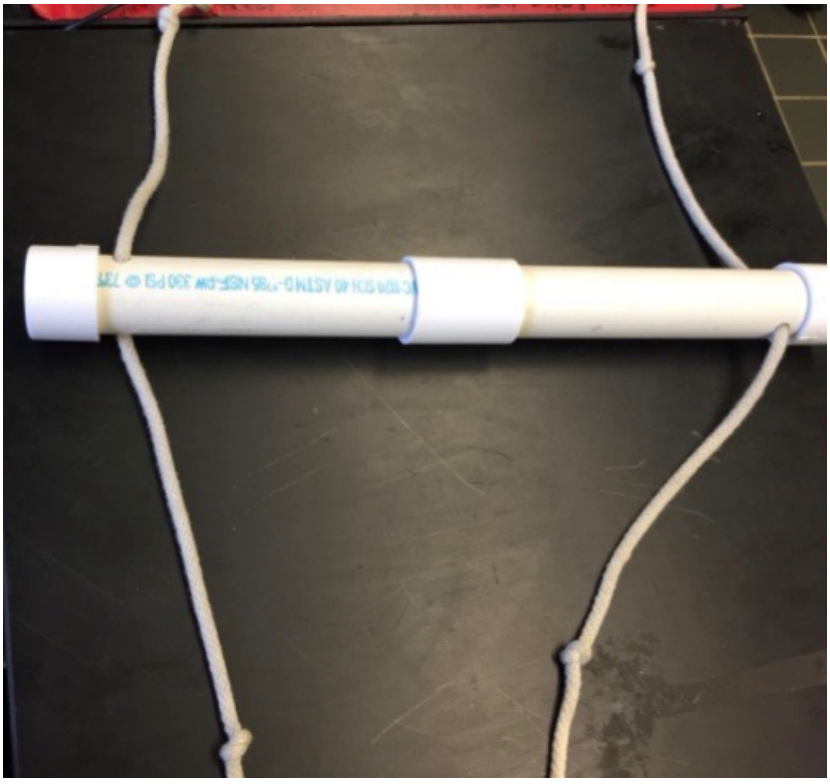
Developing the Scientific Method Using the Scientific Method Stick



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Background

The scientific method stick is an exercise used by Mauricio Gonzalez, the marine biology teacher at the New York harbor school, in order to allow students to develop the concepts of the scientific method in a physical and simple way. Giving students a physical model to handle opens the opportunity to use almost all senses in order to obtain as much information as possible to work their hypotheses. Developing answers that cannot be seen but can be proven. The question is what is causing the lines to react to each other the way they do.

Hypothesis

In the beginning stages of the activity the student's objective was to develop as informed of a hypothesis as possible without opening or breaking the device. Based off of the nature of the motion of the scientific method stick the interior could have possibly been a pulley system in which was disproved by the capability to break it and the difference in behavior once broken. Once the concept of a pulley system was removed the idea that a ring of some sort had developed. Using basic yarn and a ring the motion could be tested outside to develop the idea of motion through a ring and based off of the way they move together. Therefore, multiple hypotheses were formed but the closest or most structured was the last in which a ring of some sort had been the culprit.

Materials

material	quantity	purpose
Pvc pipe	2	to contain the mechanism moving the lines
Pvc connector	1	To create an opening for repair
Pvc cap	2	To close the ends
lines	2	to be visually manipulated
magnets	1	To test and manipulate the piece inside
MYSTERY MATERIALS		
Wire connector	1	To hold the steel rings together
Wire	1	To attach the wire connectors to the steel rings
steel rings	2	To allow the lines to move freely

Methods

Once the scientific method sticks had been distributed studying the behavior of the object had begun. When one string was pulled any other strings that were out had come in. Then the idea that the two lines were attached in some way developed. Using a magnet, the type of material the mystery object was made out of could be determined. Once nothing else could be discovered pulling one string at a time two strings had been pulled which resulted in breaking the device. Once the device was broken it was discovered that two magnetic objects made up the mystery object. Once the most information possible was retrieved it was time to complete analysis and open the stick. The stick had been opened to discover an electrical wire connector had been holding two steel rings together in which the lines were threaded through.

Results

Although this question had a definitive answer the activity developed the scientific method and put students into the habit of doing all that is in their power to not destroy their evidence before finding out what it is. Students used magnets, rulers and other random materials to test their hypotheses and attempt to determine what makes the scientific method stick work. The ring theory was proven correct but the piece connecting the two rings was never determined. The final step was opening the stick in which the hypothesis hadn’t been proven but wasn’t disproven due to the motion deriving from a ring system just their means of attachment hadn’t been determined.

Conclusion

In conclusion the scientific method stick activity had exposed students to the scientific method giving them an opportunity to have a hands-on experience in developing the use of the scientific method. The students had the opportunity to interpret their own data and develop their own hypotheses developing their capability to problem solve and troubleshoot along with dozens of other things in which are preparing them for real world life and exposure to the scientific field such as The close ended question taught students to observe without damaging the scientific method stick itself. In future experiments and labs vivid notes should be taken throughout the duration of the lab in order to involve as much information in the soon to come lab report as well as keeping track of any alterations in hypotheses. The assumption of a ring system was proven correct by the opening of the stick and through outside testing although the means of connection had not been determined.