Primary Source
Visible Thinking Strategies for the STEM classroom
Notice of recording

This session is being recorded. If you choose to participate, any of your comments or questions will become part of the Library’s collections.
Please introduce yourself in the chat!

- Your first name
- Where you’re joining us from
- Your subject area and grade level

Please select **ALL PANELISTS AND ATTENDEES** in the To: box
Welcome!

Lesley Anderson, @LAnderson_STEM
Peter DeCraene, @ShowTheWork
2021-22 Albert Einstein Distinguished Educator Fellows

https://science.osti.gov/wdts/einstein
Objectives

- Use variations on the Observe-Reflect-Question protocol to uncover student thinking.
- Model visible thinking strategies
Observe and Reflect

What’s going on here?
What’s going on here?

Type your ideas in the chat, and give your confidence level: 1-5

1 = not confident

5 = very confident
What patterns do you notice in the way the oranges are arranged?
Compare! Simulate the oranges with coins on a paper plate. Are there patterns in the coins that are similar to the patterns in the oranges?
Try It!
Arrange the circles on a jamboard page to illustrate the patterns you see.
What questions do you have about this image?
Which question is most important to you?

1. Why are the oranges floating in water?
2. Who took the photo and why?
3. When was this picture taken?
4. Why do the oranges float like that?
5. What is the green thing in the background?
6. Other - Please type your question in the chat.
Title
Washing oranges at an orange packing co-op, Redlands, Calif. Santa Fe R.R. trip

Contributor Names
Delano, Jack, 1914-1997, photographer

Created / Published
1943 March

Subject Headings
- Southern California Fruit Exchange
- World War, 1939-1945
- Oranges
- Citrus fruit industry
- Cooperatives
- United States--California--Redlands

Headings
Transparencies--Color.

Genre
Transparencies--Color
Class Connection: Geometry

What’s the most efficient way to “pack” circles?
Class Connection: Geometry

What’s the most efficient way to “pack” circles?

Regular Polygons
Area
Tessellations
Others?
Class Connection: Geometry

Which is better for packing in a box?
What patterns do you see here?
Engineering Connection

Here are several pictures from the same series.
Engineering Connection

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Here are several pictures from the same series.
Engineering Connection

Put the pictures from the orange packing plant in order.

Explain what is happening, and why you chose this order.
Zoom-in / Zoom-out

- Directs students to only part of a primary source
- Provides time and space to pay attention to details
- Focuses on revising thinking with new information
I think I’m looking at __________ because __________.
I used to think

_________

now I think

_________

because

_________.
Lab Connection - Chemistry

• Does oil mix in the water column?

• **Key Vocabulary:** polarity, density, hydrocarbons, surface tension, viscosity

• **Lab Supplies:** glass jar, water, oil, food coloring, soap
Lab Connection - Chemistry

• Does oil mix in the water column?

• **Key Vocabulary:** polarity, density, hydrocarbons, surface tension, viscosity

• **Lab Supplies:** glass jar, water, oil, food coloring, soap

1. Add water (⅓ full) and food coloring to the jar
2. Add oil (another ⅓ full) to the jar and close the lid
3. Shake the jar (30 sec)
4. Observe
5. Open the jar and add soap
6. Reseal the jar and shake again (30 sec)
7. Observe
Deepwater Horizon Satellite Map
Benjamin Franklin’s ocean current map

Lab Connection - Oceanography

• How does ocean circulation work?

• **Key Vocabulary:** gyres, circulation, currents, mixing

• **Lab Supplies:** glass bowl, pepper flakes, straw
Lab Connection - Oceanography

• How does ocean circulation work?

• **Key Vocabulary:** gyres, circulation, currents, mixing

• **Lab Supplies:** glass bowl, pepper flakes, straw

1. Add water to the bowl (about ½ way)
2. Add pepper flakes to the surface of the bowl
3. Use the straw to blow wind across the surface of the water
4. Observe what happens to the pepper flakes
5. Repeat in different directions to observe various currents
Location of Oil Platform Disasters and their Relation to Coastal Cities
Summary: Visible Thinking Strategies

➔ **See-Think-Wonder** or Observe-Reflect-Question opens space for student thinking.

➔ Identifying students’ **Confidence and Importance Levels** can provide direction for next steps.

➔ **Drawing Pictures** provides insight into student thinking.

➔ Using **Wait Time** can allow for responses from more students.

➔ The **Zoom-in / Zoom-out** and **sentence stems** provides focus on revising thinking with the addition of new information.
Thank you!

For joining us today and sticking with your students these last two years!

Questions?

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Lesley Anderson: landerson@loc.gov
Peter DeCraene: pdecrane@loc.gov