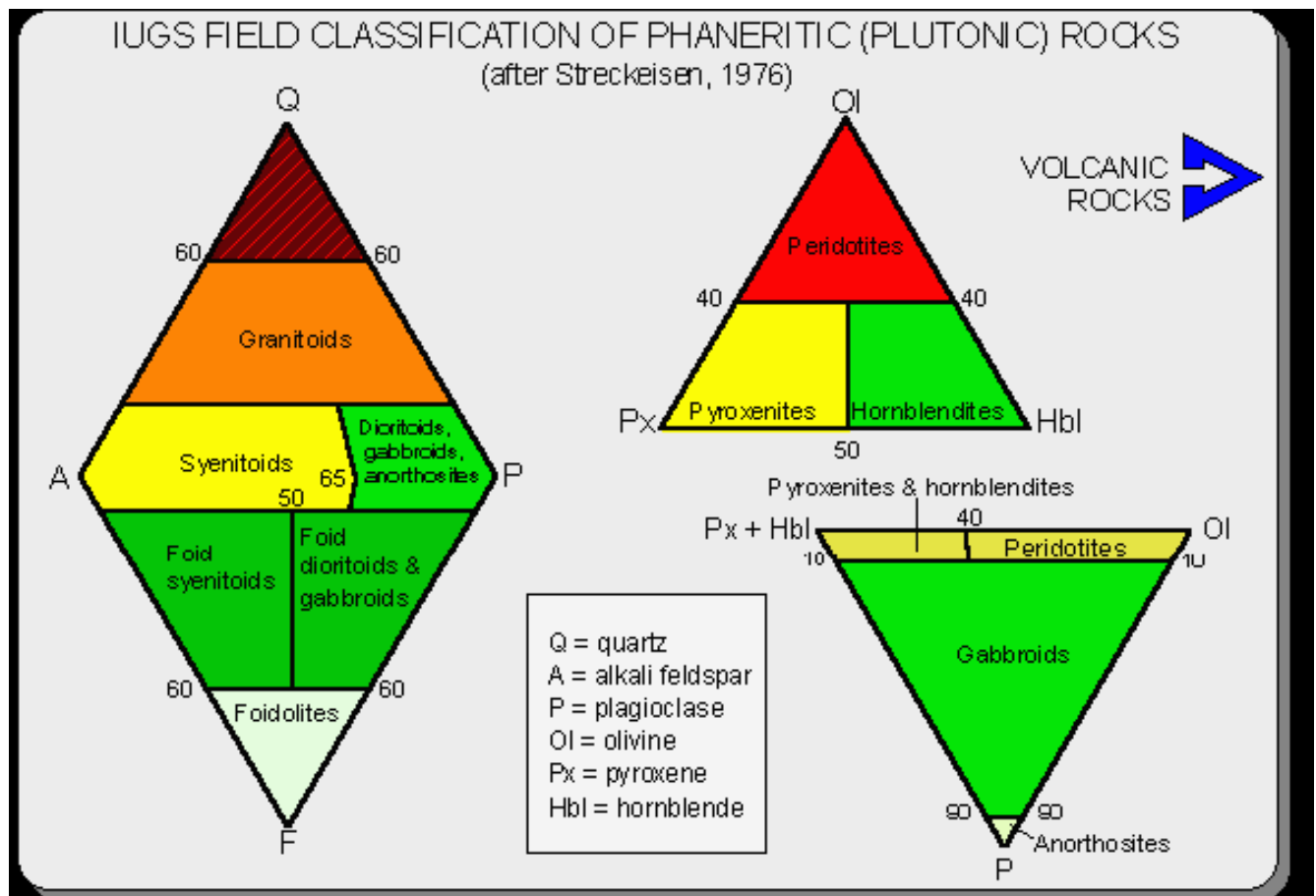


Figure 5 (CI=0~35%) from: <http://www.eos.ubc.ca/courses/eosc221/igneous/intru/feldphan.html>

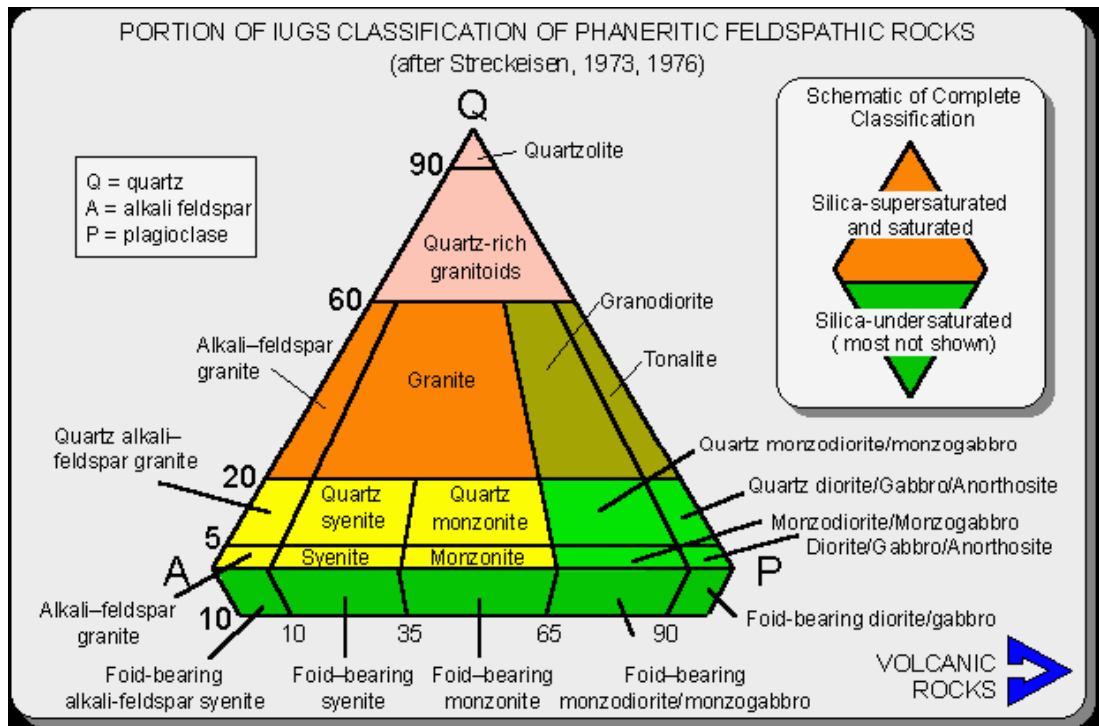


Figure 6 (CI= 35~90%)

IUGS classifications of gabbroic rocks. (a) For rocks composed of plagioclase, pyroxene, and olivine. (b) For rocks composed of plagioclase, orthopyroxene, and clinopyroxene. (c) For rocks composed of plagioclase, pyroxene, and hornblende.
(From Streckeisen, 1976)

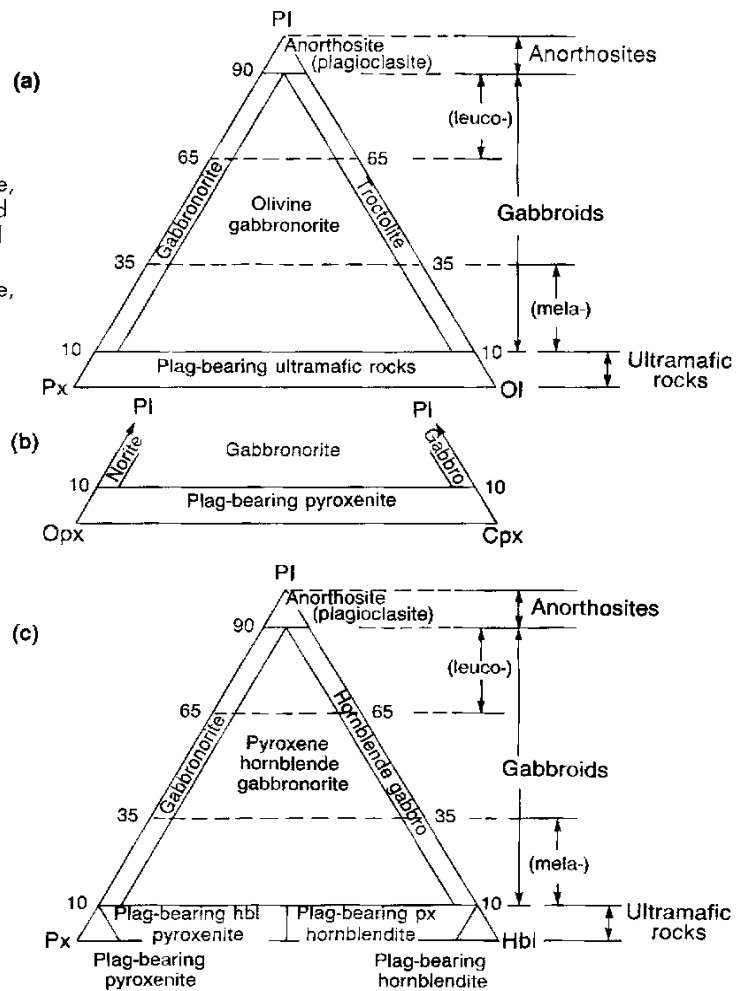
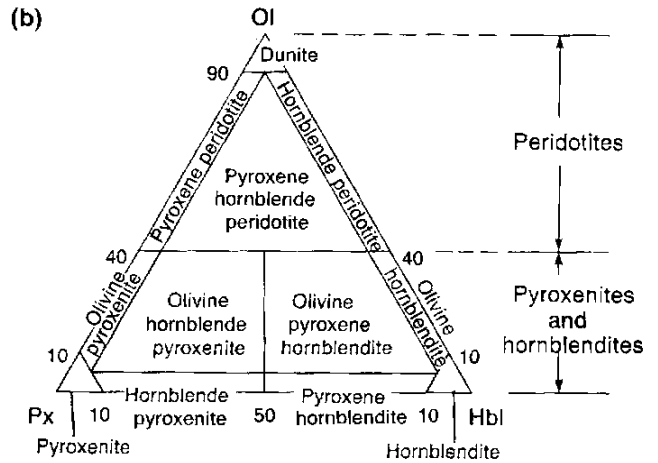
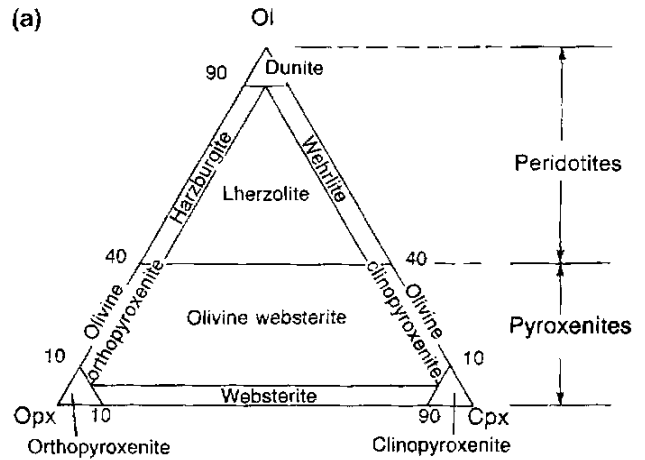
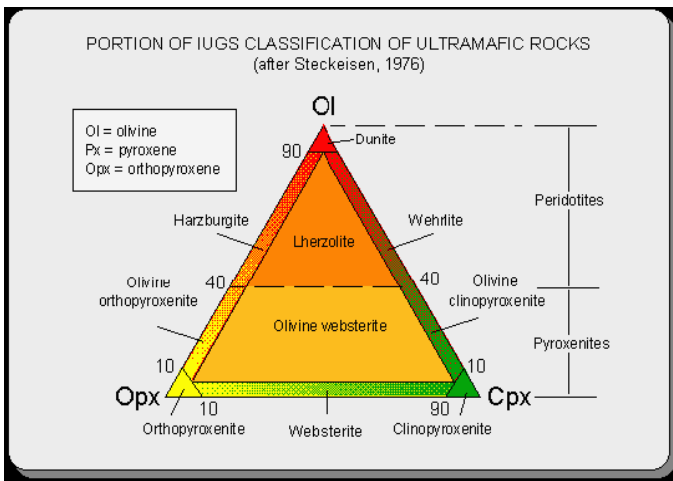


Figure 7a and b (CI=>90%)

IUGS classification of ultramafic (phaneritic ferromagnesian) rocks. (a) For rocks with olivine and two pyroxenes. (b) For rocks with hornblende, olivine, and pyroxene. Ol = olivine, Opx = orthopyroxene, Cpx = clinopyroxene, Px = pyroxenes, Hbl = hornblende.
(From Streckeisen, 1976)



from:

<http://www.eos.ubc.ca/courses/eosc221/igneous/intru/ultphan.html>