



Close, Closer, Closest

Boys and Girls Club After School Science
NSF Center for Chemical Innovation
Chemistry at the Space Time Limit (CaSTL)
<https://www.castl.uci.edu/>

Standard(s) Addressed:

Children will practice the abilities necessary to do scientific inquiry. They will learn more about various ways to identify the properties of objects and materials by doing high quality observations.

California Department of Education, Science Content Standards, Grade 2 IE: Use magnifiers or microscopes to observe and draw descriptions of small objects or small features of objects.

Lesson Objective:

Children will take a closer look at common objects by using the naked eye and then a hand lens. They will determine how the details change when their view gets more precise.

Materials Used:

For each individual:

1 dime

1 hand lens

“Coin Observation” data recording sheet

Object from their own search

Classroom Management:

Setting up: Be sure to have enough dimes, hand lenses, and data sheets for each student. Have film canisters for students to collect their own object during a break time (film canisters ensure a smaller size for the object).

During Explore: Encourage students to draw and write their observations.

Clean Up: Collect all dimes and hand lens. Count to be sure that all are accounted for.

Signal: Stand silently in front of the room, raising hand in the air to get the children’s attention.

Funding and Credits:

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ENGAGE: *Connect to Prior Knowledge and Experience, Create Emotionally Safe Learning Environment, Preview New Vocabulary* **Estimated time: 5 – 10 minutes**

Description of Engage: Students will connect to their prior knowledge by being asked to recall from memory what a dime looks like. They will discuss the details that they can remember with peers and with the class.

Teacher’s Role	Teacher Questions	Children’s Role
<p>Teacher gets the children interested in the lesson by asking them to imagine a dime in their heads.</p> <p>Teacher has the students turn to a partner and recall one characteristic of a dime.</p> <p>Teacher scripts their words as students report back to class.</p> <p>Teacher has students draw a dime in the first box from memory on the “Coin Observation” data recording sheet.</p> <p>Teacher has students come and show their drawing on the overhead document handler (Elmo).</p> <p>Teacher asks about the benefits and difficulty of drawing from memory.</p>	<p>Think of a dime. What does it look like?</p> <p>Turn to your partner and find out one thing that they can see in their heads when they think of a dime. Then, you’ll report back to the class.</p> <p>Teacher asks students to describe what they drew. Also, teacher has non-presenting students state whether they had those details, by asking, “Who else drew [the president’s face]?”</p> <p>“What were the benefits and limitations of drawing details from memory?”</p>	<p>Students will close their eyes and recall the characteristics and details of a dime.</p> <p><i>“It’s silver.”</i> <i>“It’s got a man on it.”</i> <i>“A dime is the smallest U.S. coin.”</i></p> <p>Students draw individually.</p> <p>Students present their from memory dime drawing and/or discuss their drawings with the class.</p> <p><i>“It was hard to remember where things were on the dime.”</i></p>

EXPLORE: *Hands-On Learning, Contextualize Language, Use of Scaffolding (Graphic Organizers, Thinking Maps, Cooperative Learning), Use of Multiple Intelligences, Check for Understanding* **Estimated time: 15 – 20 minutes**

Description of Explore: “Close!” Students will do a hands-on investigation to look at a real dime and record their observation. First, they will record how they view the dime with the naked eye. Then, they will get “Closer!” Students will work individually and in pairs to observe a dime with a hand lens. Once all the students have had a turn observing, recording their

observation, and sharing their observation with a partner, they share their observations with the class.

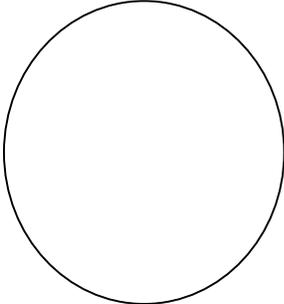
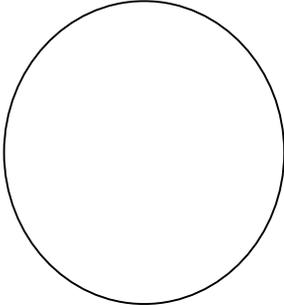
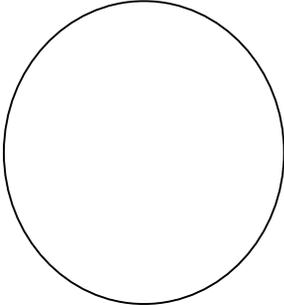
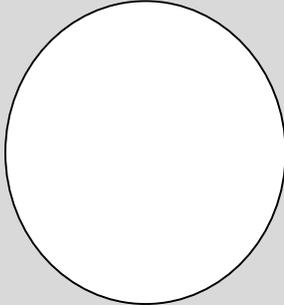
Teacher's Role	Teacher Questions	Children's Role
<p>The teacher tells students that they will get a dime and act like a scientist, using their 5 senses, to observe the dime and draw what they observe. Teacher models how she might get started.</p>	<p>Which senses would you use to observe and record what the dime is like?</p>	<p>Students observe and draw the dime with the naked eye.</p>
<p>Teacher has students come to present what they observed and recorded.</p>		<p>Selected students present their work.</p>
<p>Next, teacher asks what tool might help them see the dime in more detail.</p>	<p>What scientific tool could you use to observe the details of an object better than you could with your eyes alone?</p>	<p><i>“A hand lens”</i> <i>“A magnifying glass”</i> <i>“A microscope”</i></p>
<p>Teacher explains that students will be given a hand lens to look at the same dime a bit closer. Teacher models how to use the hand lens (holding the lens close to one eye, shutting the other, and bringing the object toward the lens until it comes into focus). Teacher has students record their observations.</p>	<p>What is the name of this scientific tool? What are some things this tool can help us do?</p>	<p><i>“A hand lens”</i> <i>“A magnifying glass”</i> <i>“It helps us see things more closely and with more detail.”</i></p>
<p>Teacher gives students time to share their observations with a partner.</p>	<p>Teacher models how the pairs should ask questions, such as, “What did you notice with the hand lens?” “Did you see more detail? “What details did you notice with the hand lens that you didn’t see with your eye alone?”</p>	<p>Students share their records with a partner. They ask and answer the prompted questions: <i>“I saw the date.”</i> <i>“I saw more details, such as little words around the top.”</i> <i>“I saw a little torch on the back.”</i></p>
<p>Teacher has students come to present what they observed and recorded.</p>		<p>Selected students present their work.</p>

EXPLAIN: Listening, Speaking, Reading, and Writing to Communicate Conceptual

<i>Understanding</i>		Estimated time: 20 minutes
<p>Description of Explain: Children will discuss what each tool allowed them to do when making observations and sharing results about the dime. They will explain how the hands lens helped them see details of things that they could not otherwise see. Children will note the similarities and differences between their 3 observations. Discussion will be prompted to lead to how students purposely use different tools for different reasons.</p>		
Teacher's Role	Teacher Questions	Children's Role
<p>Teacher has students explain how the hand lens helped them see details of things that they could not otherwise see.</p> <p>Teacher asks students to reflect upon the similarities/differences and the benefits/challenges of using each tool. She records students' answers on a 3 way t-chart.</p>	<p>How does the hand lens work? What other things could you see with a hand lens?</p> <p>Let's talk about each of the 3 observations and the tools you used. What were the benefits of using each tool? Challenges?</p>	<p><i>"As the light hits the hand lens, the light rays bend. This makes things look bigger."</i> <i>"You can see a fly's eye."</i> <i>"You can see patterns in a fingerprint."</i></p> <p><i>"It was hard to remember what was on the dime."</i> <i>"I couldn't see all the details until I had the hand lens."</i></p>
EVALUATE: Thinking Maps, Summarize Lesson and Review Vocabulary, Variety of Assessment Tools, Games to Show Understanding		Estimated time: 5 minutes
<p>Description of Evaluate: The children will be assessed whether or not they learned how different tools offer scientists various ways of looking at objects and materials. They will review the purposes of each of the investigated methods of observation.</p>		
Teacher's Role	Teacher Questions	Children's Role
<p>Teacher relates the investigation to the study of science.</p>	<p>Why would a scientist want to use each of these tools?</p>	<p><i>"If a scientist needs to see something really closely, she might use a hand lens."</i> <i>"When a scientist only uses his memory to record observations, he might miss a detail."</i></p>
EXTEND/ELABORATE: Group Projects, Plays, Murals, Songs, Connections to Real World, Connections to Other Curricular Areas		Estimated time: 5 – 10 minutes
<p>Description of Extend/Elaborate: Students will get the opportunity to look at their own objects from outside by repeating the three ways of observing.</p>		
Teacher's Role	Teacher Questions	Children's Role
<p>Teacher explains that students should try this again with their own "found" objects from the break outside.</p>		

Name _____

Coin Observation

Draw a dime from memory.	<u>Look</u> at a dime. Draw it.	Use a <u>hand lens</u> to look at a dime. Draw it.	Use the _____ to look at a dime. Draw it.
			

Which picture has the best details? _____

Why do you think so? _____

Your Own Object

Draw your object from memory.	<u>Look</u> at your object. Draw it.	Use a <u>hand lens</u> to look at your object. Draw it.	Use the _____ to look at your object. Draw it.

