ASK MARSHALL BRAIN: HOW DO PEOPLE WALK ON FIRE?

Curriculum Links to the National Science Education Standard: http://www.nap.edu/readingroom/books/nses/html

Science as Inquiry
CONTENT STANDARD A:
As a result of activities in grades 5-8, all students should develop:

UNDERSTANDINGS ABOUT SCIENTIFIC INQUIRY

- Different kinds of questions suggest different kinds of scientific investigations. Some investigations involve observing and describing objects, organisms or events; some involve collecting specimens; some involve experiments; some involve seeking more information; some involve discovery of new objects and phenomena; and some involve making models.
- Current scientific knowledge and understanding guide scientific investigations. Different scientific domains employ different methods, core theories and standards to advance scientific knowledge and understanding.
- Mathematics is important in all aspects of scientific inquiry.
- Technology used to gather data enhances accuracy and allows scientists to analyze and quantify results of investigations.
- Scientific explanations emphasize evidence, have logically consistent arguments and use scientific principles, models and theories. The scientific community accepts and uses such explanations until displaced by better scientific ones. When such displacement occurs, science advances.
- Science advances through legitimate skepticism. Asking questions and querying other scientists' explanations is part of scientific inquiry. Scientists evaluate the explanations proposed by other scientists by examining evidence, comparing evidence, identifying faulty reasoning, pointing out statements that go beyond the evidence and suggesting alternative explanations for the same observations.
- Scientific investigations sometimes result in new ideas and phenomena for study, generate new methods or procedures for an investigation or develop new technologies to improve the collection of data. All of these results can lead to new investigations.

Physical Science
CONTENT STANDARD B:
As a result of their activities in grades 5-8, all students should develop an understanding of:

PROPERTIES AND CHANGES OF PROPERTIES IN MATTER

- A substance has characteristic properties, such as density, a boiling point and solubility, all of which are independent of the amount of the sample. A mixture of substances often can be separated into the original substances using one or more of the characteristic properties.
- Chemical elements do not break down during normal laboratory reactions involving such treatments as heating, exposure to electric current, or reaction with acids. There are more than 100 known elements that combine in a multitude of ways to produce compounds, which account for the living and nonliving substances that we encounter.

TRANSFER OF ENERGY

- Energy is a property of many substances and is associated with heat, light, electricity, mechanical motion, sound, nuclei and the nature of a chemical. Energy is transferred in many ways.
- Light interacts with matter by transmission (including refraction), absorption or scattering (including reflection). To see an object, light from that object – emitted by or scattered from it – must enter the eye.
- In most chemical and nuclear reactions, energy is transferred into or out of a system. Heat, light, mechanical motion or electricity might all be involved in such transfers

History and Nature of Science
CONTENT STANDARD G:
As a result of their activities in grades 5-8, all students should develop an understanding of:

SCIENCE AS A HUMAN ENDEAVOR

- Science requires different abilities, depending on such factors as the field of study and type of inquiry. Science is very much a human endeavor, and the work of science relies on basic human qualities, such as reasoning, insight, energy, skill, and creativity–as well as on scientific habits of mind, such as intellectual honesty, tolerance of ambiguity, skepticism and openness to new ideas.

NATURE OF SCIENCE

- Scientists formulate and test their explanations of nature using observation, experiments, and theoretical and mathematical models. Although all scientific ideas are tentative and subject to change and improvement in principle, for most major ideas in science, there is much experimental and observational confirmation. Those ideas are not likely to change greatly in the future. Scientists do and have changed their ideas about nature when they encounter new experimental evidence that does not match their existing explanations.
- In areas where active research is being pursued and in which there is not a great deal of experimental or observational evidence and understanding, it is normal for scientists to differ with one another about the interpretation of the evidence or theory being considered. Different scientists might publish conflicting experimental results or might draw different conclusions from the same data. Ideally, scientists acknowledge such conflict and work towards finding evidence that will resolve their disagreement.