CaSTL

Scientists and What They Do

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

Lesson Objective: Children will be able to understand that some scientists work in the field and some work in the lab, like the CaSTL scientists. They will look at pictures of scientists and will identify what they do.

Materials Used:

- Pencils
- White paper to draw a scientist in Engage
- Images of scientists
- Fruit roll up
- Copper wire and scissors
- CaSTL video from COSMOS summer program

Classroom Management:

Conversation: quiet indoor voices
Help: ask the teacher, ask helpers/volunteers
Activity: work with group of three or four children, brainstorm/answer questions
Movement: groups move from station to station
Participation: working well in groups, doing task, working cooperatively

Consequences for misbehavior will be removal from room to copy the behavior paragraph.

Funding and Credits:

This project was funded by the National Science Foundation Centers for Chemical Innovation award #1414466 and #0802913 to V. Ara Apkarian, Ph.D. at the University of California, Irvine, Department of Chemistry. This lesson was written by Therese B. Shanahan, Ed.D., University of California, Irvine, School of Education and Cal Teach.

ENGAGE: ***Connect to Prior Knowledge and Experience, Create Emotionally Safe Learning Environment, Preview New Vocabulary*** **Estimated time: 15 minutes**

Description of Engage: Children will draw their image of a scientist on white paper.

Teacher's Role	Teacher Questions	Children's Role
To determine the children's	Today we are going to talk	Children take a few minutes to

understanding of what a scientist looks like.	about scientists and what they do. I am going to give you a blank sheet of paper. Put your name on it. On this paper, you are going to draw a picture of a scientist. Do this by yourself. What do you think a scientist looks like?	draw what they think a scientist looks like.
EXPLORE: ***Hands-On Learning, Contextualize Language, Use of Scaffolding (Graphic Organizers, Thinking Maps, Cooperative Learning), Use of Multiple Intelligences, Check for Understanding*** **Estimated time: 25 minutes** **Description of Explore: Children will look at images of scientists in the field and will discuss what they are doing.**		
Teacher's Role	**Teacher Questions**	**Children's Role**
Teacher gives the children images of scientists at work (geologist, oceanographer, chemist). They will look at the pictures and talk about what the scientists are doing. Display a powerpoint slide to show what the science is. The children will look at the image of the flavor chemist. The teacher will introduce fruit roll ups and the children will ask questions about the roll ups.	What do you think each scientist is doing? What questions do you think the scientists are asking? Look at the picture and try to guess what the scientist is studying. What does the picture tell you about the scientist? I am going to give you something to investigate. A scientist made this object. Your job is to use your senses to investigate it and ask questions about it. What questions do you have about this object?	The children look at the images and talk to their partner about what they see. Children investigate the fruit roll up and think of some questions to ask. *How was it made?* *How did the chemist make the smell?*

The children can eat the fruit roll ups after they finish. The last picture is of a CaSTL scientist. After the children answer, the teacher shows them a long piece of copper wire.	What do you think this scientist is looking at under the microscope? Do you know what this is? Can I make this wire smaller? Teacher cuts the wire in half and again asks: can I make this wire smaller? Teacher continues cutting and asking the same question until the wire is too small to cut. I cannot cut this wire any smaller because I do not have the tool that can do that. But imagine being able to cut and cut and cut the wire until you get to the smallest piece of copper. It will be so small that you cannot see it with your eyes. We call that a atom. That is what the CaSTL scientist is looking at under that microscope: an atom.	*A bug, a leaf, some chemicals* *A wire* *Yes, you can cut it.* *Yes, cut it again.*

EXPLAIN: ***Listening, Speaking, Reading, and Writing to Communicate Conceptual Understanding*** **Estimated time: 5 minutes**

Description of Explain: The children talk about their questions.

Teacher's Role	Teacher Questions	Children' Role
The teacher encourages the children to talk about their questions.	What questions do you have about the work the scientists are doing?	The children share out their questions.

EVALUATE: ***Thinking Maps, Summarize Lesson and Review Vocabulary, Variety of Assessment Tools, Games to Show Understanding*** **Estimated time: 5 minutes**

Description of Evaluate: The teacher walks around the room as the children are looking at the images of the scientists and encourages their questions.

Teacher's Role	Teacher Questions	Children' Role
The teacher checks for understanding by listening to the children and encouraging them to ask questions.	What do you think the scientist is trying to investigate? What questions does the scientist have?	Children share out what they think the scientist is doing and the questions that the scientist has.

EXTEND/ELABORATE: ***Group Projects, Plays, Murals, Songs, Connections to Real World, Connections to Other Curricular Areas*** **Estimated time: 5 minutes**

Description of Extend/Elaborate: The teacher will show the CaSTL video of the COSMOS summer institute and will pause the video from time to time to ask the children what they notice the scientist is doing.

Teacher's Role	Teacher Questions	Children' Role
The teacher will show the video and will pause the video after Eric Postma asks questions about the sky and the ocean. The teacher continues to stop the video to ask the children to tell what they noticed.	What was the scientist doing just now? And now. . .?	*He was asking questions.* *He was doing investigations.*

Scientists And What They Do

Scientist	What Is the Scientist Studying?	What Is the Scientist Thinking About?
Geologist 		
Oceanographer 		
Chemist 		
CaSTL Chemist 		

Common Characteristics of Lesson Plans

Get Children into the Learning--Connect to Their Prior Knowledge

Exploration/Investigation/Hands-On Learning

Making Meaning--Teachers and Children Together

Evaluation/Assessment

Extension to the Real World or Other Curricular Areas

Other Aspects to Consider:

The lesson is Child-Centered--the child is listening, speaking, reading, writing and drawing. The child is thinking.

There is more Child Talk than Teacher Talk.