ASM School Visits

Studies show that 50% of future jobs will require STEM skills and the demand for proficient STEM professionals is strong and growing, making it critical that we engage the world's future workforce to pursue education and training in STEM disciplines. For this reason, ArcelorMittal Dofasco and McMaster University have parthered to present a series of events to promote STEM in the Greater Toronto—Hamilton Area.

"Materials Science Boot Camps" - High Schools' Visits

A. "How Materials Behave"

These demos are suitable for grades 8 to 13 (We will present in all class periods you have in a day and will present as mny demos as we can fit in each class period)

1. Superconductivity and Magnetic Levitation—ties into electrical conductors and insulators.
2. Shape memory effect—ties into allotropic phase changes.
3. St. Rupert droplet—ductile vs. brittle materials and the importance of defects.
4. Gold penny—application of diffusion.
5. Cu Rod Experiment—Strengthening mechanisms in solids.
6. LEDs and Lasers—illustrates how electron energy is quantized.
7. Foams are aerogels—energy absorption, filters.
8. Fuel Cells—Chemistry and catalysts
9. Ductile-Brittle transition in polymers—change of properties with temperature.
10. Fire syringe—Illustrates the ideal gas law.
11. P-T phase diagram of CO_2-- illustrates how we can get liquid CO_2 and the ideal gas law.

B. "The Materials Science of Heat Transfer"

This cool presentation (pun intended) is suitable for grades 7-8.

It's hot and it's cold?

How does your thermos keep your chicken soup warm in the winter and your smoothies cold on a hot summer day? Why will the inside of a car with black seats heat up faster than one with grey seats on a road trip this summer to Montreal? Materials transfer heat and through effective materials selection, we can control how fast or slowly heat is transferred. In this presentation, with the help of a few scientific demonstrations, we explain:

- how materials conduct heat, and why some materials are better than others at transferring heat
- how heat relates to light (e. g. microwaves).

At the end of this a discussion of what strategies students may take to maintain a high or low temperature in a room.

"Tours at McMaster University"

The "Highlights of the tours at McMaster University include": (Transportation for this will be covered by the ArcelorMittal Dofasco grant).

- CCEM—Various electron microscopes that can offer resolution from the mm range down to 0.7 Angstroms. Includes the only Atom Probe Tomography analysis technique in Canada.
- MARC—Corrosion testing, mechanical testing, x-ray tomography, furnaces. Impressive machines large and small which are used by engineers.