

## ***“Minerals that do things...”***

**Hands-on demonstrations of mineral properties**

***Provided for the Mineral Information Institute by Andrew A. Sicree, Ph.D.***

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### **Can you find the real diamond?**

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Object: If you purchase diamond jewelry, how do you know you're buying a real diamond? Students will learn how difficult it is to pick out a real diamond from among fakes. If diamond simulants are hard to distinguish from real diamonds, should you spend lots of money on real gems?

Procedure description: Use a diamond tester. Test a number of likely-looking specimens. First, the student looks at the specimens, then guesses which ones are diamonds, and then uses the diamond tester to test each specimen. Students will find that many of the diamond fakes and simulants are hard to detect.

Specimens to test: (all should be roughly the same size) Faceted stones: inexpensive diamond(s), small (0.1-0.2 carat are fine) – can sometimes be obtained from old inexpensive jewelry; moissanite; quartz; rhinestone(s); cubic zirconia; clear aluminum oxide, or other clear or light-yellowish gemstones. Rough, uncut materials: diamond crystal(s); diamond(s) as chips or grit (may be obtained from old diamond drill bits); bort; carborundum; moissanite; quartz; Herkimer diamond; glass; cubic zirconia; other clear synthetic rough. Ideally all of the specimens would be small and roughly the same size as your true diamond(s).

Equipment Needed: One electronic diamond tester. One of the old-style thermal conductivity probes is best – ask a jeweler to loan/give/sell his old one – many jewelers had to buy new testers because the older probes could not separate moissanite from diamond. Specimens should be adhered to a wooden board. A dark stained hardwood is best. Faceted specimens may be glued to the board – first make a dimple in the wood with a large nail or the tip of a pointed chisel, then glue faceted specimens in place with epoxy glue. Rough material should also be attached to the board.



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Ideally, you will have up to a dozen cut and a dozen rough stones with at least one real rough and one real cut diamond. Number each specimen to permit guessing. Keep a separate list for specimen identification.

Scientific discussion: Diamonds have a high index of refraction and exhibit strong dispersion of light. And they are the hardest substance known. While, it is impossible to find or make a simulant that does as well as diamond in all of these areas, it is possible to make synthetic stones that appear similar to diamond even though they are substantially softer. The most recent addition to a long line of diamond simulants is moissanite or silicon carbide. Most silicon carbide, produced for abrasive purposes, is black, but new techniques allow the production of clear colorless stones, suitable for faceting into “fake” diamonds.

Notes for demo tables: If you are doing demonstrations for large numbers of visitors (such as at a booth at a trade show), just let them use the probe on their own to test the various samples. You may wish to prepare a separate display of natural, synthetic, and fake rubies, sapphires, and emeralds. The diamond tester is, of course, useless for test these stones, but your visitors will have fun trying to pick out the real, natural gems.