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Looking Through the Lens

Nature and History of Science

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As classroom teachers, we have a responsibility to teach the curriculum standards that have been determined for our grade level. Within our Nevada State Science Standards, there is a strand of standards called nature and history of science. Just what is meant by this and what does it look like in the classroom?

The nature of science refers to the **doing** of science. It is how science works. It is the thinking, questioning and investigating that is necessary to gain an understanding of our natural world. The history of science is concerned with who has contributed to the field of science over the years.

We need to be explicit about teaching nature and history of science. Here are some points to keep in mind as we do science in our classrooms:

Science is both content and process. In order to help our students understand the science content they need, they must first have hands-on experiences, coupled with science talks. In the classroom, our lessons need to allow time for active investigating and time for processing what was learned. Science is NOT memorizing facts and vocabulary!

Science is a collaborative field. Scientists work together to learn about the natural world. Because they each interpret the same data in different ways, they need to communicate with others in order to further their thinking. Our science lessons should be structured to allow students to work with partners and/or in teams in order to acquire new understandings. In addition to science talks, writing in science notebooks and then sharing their writing is another effective way for students to collaborate.

There is no one scientific method. Many of us learned to do science by following a rigid, linear set of steps. This is not how scientists think and work! Science is actually a very creative endeavor, with many different ways of gathering data, depending on what we are doing. Scientific studies begin with questions/ wonderings that lead into investigations or experiments. From these experiences, evidence is acquired—a must in science. In the classroom, we need to guide students to analyze their data/evidence, then make a claim—what they think– based on that evidence. Another way to understand the creativeness of science is to assist students to develop their own procedures to answer their questions, then allowing them to explain what they have done.

Scientific data is not straightforward. Students need to realize that data does not have meaning in and of itself. We bring meaning to the data. To help students with this idea, instead of asking them "What does this data tell us?" try asking "What are you thinking about this data?" In this way, students will come to realize that data can be interpreted in different ways, and this leads us as scientists to continue gathering more information, either by further investigating or by finding resources or people who can help us expand our thinking.

Science knowledge is both reliable and tentative. Scientists use evidence to form their ideas, but as new evidence is acquired, those ideas can change. Just think what scientists are now saying about the number of planets that exist! When teaching science, we need to reinforce the nature of science by pointing out changes in thinking that have taken

place in science. These changes occur because scientists are always analyzing new evidence and gaining new insights. However, we also need to help students understand that some ideas, such as Newton's laws of motion, continue to stand up to the test of time.

Contributions to science have been made by people of all ages and backgrounds. Most of us are unaware that everything around us is somehow connected to the work of scientists. In order to help open our students' eyes to this, we might try reading books about various scientists and the contributions they have made to our everyday lives.

When planning your science lessons, try to incorporate one or two of these ideas into your lessons. Not only will your students gain a deeper view of science, but they will also be showing more ownership for their own growth.

Science Resources

- Wendy Saul and Jeanne Reardon (1996). *Beyond the Science Kit: Inquiry in Action*. Portsmouth, NH; Heinemann.
- Lori Norton-Meier, Brian Hand, Lynn Hockenberry, Kim Wise (2008). *Questions, Claims and Evidence*. Portsmouth, NH; Heinemann.
- Wendy Saul (2002). *Science Workshop: Reading, Writing, and Thinking Like a Scientist.*

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