

Microscopes (Science and Technology)

Descriptive Data

Topic of Lesson

Microscopes: an Introduction to Microorganisms

Grade Level

4th grade

Concepts

Objectives

CONCEPTS: The students will begin to learn that things exist that cannot be seen with the unaided eye.

OBJECTIVES: Students will begin to learn that things exist that cannot be seen with the unaided eye through discussion about microscopes and what they allow us to see as well as getting the opportunity to work with computerized microscopes.

Assessment

Formative, Summative, and/or Authentic

In order to assess student learning during this lesson the students will be recording their observations while using the microscopes and verbalizing understanding during discussion at the end of the lesson.

Rubric

Practical and helpful rubric.

	Target (3 pts)	Acceptable (2 pts)	Unacceptable (1 pt)
Investigative Journal	Observation elements are descriptive and complete.	Observation elements have some description and are mostly complete.	Observation elements have no description and are incomplete.
Conceptional Understanding	During discussion accurate elements and concepts are present.	During discussion some elements and concepts are accurate.	During discussion elements and concepts are inaccurate or not present.

Lesson Background Information

Lesson Background Summary

Microscope--an instrument for looking at tiny things. It has lenses that make things look bigger.

Microorganism--any organism too small to be viewed by the unaided eye.

Standards

Description

Standards

- NSES-S.K-4.A.1** STANDARD: Science As Inquiry -- As a result of activities in grades K-4, all students should develop abilities necessary to do scientific inquiry
- NSES-S.K-4.C.3** STANDARD: Life Science -- As a result of activities in grades K-4, all students should develop understanding of organisms and environments
- NSES-S.K-4.E.1** STANDARD: Science and Technology -- As a result of activities in grades K-4, all students should develop abilities of technological design

Preparation

Organizational & Management Steps

In order to prepare for this lesson it is important to find resources that would allow you to check out computerized

microscopes such as colleges or your school district. Once you have obtained the microscopes load the software onto classroom laptops and test the microscopes to see if they work and also to be sure that you know how to use them.

Materials

Materials & Resources

Materials:

- Laptops or Computer Lab
- Computerized Microscopes (ideally 1 microscope per 2 students)
- Paper
- Pencils

United Streaming

Incredible World of the Microscope, The

<http://www.unitedstreaming.com/search/assetDetail.cfm?guidAssetId=64b7f5df-37ca-42b5-a15b-37226d2c2>

Magnifiers and microscopes open a fascinating miniature world where common objects take on awesome, beautiful and, at times, grotesque forms. Viewers will marvel at the multi-faceted eye of a dragonfly, the piercing mouthparts of a tiny flea, the elegant symmetry of growing crystals, blood pulsing through the tail of a goldfish, the frenetic world in a drop of water, and many other specimens as well. Students will not only be captivated by the video's remarkable imagery, but they will learn how to use magnifiers and microscopes themselves, and discover why the microscope is such an important research tool.

Procedures

Engage

Start the lesson with discussion by asking, "Who has used a microscope before?" "What is a microscope?" "What things can we see with a microscope?"

Explore

After discussion the students will be paired into groups each group will get an opportunity to work with the computerized microscopes. While they are working with the microscopes they are to be jotting down things that they notice and discussing with their partner things that they see. While they are doing this I will be circulating between groups and listening to their discussion and seeing the things that they are finding with their microscopes.

Explain

Once each group has had a turn at the microscopes have the students share what they have observed. Encourage discussion based on their observations. After discussing what the students have observed using the microscopes ask, "Can anyone tell me what a microorganism is?"

Elaborate

Have the students think about the things they were able to look at with their microscopes today, then ask, "What other things could we look at using our microscopes?" (If possible set up another session with the microscopes where the students would be able to look at some of the things they mention.)

Evaluate

In order to assess student learning during this lesson the students will be recording their observations while using the microscopes and verbalizing understanding during discussion at the end of the lesson.

Independent Practice

Differentiated Instruction

Differentiation & Accommodation

Good ideas.

During my field there were not any students that needed specific accommodations; below is an example of how the lesson could be modified to fit all students:

Differentiated Process--be sure to allow plenty of time for the students to explore with the microscopes. Let the students work at a pace that works for them.

Differentiated Product--students could select a different way to show what they have learned through other creative methods such as drawing, acting, singing, poetry, or other ways of communication.

Extensions

Enrichment

Take a trip to the library, have the students investigate different organisms that cannot be seen with the

unaided eye such as fleas, mites, lice, etc. Once they have researched these tiny critters have them present what they have found. If possible it would be fun to find slides they could look at with these insects on them.

Technology

Hardware (Computer, Calculator, Probeware, GPS, etc.)

In this lesson computerized microscopes are used to help in the inquiry and investigation of microorganisms. By using the microscopes the students are able to see their skin, ears, nose, clothing, etc. up close. This inquiry will help the students come to understand that there are things that are alive that are smaller than the unaided eye can see. Since, we had a limited amount of microscopes students were also using the computers to look at related science websites.

Software

Internet Resources & Tools Description

Internet Resources & Tools

Microbe World <http://www.microbeworld.org/microbes>

This is an interactive website discussing different microorganisms. It has pictures, information, and quizzes for students to learn more about microorganisms.

The Micropolitan Museum <http://www.microscopy-uk.org.uk/micropolitan/index.html>

This website allows students to look at pictures of different microorganisms from insects to plants.

Audiovisual

Other

Reflection

Thoughts regarding the Lesson

Nichole,

It sounds like you didn't have nearly the time to make this a more valuable science lesson - your time was focused on learning to use the microscopes rather than learning about microorganisms. I don't fault you for that, it seems that this lesson would have been a good warm-up for building a conceptual understanding of small organisms. I know you wanted the microscope to be the tool for science learning rather than an end in itself. I appreciate all your hard work and preparation to make this a fascinating lesson. Keep sciencing in your own classroom!

Grade A

Mark Guy

To start the lesson I asked the students if they had ever used a microscope; most of them hadn't. We then talked about what a microscope was and what we could see using a microscope. I then split them into pairs, as we had a limited amount of microscopes. Some students worked on the microscopes while others looked at related websites. While the students were working with the microscopes, I walked around to each group and listened to their discussion and got to see some of the neat and disgusting things that the students were finding with their microscopes. When each group had had an opportunity to work with the microscopes, we wrapped up the lesson by talking about what they thought a microorganism was and what other things we might be able to look at with our microscopes.

This lesson was a little hectic; we had to kind of rush through it as I had some technical difficulties at the beginning of the lesson. I was able to figure everything out and the lesson ended up being very fun and informative for the students. However, I left feeling as though my lesson had failed because it was so limited and rushed. I do feel that the students did get out of it what I wanted them to, even with the limited time they were able to use the microscopes to discover and see things that they had never seen before at least not that close up! Through our quick discussion the students seemed to understand that there are things that alone our eyes cannot see. I really wish there would have been time to take it to the next step and allow them to look at the other things they thought they could look at under the microscope.

This lesson taught me that when working with technology you need to be prepared for anything, and also you need to make sure that your technology is ready by setting it up a day in advance. It also helped me see how it is important to be prepared for anything, stay calm, and have a backup plan. This lesson was probably the most interesting lesson I did, and I think that when you are setting up something like this it may be hectic, but in the end the experience that the students take away from that makes all the hard work worth it.

If I was able to teach this lesson again, like I said the main thing I would do would be to be better prepared with the technology. Also, I would have the students use the microscopes more than once so that they can really begin to see and discover different things.

I think the next step in this lesson would be to look more in depth at things that cannot be seen by the unaided eye. Finding out what types of things cannot be seen, researching those things, and then trying to find slides

that would allow students to see these things under the microscope.

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