

Teacher's Preparatory Guide

Bringing the Macro to the Nano in the Early Elementary School Classroom Lesson 2

Big vs. Little – Macro to Micro

Overarching Question or Statement: Taking a closer look

Purpose: Through guided discovery, children will take a closer look at the microscopic world using magnifying glasses and microscopes.

Time required: (2) 45 minute sessions for lesson, extension activity requires additional time

Level: Early Elementary, grades 1-3

Materials

For Lesson

- Magnifying glasses (1 for each child, if possible)
- EyeClops handheld microscope or Illuminated microscope from Radio Shack
- 1 pair of child ski mittens, Duplo, and Legos
- Science journals

For Extension Activities

- 2-3 pairs of small rubber gloves
- 2-3 pairs of child ski mittens
- small items (i.e. paperclips, flat geometric shapes, books, pencils, and paper)

Safety Information: There are no safety concerns.

Advance Preparation: Gather materials

Teacher Background:

Important Vocabulary for this lesson:

Macro: objects visible to the eye

Micro: objects not visible to the eye unless using a microscope

Microscope: an instrument used to view objects that aren't visible to the eye

Structure: a whole that is built of distinct parts

Teaching Strategies: whole group and small group configurations

Resources: Eyeclops Bionic Eye can be purchased at <http://eyeclopsbionic.com>
Illuminated Microscope can be purchased at <http://www.radioshack.com>

Instructional Procedure:

Introduction: (approx. 5min.)

Gather children in a group, on the floor, with their science journals. Invite a few children to share their structure drawings and descriptions from the previous lesson.

Part One: (approx. 20 min.)

Ask students if they are able to see objects in the room. Ask a couple of students to tell you some objects that they can see. Tell them that the objects that we are able to see with just our eyes along are called “macro” objects. Macro objects are visible to the eye.

Tell students that we’re going to talk about going smaller. Ask, what tools could we use to see something small? Students should mention a magnifying glass and microscope, if not mention them. Explain that these tools are important to see small things. Do a demonstration to show this. Have a student put on a pair of children’s ski mittens and try to pick up and build with Duplo. Next, have the student pick up and build with Lego. Then, have the student take off the mittens and build with bare hands. Talk about what happened with students. Was it easier or harder to use the ski mittens? The learning here is that small tools are needed for smaller things and that is why we need to use magnifying glasses and microscopes to see smaller things.

Introduce the Eyeclops or Illuminated Microscope to students. Elicit a few examples from students of nearby things in the classroom that can be looked at with the Eyeclops. Explain that tools like this make small things look bigger so that we can see all their parts. ASplit students into two groups. Have one group use the Eyeclops or Illuminated Microscope to explore objects in the classroom while the other group uses magnifying glasses to look at classroom objects. Then after 10-15 minutes, have the groups switch.

Ask students if there were objects that they saw with the Eyeclops, Microscope or magnifying glass that they did not see before they used these tools. Objects that are not visible to the eye unless we use a microscope are called “micro”.

Part Two: Day 2(approx. 20 min.)

Gather children in a group, on the floor, and discuss what the differences between both tools. Give all students a pencil and magnifying glass. Have them use the magnifying glass to observe and then show the Eyeclops image of a pencil. Do a think-pair-share with students to compare the images. Have them think about what they notice, then pair with a partner and tell their partner. After that, have students share their thoughts with the class. Have students draw a picture in their science journal of something at the macro level and at the micro level.

Extension: (approx. 20 min.)

Center activities

- 1) Using tools – Have 2-3 pairs of rubber gloves available for students to use to practice grasping different objects. (i.e. paper clips, geoblocks, small erasers, coins, a chapter book)
- 2) Microscope Exploration – allow students to use the Eyeclops to explore and record other objects in the classroom. Tell students to bring a small object from home to look at too. Students can use drawings to record their observations or, for something different, have students use geoblocks to replicate their designs.

National Science Education Standards

National Nanotechnology Infrastructure Network

www.nnin.org

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National Science Education Standards K-4

- Content Standard A Science as Inquiry
 - Abilities necessary to do scientific inquiry
 - Understanding about scientific inquiry
- Content Standard B Physical Science
 - Properties of objects and materials
- Content Standard E Science and Technology
 - Understanding about science and technology