

## Teacher's Preparatory Guide

### ***Bringing the Macro to the Nano in the Early Elementary School Classroom Lesson 5***

#### ***Big vs. Little – Macro to Nano***

**Overarching Question or Statement:** Lessons from Nature

**Purpose:** Children will investigate patterns and structures in nature and understand that these can be replicated in manmade structures.

**Time required:** 45 minute session for lesson, extension activities require additional time

**Level:** Early Elementary, grades 1-3

#### **Materials**

##### **For Lesson**

- Large images at macro, micro, and nano scale for whole class activity
- Small images at macro, micro, and nano scale for group activity
- Image Chart, one copy per group ( At end of lesson)

**Advance Preparation:** Gather images for discussion and individual images for group work

**Teacher Background:** This is a review lesson

**Teaching strategy to be used in this lesson:** whole group and small group configurations

#### **Resources:**

Suggested places for images:

[http://www.nisenet.org/catalog/programs/what\\_am\\_i\\_nanodays\\_2012](http://www.nisenet.org/catalog/programs/what_am_i_nanodays_2012)

[http://www.nisenet.org/catalog/programs/build\\_giant\\_puzzle\\_nanodays\\_2012](http://www.nisenet.org/catalog/programs/build_giant_puzzle_nanodays_2012)

#### **Instructional Procedure:**

*Part One: (approx. 10 min.)*

Have ready one image at the macro, micro, and nano level. As you introduce each image, review the terms macro, micro, and nano with the children. First, show students a macro image at the macro scale and ask if it reminds them of anything that they see in their every day world. Allow students to share their thoughts. (For example, hold up an image of a honeycomb. Students may think that it resembles a jungle gym or a sponge.) Through guided discovery,

encourage students to identify patterns they see in this structure. Then, hold up a microscopic image and repeat procedure. Lastly, using a nano image, ask students if they see any resemblance to objects in their every day world.

*Part Two: (approx. 20 min.)*

Divide the class into four groups. Give each group a different image, identifying whether it is a macro, micro, or nano image. Children will brainstorm a list of objects or patterns it brings to mind and record this information using words and/or drawings on the image chart. Allow approximately five minutes. At this point, change images by passing the image to the right and follow procedure until each group has worked with all four images.

At the conclusion of this section of the lesson, the teacher will hold up each image separately, so groups can share their thoughts and ideas.

*Conclusion: (approx. 2 min.)*

As a concluding activity, have students choose their favorite macro, micro, or nano image from the lesson and write about it in their science journal. They should include what level of image they chose, what patterns they see, and what it reminds them of from their every day world.

*Extension: (approx. 20 min.)*

Math Center: Children can explore geometric patterns by using geoblocks to create patterns and designs.

As a conclusion activity, the children can build big and small structures using similar materials as in the first lesson. They can compare these structures with the structure they built in lesson one, noting any changes they have incorporated based on the information learned from this unit.

#### **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

#### **National Mathematics Standards K-2 and 3-5**

- Understand measurable attributes of object, units, systems, and processed of measurement

## Image Chart

Macro Objects	Micro Objects	Nano Objects