Metals, Metalloids, and Nonmetals

1)   What's the difference between a chemical and a physical property? Give two examples of each and explain how they are different.

2)   Give four properties that are generally present in metals.

3)   If steel (a metal) is hard and granite (a nonmetal) is hard, why don't we make automobile engines out of granite?

4)   What are metalloids used for, and how does this affect modern technology?

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Answer Key

1) What's the difference between a chemical and a physical property? Give two examples of each and explain how they are different.
Chemical properties can only be tested by doing a chemical reaction, while physical properties don't require making a chemical change. Examples of chemical properties are flammability, acidity, basicity, corrosion resistance, reactivity with water (or anything else), smell and taste (though these are debatable), and toxicity. Physical properties include color, shape, texture, melting and boiling point, density, mass, tensile strength, and brittleness.

2) Give four properties that are generally present in metals.
Metals generally have the following properties:
- **They are malleable (can be made into sheets)**
- **They are ductile (can be made into wires)**
- **They conduct electricity**
- **They conduct heat and have low specific heat capacity**
- **They are shiny**
- **They react with acids and oxygen**

3) If steel (a metal) is hard and granite (a nonmetal) is hard, why don't we make automobile engines out of granite?
Although the property of "hardness" is similar for steel and granite, other properties aren't as desirable for manufacturing automobile engines. For example, the low heat conduction of rocks make them explode under high temperature. They are also brittle, making them poor for use in engine blocks.

4) What are metalloids used for, and how does this affect modern technology?
Metalloids are used in the fabrication of computer chips. Because they only conduct electricity under some conditions, they are good for making electronic switches.