IES and Inquiry

Inquiry and the interrelation of Earth systems form the backbone of all IES activities. Inquiry drives science. Chances are, your students already use inquiry when they solve problems. Like scientists, students form questions to investigate after looking at what is observable or known. They predict the most likely answer to a question. They base this prediction on what they know to be true. Unlike professional scientists, your students may not devote much thought to these processes. In order to be objective, students must formally recognize inquiry as they do it. Stress the importance of inquiry processes as they occur in your investigations. Provoke students to think about why these processes are important. Students will form questions, collect data, use evidence, show evidence to others and consider alternative explanations. In short, they will act as young scientists.

Inquiry Processes

Scientists usually form a question to investigate after first looking at what is known about a scientific idea. Sometimes they predict the most likely answer to a question. They base this prediction on what they already know to be true.

- To make sure that the way they test ideas is fair, scientists think very carefully about the design of their investigations ahead of time. They do this to make sure that the results will be valid and reliable.
- When scientists have designed an investigation, they conduct tests. They observe what happens and record the results. Often, they repeat the same test several times to ensure reliable results.
- Scientists collect information (data) from their tests. The data may be numerical (numbers), or verbal (words). To collect and review data, tools such as computers, calculators, charts, and graphs, are used.
- Evidence is very important for scientists. Just as in a court case, it is proven evidence that counts. Scientists look both at the evidence other scientists have collected, and also at the evidence they have collected themselves.
- Finding strong evidence does not always provide the complete answer to a scientific question. Scientists look for likely explanations by studying patterns and relationships within the evidence.
- Sometimes, the evidence available is not clear or can be interpreted in other ways. If this is so, scientists look for different ways of explaining the evidence. This may lead to a new idea or question to investigate.
- Scientists communicate their findings to other scientists to see if they agree. Other scientists may then try to repeat the investigation to validate the results.
- Mathematics is a key tool for scientists. Accurate measurement with suitable units is very important for both collecting and analyzing data. Often, data are shown using numbers and calculations