*Teaching Notes - Pico Project Video*

**Overview:**

The purpose of this lesson is to show students what scientists look like, where they work, and what they do. They will answer questions from the video and then reflect on their work from this unit. As they compare what they did to what scientists do, they should start to gain an understanding that what they did is very similar. Another purpose is to promote collaboration and its importance. Scientists cannot do it all by themselves. Many work in teams from the same university and some have team members from multiple universities (such is the case with the Pico Project).

**The Lesson:**

* Handout the video questions
* Show the video labeled “Pico Elaborate”. This is in two parts and depending on time, they could be shown in one day or two. Part 1 goes with questions 1-10 and part 2 includes questions 10-13.
* Discuss what science is, the importance of collaboration, and how the students’ work relates to scientists’ work.

**Answers - Video Questions:**

1. Who first contacted Prof. Paulo Fialho and when?

***Richard Honrath, 1998***

1. What was Drs. Mazzoleni’s relationship with Richard?

***They were both hired by Dr. Honrath and included in the atmospheric science work he was doing***

1. Where are other atmospheric stations located? Why are the stations on Pico and Mauna Loa unique?

***Pico and Mauna Loa are unique in the fact that they are the only two atmospheric research stations located in the middle of an ocean, away from the continent. The other stations are located on land.***

1. When did the equipment arrive and how did it get to the top of the mountain?

***In 2001 by U.S. Air Force cargo planes***

***The station was lifted by helicopter to the top of the mountain.***

1. In what year was the station installed?

***2001***

1. Based on what you see in the video, why doesn’t the team gather data in the winter?

***Dangerous conditions, snow and ice (mainly ice)***

1. Do scientists really use the scientific method?

***In a way, yes – they ask questions and start to answer them by experimenting. This tends to lead to more questions and more investigations. In the end, they come up with conclusions and publish them.***

1. What are the steps to get work published? How long does this take?

***(Working backwards) Publish, analyze data and write paper, collect data, wait for proposal acceptance, write proposal – whole process can take 3 years from the time you come up with an idea to the time the data is published in a journal***

1. Do all scientists understand everything? Do they ever have other scientists work on their projects? Why or why not?

***No, they do not understand everything. Scientists become very specialized in one particular topic. That’s why it is important to have other scientists with different expertise on the team. With all scientists working together on a common plan, data can be shared and conclusions can be made. (Like the elephant poem, you need to know what every person is feeling in order to get the big picture)***

1. How important is collaboration? Explain.

***Very important! Not everything can be done by one person, and one person cannot know everything about the project. (Answer should also include specific statements made by those in the video)***

1. How did the following team members get involved in the Pico Project and what is their role:

|  |  |  |
| --- | --- | --- |
| **Scientist** | **How they got involved** | **Role in the project** |
| **Bo Zhang** | ***Other project did not get funding*** | ***Modeling work*** |
| **Lynn Mazzoleni** | ***PI (Principle Investigator) of project******Developed the project to investigate aerosols and also keep Richard’s memory alive.*** | ***Chemical properties of aerosols*** |
| **Claudio Mazzoleni** | ***PI (Principle Investigator) of project******Developed the project to investigate aerosols and also keep Richard’s memory alive.*** | ***Physical properties of aerosols*** |
| **Katja Dzepina** | ***Invited by Lynn Mazzoleni*** | ***High resolution mass spectrometry******(determines the chemical composition of the aerosols)*** |
| **Kendra Wright** | ***Opportunity presented itself and received funding from NASA*** | ***Physics and lasers*** |

1. What are some of the roles other scientists have in the current project?

***Analyze data, technicians, gas measurements, regional and global scale modeling, students, chemical measurements, a teacher to write lessons based on research***

1. What do scientists gain from collaboration?

***Examples of statements from team members: measurement data from others in order to do their job, help from professors, collaboration is everything - we can do more together and learn more, expertise from so many coming together, unique perspectives from students and other scientists around the world, dependent on each other otherwise project would not get done***

Think:

1. How did what you completed in this unit relate to what actual scientists do?

***Answers will vary: Perform experiments, collect data, analyze data, collaborate/work with others***

1. Do you think it would be helpful to share ideas while doing experiments in class? Why or why not?

***Answers will vary: Yes, see things in a different way, some things could have been missed, etc.***