Module 02 Lesson 04
VoiceThread: The scientific method: A worked example
Transcript

We have had a brief introduction to the scientific method, but let's take a walked-through example to see how it is put into practice.

Take a read of this weeks headline story in The Biol Daily Times.

[Visual: Image of a newspaper titled "The Biol Daily Times" with the headlines reading "US Obesity Rates Alarmingly High.]

Using this news report as a worked example, let's apply the steps of the scientific method.

1. Make an observation

Given that a scientific study always begins with an observation, based on what you have now read or seen around town, you may well start to ask yourself whether eating fast food does in fact lead to obesity?"

If so, this is a great question and is a good launching pad to start the scientific process.

2. Formulate hypothesis

The next step is to generate a hypothesis, and as such you may generate a hypothesis that states, "Fast food consumption leads to obesity."

But remember that a hypothesis needs to firstly be testable and secondly falsifiable, and so you may generate a Null and Alterative hypothesis that looks something like this:

Null: Fast food consumption has no effect on weight gain.

Alternative: Fast food consumption has an effect on weight gain.

After stating the hypotheses, you now have a starting point to go more in-depth, and you may therefore make the following prediction: That if fast food consumption does lead to obesity, then individuals eating fast food should be more overweight than those individuals that are not eating fast food.

In effect, when you start to think scientifically, you will no doubt come up with a number of 'if and then' type statements – if that is true, then I would expect this etc.

3. Conduct a critical experiment

One of the most effective ways to test a hypothesis is through some form of experimentation and so the next step is to conduct a critical experiment.

Now if you go back to your hypotheses, perhaps you may set up an experiment that looks something like this:

[Visual: text that states "Experiment 1" is displayed. The first area in the graphic to the left

side states "Start (day 0). Weigh 20 individuals. There is an image of a person on a scale. The center of the graphic displays an arrow pointing to the right with the text "Feed the 20 individuals fast food for a period of 4 weeks. The final area in the graphic to the right side states "Finish (day 30). Weigh 20 individuals."]

4. Draw conclusions and make revisions

The final step in the scientific process is to draw conclusions from your data and make revisions where appropriate. This entails looking for patterns and relationships from the data gathered in your experiments.

The results from the experiment:

[Visual: text that states "Experiment 1" is displayed. The first area in the graphic to the left side states "Start (day 0). Weigh 20 individuals. There is an image of a person on a scale. The center of the graphic displays an arrow pointing to the right with the text "Feed the 20 individuals fast food for a period of 4 weeks. The final area in the graphic to the right side states "Finish (day 30). Weigh 20 individuals." The final area in the graphic displays an arrow pointing to the right with the text "All 20 individuals gained weight over the 4 week period."

Based on these results, you may well conclude that eating fast food leads to weight gain. As such, you would therefore reject the Null hypothesis that states there is no effect and accept the Alternative hypothesis that stated that fast food consumption does has an effect on weight gain.