

Worksheet on the Important Use of GOLD

Gold was among the earliest metals discovered it occurs in Octahedral crystals, but is also found as flakes, thin wires, and plates. From the beginning, it was prized for its beauty and its rarity and came to be a sign of wealth. it was used to make coins and bars which, like money today, could be used to buy things.

The ancient Egyptians were among the earliest peoples to develop goldsmithing as an art, making jewelry and other beautiful objects from the minerals. They used solid gold, beating, and pounding it to the shape they wanted it. Gold is easily worked since it has the hardness of only 2.5.

Early in America, gold was mined for decorative uses. The Incas writer Garcilaso de la Vega, writing in the early 17th century, described the Temple of the Sun at Cusco; “The four walls were hung with plaques of gold, from the top to bottom, and a likeness was made of a gold plaque twice as thick as those that paneled the walls... the whole thing was so immense that it occupied the entire back of the temple...”

Gold can be found in most parts of the world, but it is often difficult to separate it from the other minerals, like quartz, where it is found. Frequently a ton or more of rock will yield only a few dollars’ worth of pure gold. When gold is found on the surface of the ground, it is usually in slow flowing parts of rivers, dropped because of its weight after being uncovered by erosion and washed downhill by the rapidly moving water. These are called Placer deposits. It was this visible gold that began the famous gold rush in the western United States and in Australia. When gold is found in quartz veins, it is separated by crushing ore and obtaining a concentration to be smelted (heated and melted).

Gold is still used for jewelry in other art objects. Today, however, other minerals, such as copper or silver, are usually added to gold to make it harder and more durable. More recent markets for gold include dentistry and electronics. Strangely, most of the gold that is dug out of the rock with such hard work ends up underground again in bank vaults where it is stored by governments and investors!

- 1. How has its hardness made gold an important metal?***
- 2. How has its luster made gold an important metal?***
- 3. Explain how the weight of gold affected the history of some western states?***
- 4. Why is gold expensive?***

NAME:

DATE:

Pd:

BONUS: *The Spanish came to America from Europe in the 16th century. Use a history of Mexico or Peru to find how the presence of gold affected the lives of the Native Americans who lived in those places during the 16th and 17th centuries.*

Worksheet on the Important Use of TITANIUM

Like titanium, the element Silicon has properties that make it valuable for industrial uses. Also, like titanium, silicon is found in sand; in fact, silicon dioxide, in which silicon is combined with oxygen, is the main ingredient in sand (as well as in many minerals that make up rocks). Overall, silicon is the second most abundant element on earth. In nature it is usually combined with oxygen as silicon dioxide. Lava that flows from some volcanoes is mainly silicon dioxide.

Silicon is a semiconductor, a material that conducts electricity better than insulators like glass, but not as well as conductors like copper. Pure Silicon would be an insulator, material that cannot conduct electricity, because it has no free electrons. But silicon with just the right amount of certain impurities, such as arsenic or phosphorus, has a few free electrons and is called P-type Silicon. Silicon with impurities such as aluminum or boron can take only a few electrons. It is called and type silicone period of flow of electrons passing from one atom to another results in an electric current.

Semiconductors are useful because the flow of electrons can be controlled. Semiconductors and solar cells can change light into electricity. Solar cells are made up of both P-type and N-type Silicon. Light hitting the cell reaches the silicon and knocks free electrons from P-type silicon. Electrons from atoms in the N-type silicon move in to fill the holes. The movement of electrons causes an electrical current to flow out of the sale. Semiconductors also are important in making transistors an integrated circuits or microchips. Silicon chips are used in computers and calculators. Transistors amplify electric signals.

- 1. How do you think solar cells could be useful?**
- 2. Silicon dioxide is a very stable compound. What evidence can you suggest to support this?**
- 3. How are the impurities in the silicon in solar cells important in the way the sells function?**