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May 5, 2022

Primary Source Visible Thinking Strategies for the STEM classroom

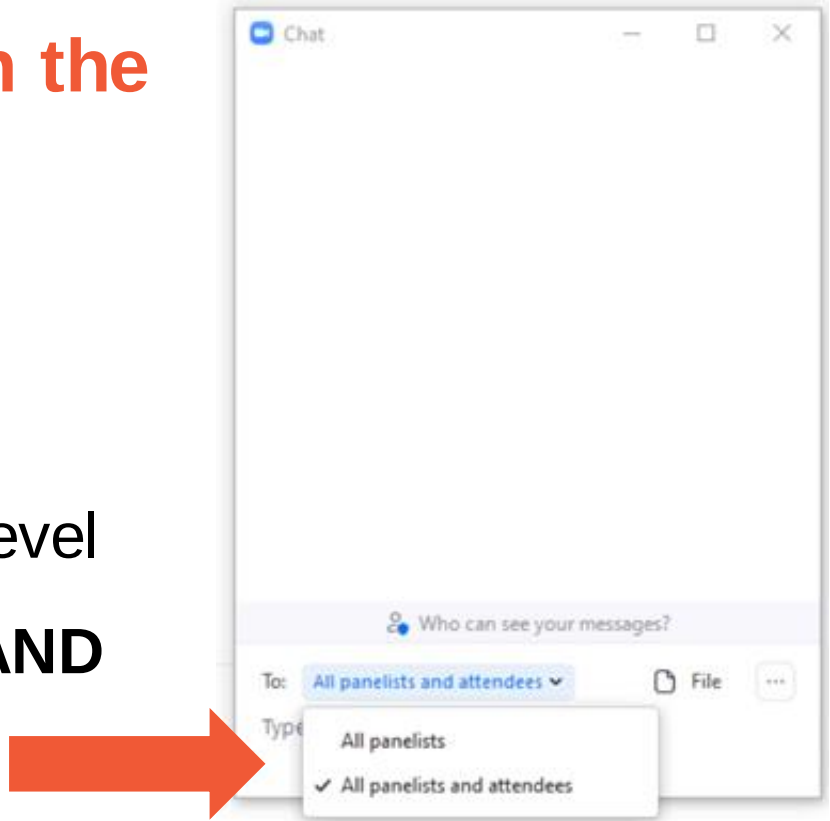
Notice of recording

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

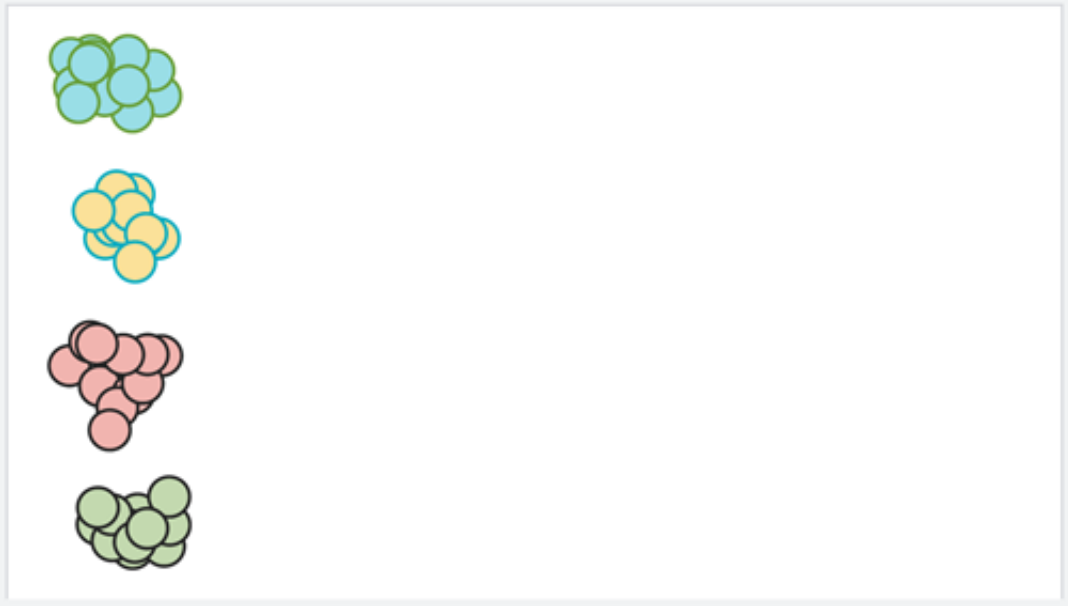
What patterns do you notice in the way the oranges are arranged?

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.

About this Item

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

Part of
Farm Security Administration/Office of War Information Color Photographs (1,623)

Prints and Photographs Division (947,622)

Library of Congress Online Catalog (1,247,677)

Format
Photo, Print, Drawing

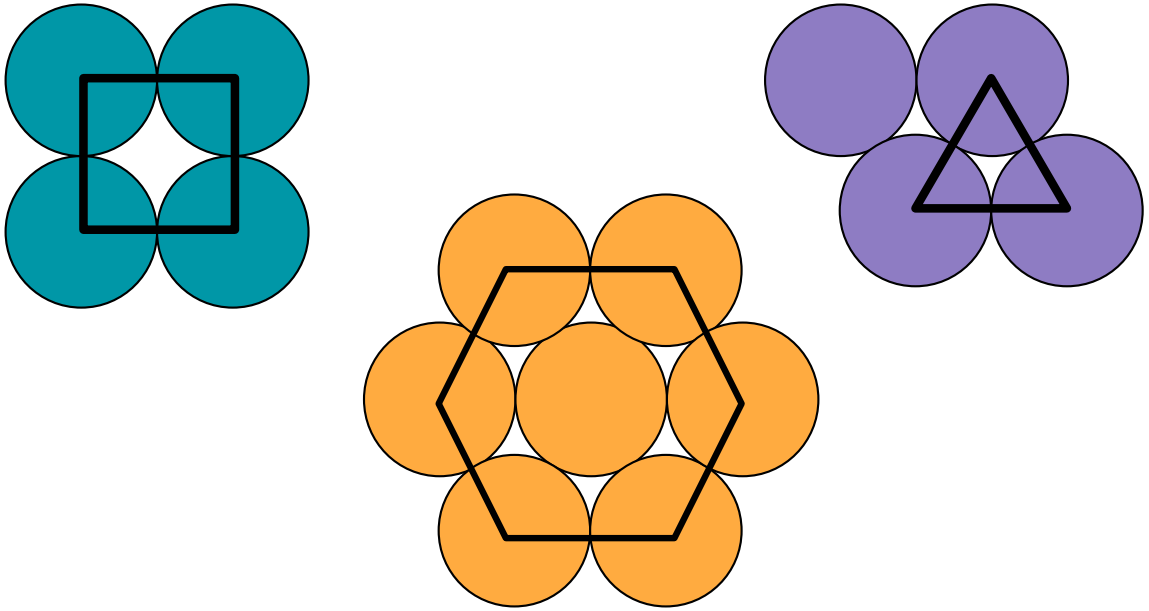
Contributors
Delano, Jack

Dates
1939

Locations
California
Redlands
United States

Class Connection: Geometry

What's the most efficient way to "pack" circles?



Class Connection: Geometry

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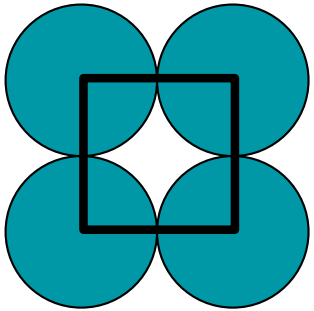
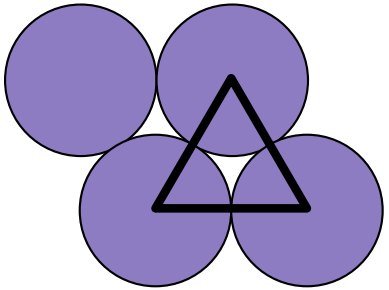
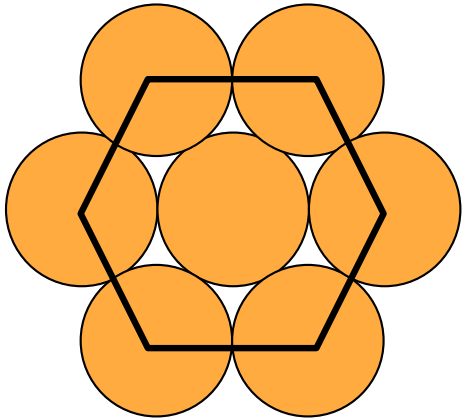


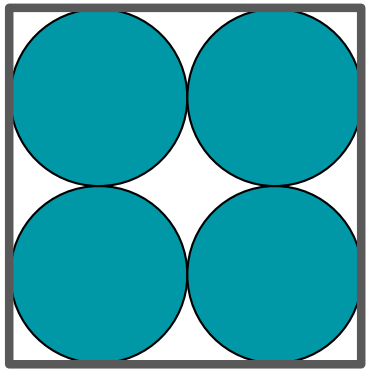


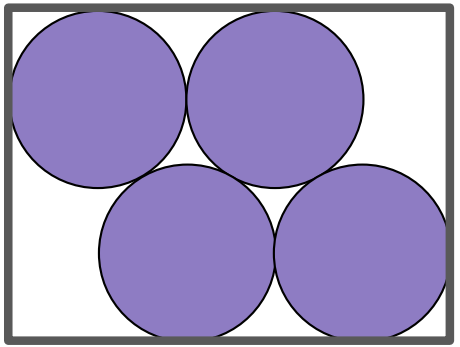


Regular Polygons
Area
Tessellations
Others?

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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Engineering Connection

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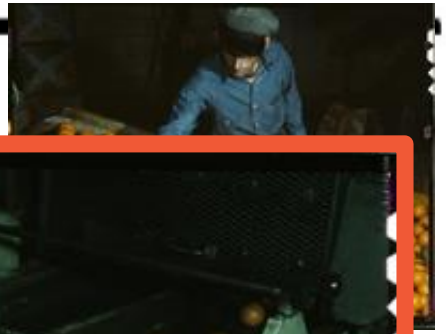

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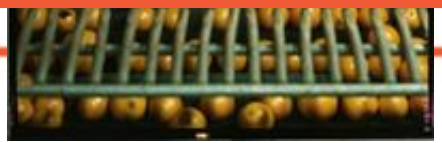

Engineering Connection

Put the pictures from the orange packing plant in order.

Explain what is happening, and why you chose this order.

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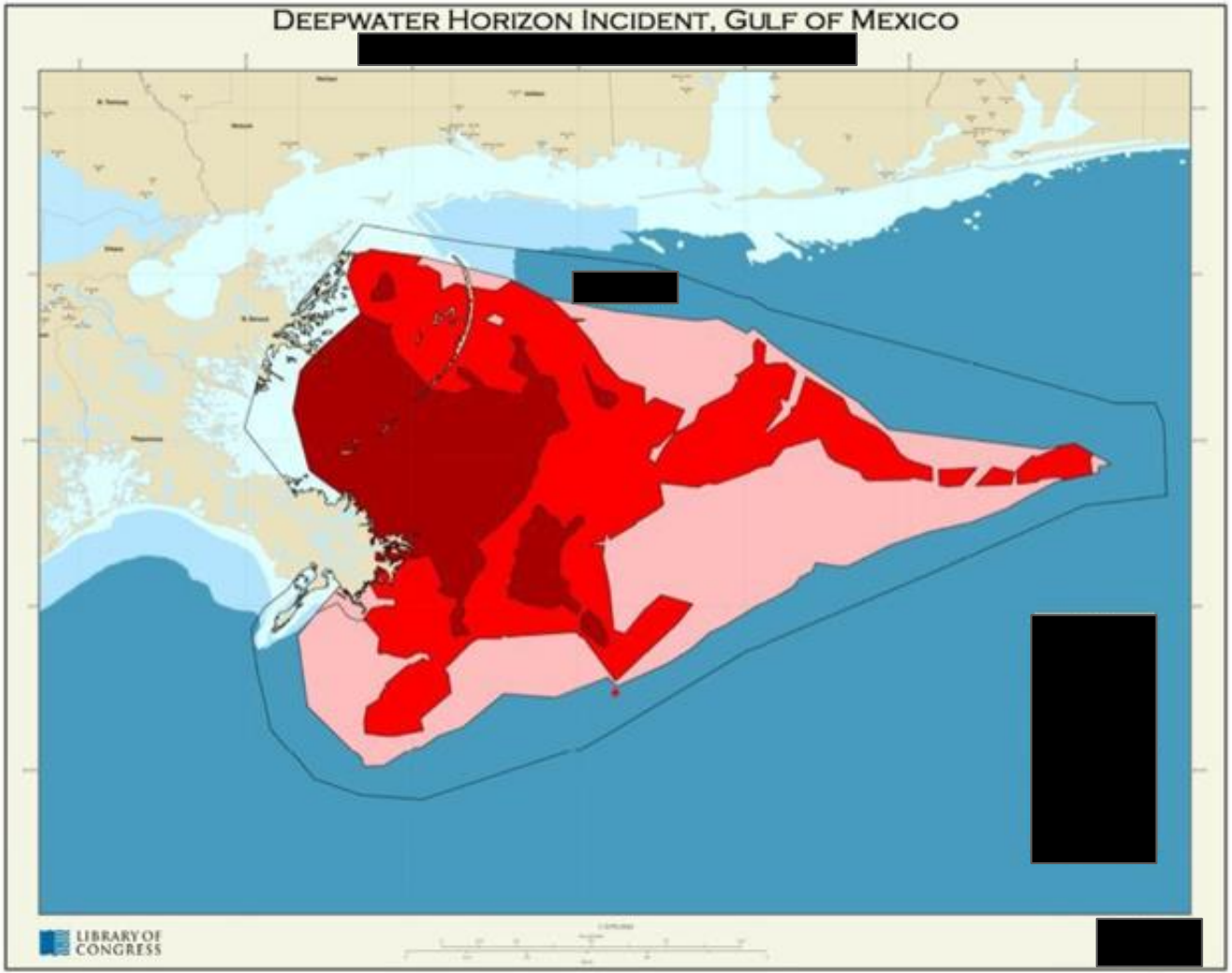
Zoom-in / Zoom-out

- 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


DEEPWATER HORIZON INCIDENT, GULF OF MEXICO
[redacted]
[redacted]
[redacted]
[redacted]
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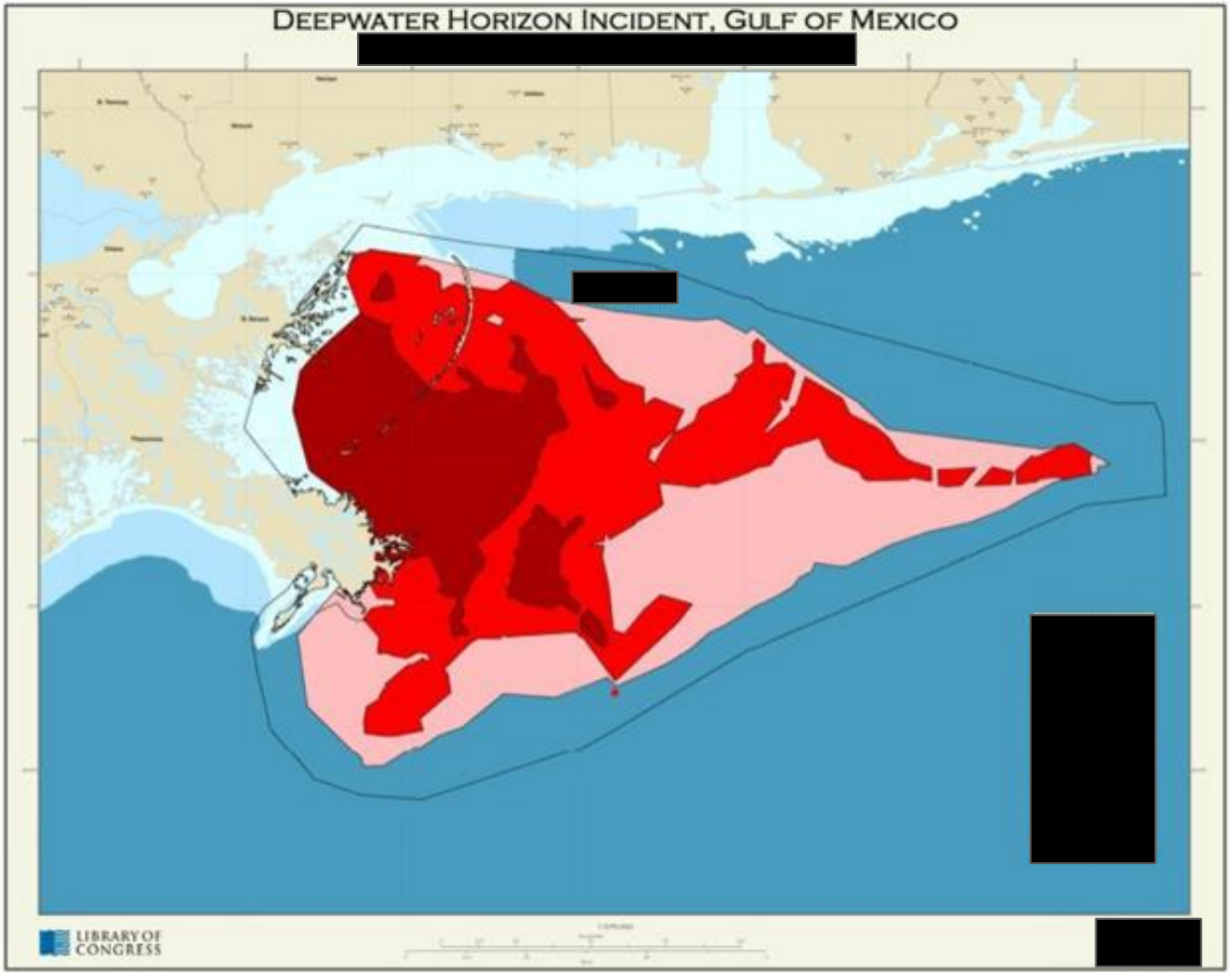
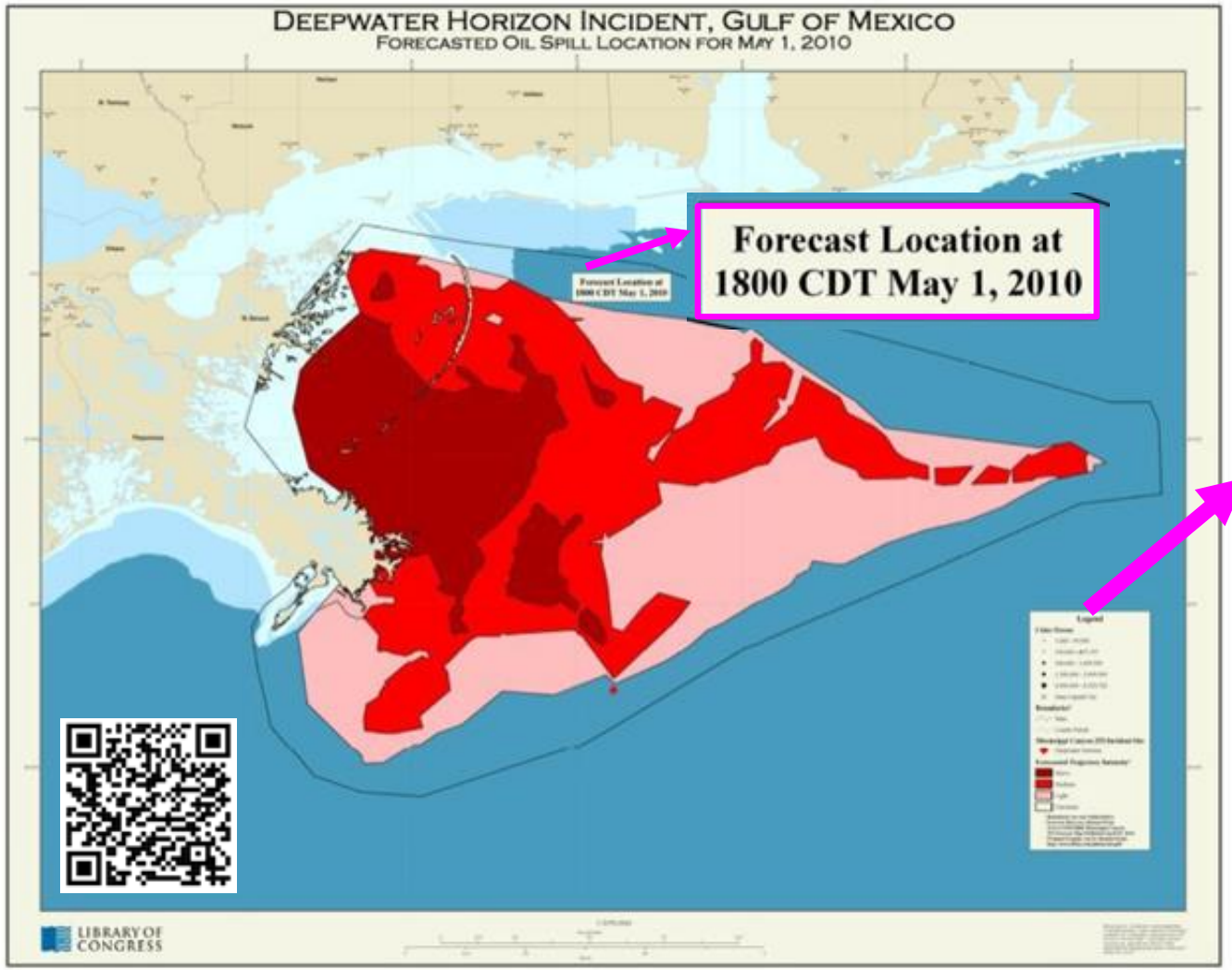
[redacted]



I think I'm looking at _____

because _____.



Legend

Cities/Towns

- 5,000 - 99,999
- 100,000 - 499,999
- 500,000 - 1,499,999
- 1,500,000 - 3,999,999
- 4,000,000 - 8,323,732
- ☆ State Capital City

Boundaries[1]

- State
- County/Parish

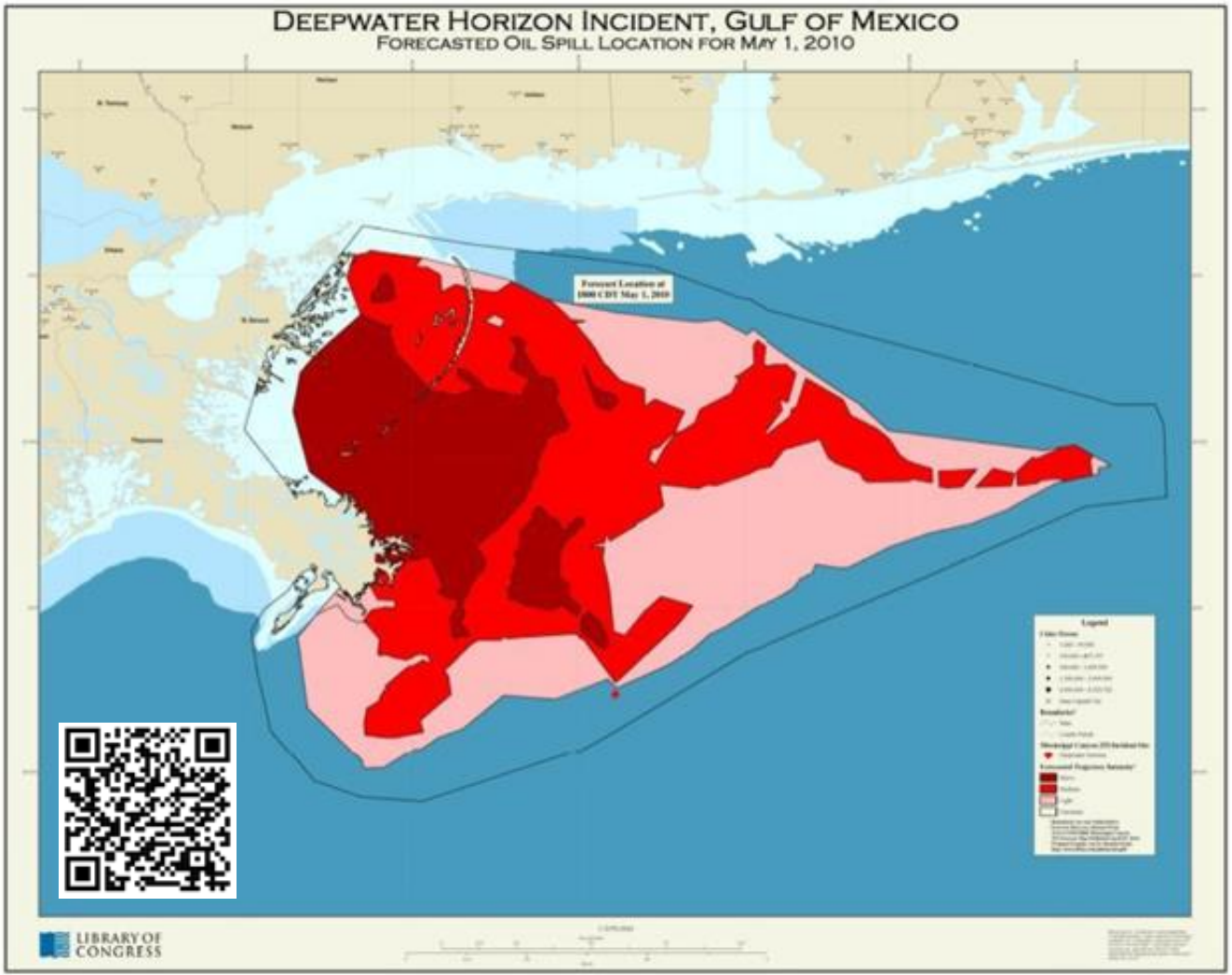
Mississippi Canyon 252 Incident Site

- Deepwater Horizon

Forecasted Trajectory Intensity[2]

- Heavy
- Medium
- Light
- Uncertain

[1] Boundaries are not Authoritative
[2] Forecast Data was obtained from NOAA/NOS/ORR Mississippi Canyon 252 Forecast Map Published April 29, 2010. Original Graphic can be obtained from: http://www.flickr.com/photos/uscgd8/



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

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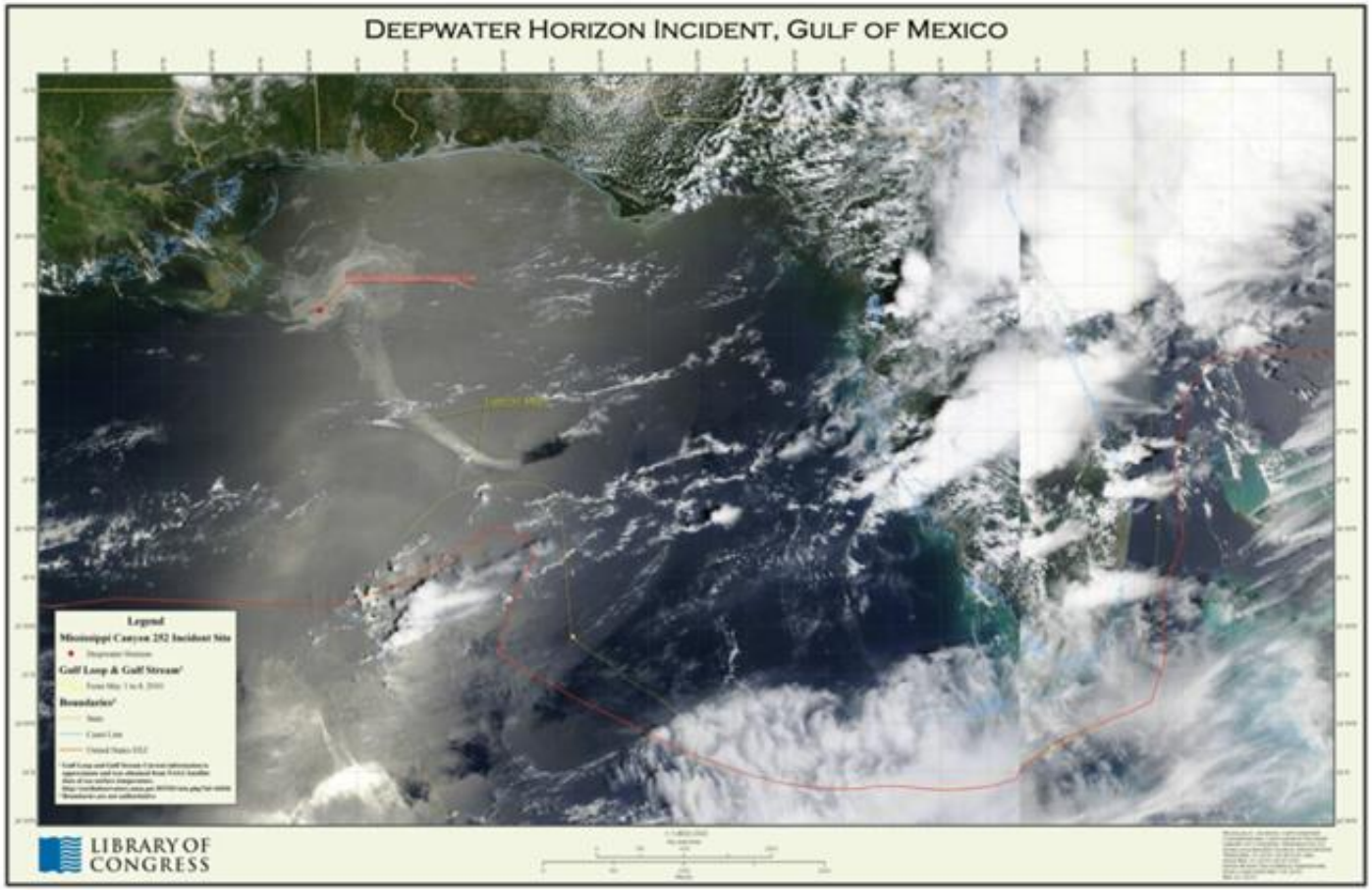
- **Lab Supplies**: glass jar, water, oil, food coloring, soap

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



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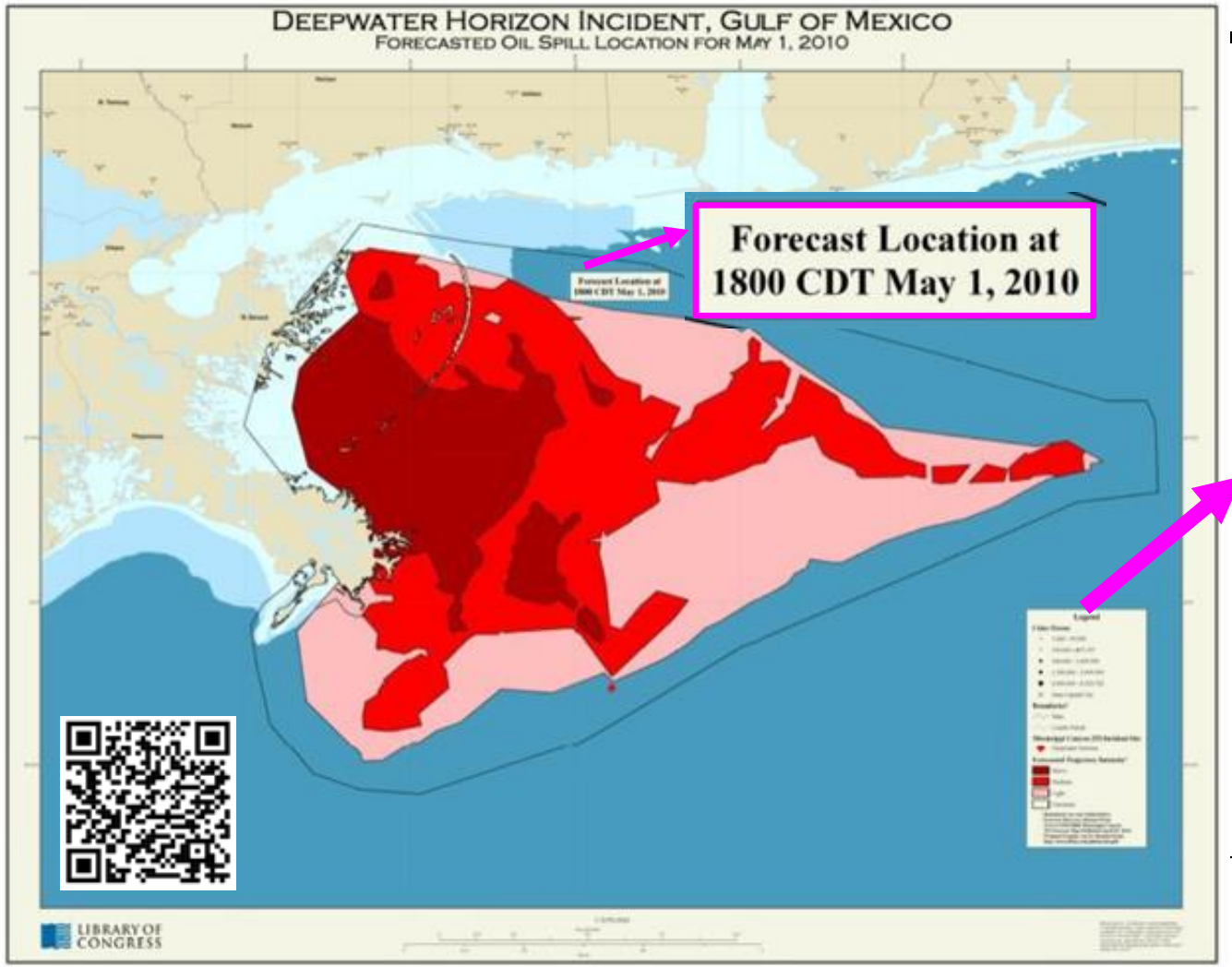

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Benjamin Franklin's ocean current map

https://eospso.nasa.gov/files/ocp/pdf/Page_145_new.pdf

Lab Connection - Oceanography

- How does ocean circulation work?

- **Key Vocabulary**: gyres, circulation, currents, mixing
- **Lab Supplies**: glass bowl, pepper flakes, straw

Lab Connection - Oceanography

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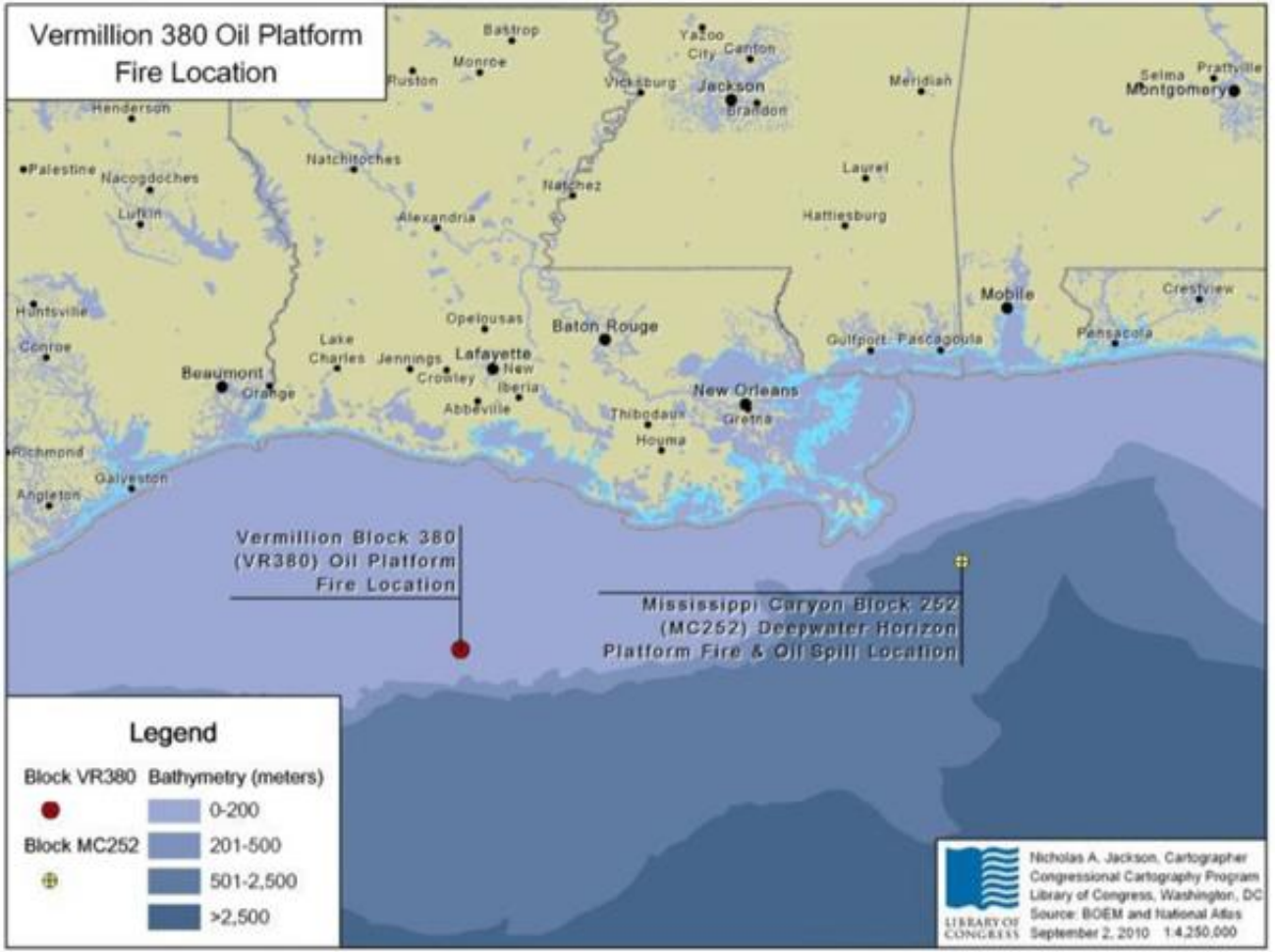
1. Add water to the bowl (about ½ way)
2. Add pepper flakes to the surface of the bowl
3. Use the straw to blow wind across the surface of the water
4. Observe what happens to the pepper flakes
5. Repeat in different directions to observe various currents

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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- Teacher Resources: https://www.loc.gov/programs/teachers
- Teacher Blog: http://blogs.loc.gov/teachers/

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