# The Process of "Doing" Science

## Background

Science is a process of creating ever better models to explain and predict the world around us. The world around us, indeed the whole universe, is extremely complex and abstract, so, in a sense, we never really "know" about the way the world works; we just get better and better insight. Part of what makes science so important (and so much fun!) is that we have a chance to investigate some of the most complicated and challenging questions of our time.

Unlike the science fair projects that you may have done in middle school, or the experiments you see on Mythbusters, many of the questions the scientific community is engaged in investigating don't have easy answers. Scientists working on these difficult problems understand that they are contributing to the creation of better and better models that allow us to make predictions about the way the world works, but they won't ever discover the "Absolute Truth" about the nature of the universe.

Despite the difficulties in addressing some of "the big questions of our time" there are a number of well-accepted professional practices that scientists engage in. Sometimes these practices are called "the Scientific Method." However, the phrase "the Scientific Method" doesn't always convey the complexity of these practices. In fact, most high school science textbooks fail to give insight into how complicated the scientific process is. Scientists often engage in rigorous debate, challenging and questioning each other to make sure that the models being developed are acceptable. Hypotheses are reworked, time and again, and our theories and laws continue to change and evolve.

## Purpose

The purpose of this activity is to present some of the complex questions being addressed by scientists today in order to demonstrate the complicated nature of the process of doing science.

## Directions

Choose one of the four articles from the *New Scientist* magazine, and read it. Then answer the following questions.

## Questions

1) a) Describe the nature of the problem or question under investigation in the experiments described in your article.

b) Who are the scientists involved?

c) What is the work they are doing?

d) How are they doing it?

2) a) What uncertainties or complexities make the research difficult or particularly challenging?

b) What are scientists doing to address these challenges?

c) Are the scientists in agreement about the best way to proceed?

3) Imagine that you are part of a research team assigned to help investigate this problem. Also imagine that you have gotten a large amount of funding. What kinds of experiments would you conduct to help address the question? (You don't have to give a step-by step procedure, but I would like you to think about what makes a good experiment and some of the possible avenues you have for research.)