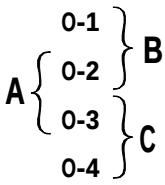
Keys and Decision Trees

A Key is a device for identifying objects based on their properties. It usually divides the objects up into groups based on their overlapping properties. The key works because each object has different combinations of properties.

For example, objects O-1, O-2, O-3, and O-4 have properties A, B, and C. O-1 has only B, O-2 has B+A, and so on. Or, property C divides the four objects into 2 groups, those with and those without. The main mineral keys work this way.



A dichotomous key, or decision tree, is one in which there are a series of question that have only two answers, often Yes or No. For each question you find the correct answer, and that leads you to the next question. At the end, if all the questions have been answered correctly, you have the correct identification.

Dichotomous keys are good for learning how to observe and make decisions. Their downside is that some minerals are best identified through a combination of two or three physical properties that may not include characteristics in the key, and a dichotomous key does not do that well.

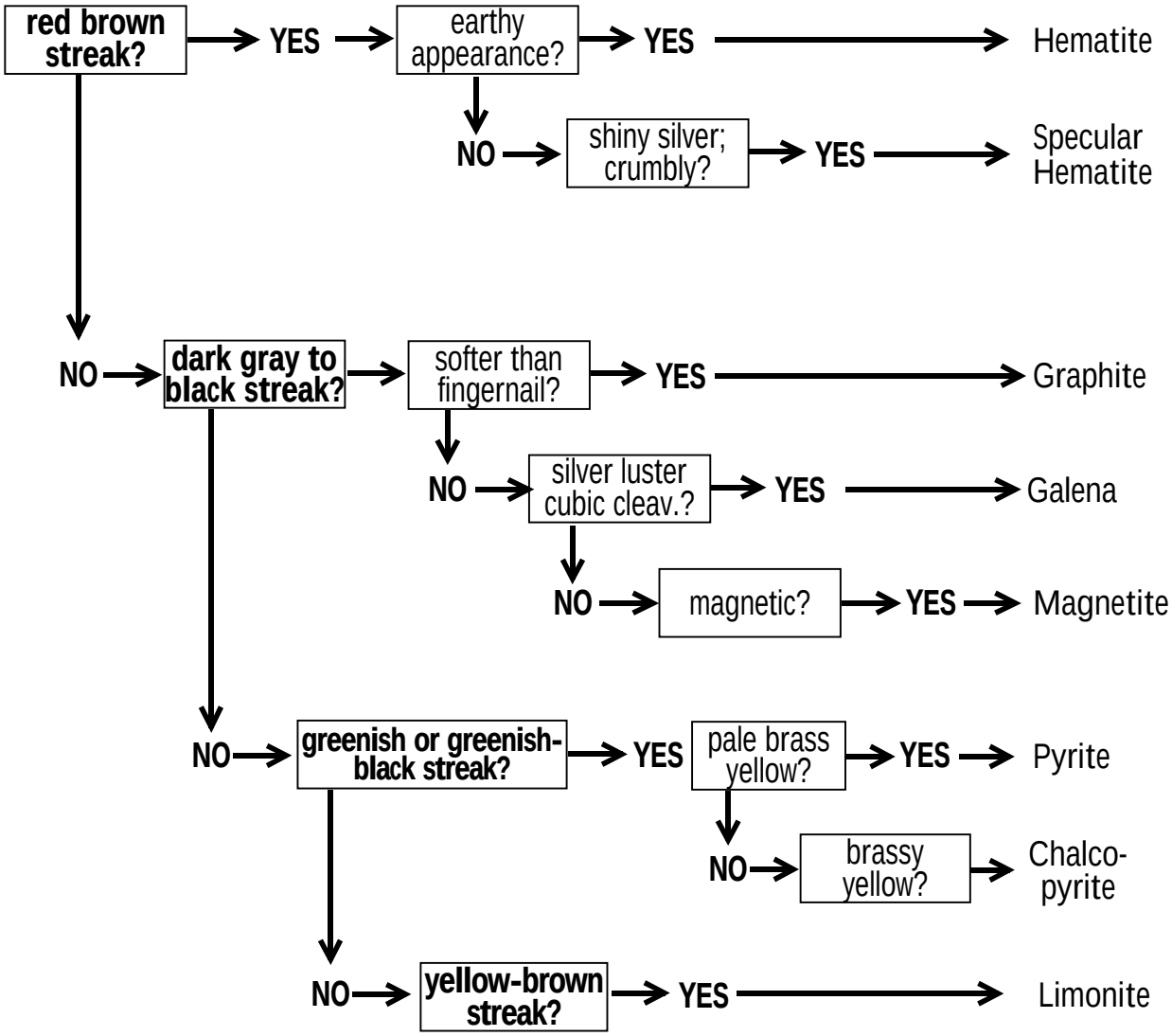
However, once the physical properties are recognizable, and the process of making decisions honed, then the more elaborate keys become very efficient tools for identifying minerals. The more elaborate keys allow you to look for more than one property at the same time, or to look at two or three properties independently first before making a decision.

One pedagogic use for decision trees is to have students make up their own for specimens that are giving them trouble, or that are similar in superficial appearance, but can be separated with the right physical properties.

Streak

Metallic Mineral
Dichotomous Identification Key

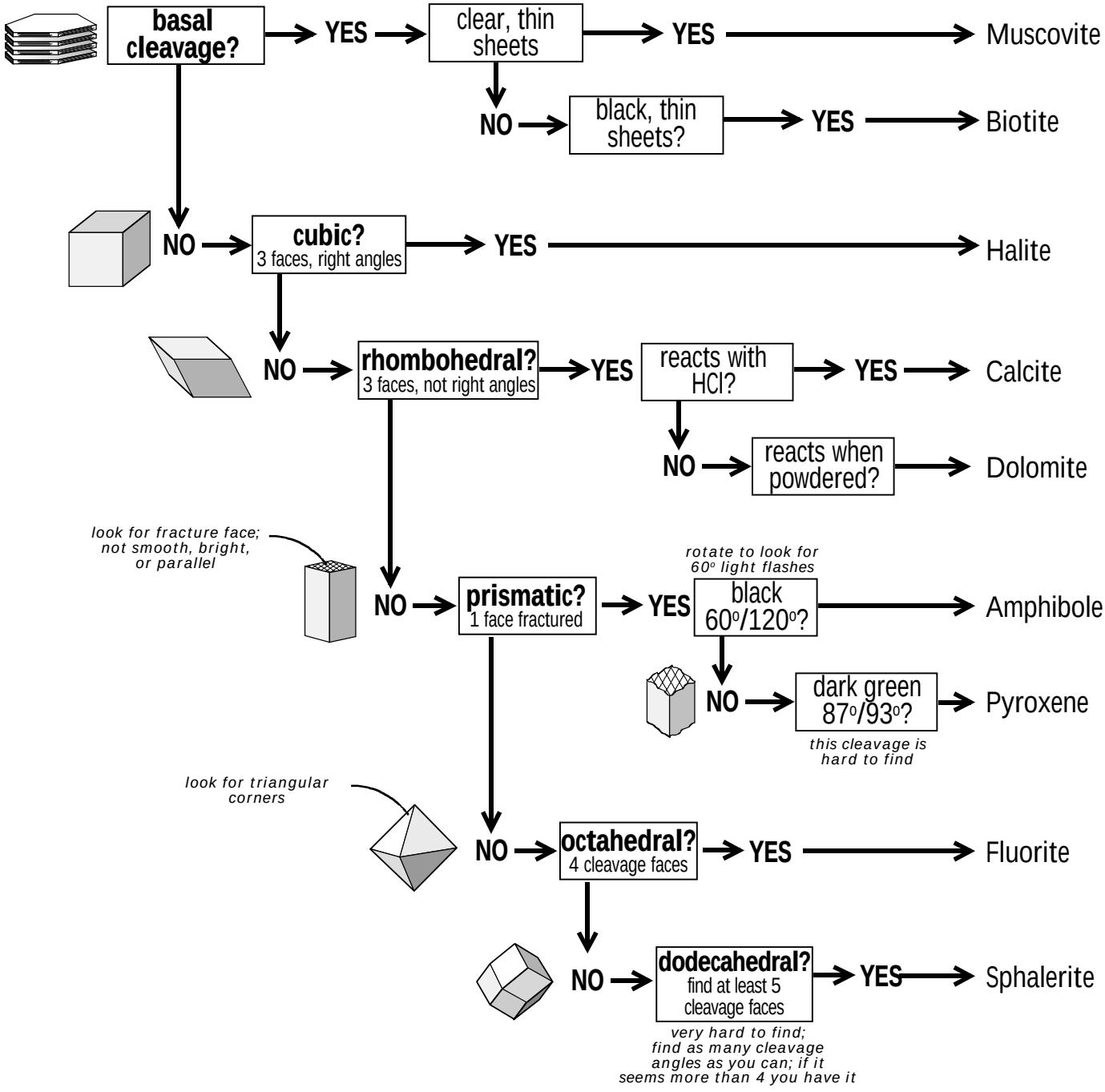
One of the more common physical properties used is streak - although it applies only to metallic luster minerals. This key uses streak in its primary decisions, and is designed to help someone become familiar with the different streaks. Observe that a mineral's streak is often markedly different from its color.



Cleavage

Dichotomous Identification Key

Cleavage is a prominent physical property, important in identification. Problem is, some types of cleavages are hard to detect, especially on poor specimens. This key begins with the clearest, most obvious, most easily seen cleavage types, and progresses to the more difficult. One good thing is that the more difficult cleavages are often found in only 1 mineral, which is distinctive on other properties.



Igneous Rock Forming Mineral
Dichotomous Identification Key