



## **Building Insights through Observation - Observation and Discussion**

Age group: Middle School

Students will collectively observe and discuss artwork that features a scientific phenomenon.

Lesson time: ~45 minutes depending on elements included

The goal is to create a safe and supportive environment for students to practice making careful observations, thinking critically about the content and features of visual representations, and providing evidence to support their insights and interpretations.

During the activity, students are invited to silently observe a piece of artwork and then a mapped visual representation of data, offering a comfortable amount of time to collect their thoughts and consider different elements of the artwork and data without influence from others. During the discussion that follows, strategic facilitation techniques are used to solicit and equitably validate ideas from as many students as possible; support students in citing evidence to support their thinking; and leverage students observations to build collective understanding, connect to students' experiences and prior knowledge, and introduce vocabulary related to scientific phenomena. The goal is to encourage students to notice, wonder, express uncertainty, and/or offer unique/diverging perspectives by removing the pressure or incentive to arrive at a "right" answer (or anxieties related to sharing the "wrong" one). The facilitation techniques are also intended to provide low-risk opportunities for students to practice supporting their inferences with evidence.

### Materials Needed:

- Teacher selected artwork featuring scientific phenomenon
  - Projected so that visible to whole class
  - *Optional: Printed or digital copies of the artwork for each student*
- Teacher selected data visualization (2-D map recommended)
  - Projected so that visible to whole class
  - *Optional: Printed or digital copies of the dataset for each student*
- Pointer/Method of directing students' attention to features (laser pointer, yard stick, mouse/cursor)
- VTS Reference Card
- Sticky notes or digital space (e.g., Google Docs) for students to record and keep track of questions about the data

### Activity:

## Art – Observation and Discussion

*Optional: Distribute or share a digital copy of the selected artwork image.*

Project the selected artwork so that it's visible to the entire class.



*Sample Image: Thomas Hart Benton - The Menemsha Hurricane [1954]*

Silent Observation (1-2 minutes): Invite students to observe the image. Provide ~1 minute to look at the image silently and independently. Optional: allow an extra minute to have students journal or write down initial ideas.

- *Teacher: Let's take a moment to look at this picture together.*

Facilitated Discussion (10 minutes): Invite as many students as possible to share their ideas about what the image shows, using the following prompts/facilitation sequence.

- *Invite Student Ideas: What's going on in this image?*
- *Gesture: As each student is speaking, use your hand, mouse, or pointer to gesture to parts of the image that they are referencing so that the whole class can see.*
- *Paraphrase: Repeat the student's observations using different language, taking advantage of opportunities to introduce appropriate vocabulary and without validating/invalidating their ideas.*
- *Ask for Evidence: What do you see that makes you say \_\_\_\_\_ ?*
- *Invite More Ideas: What more can we find?*

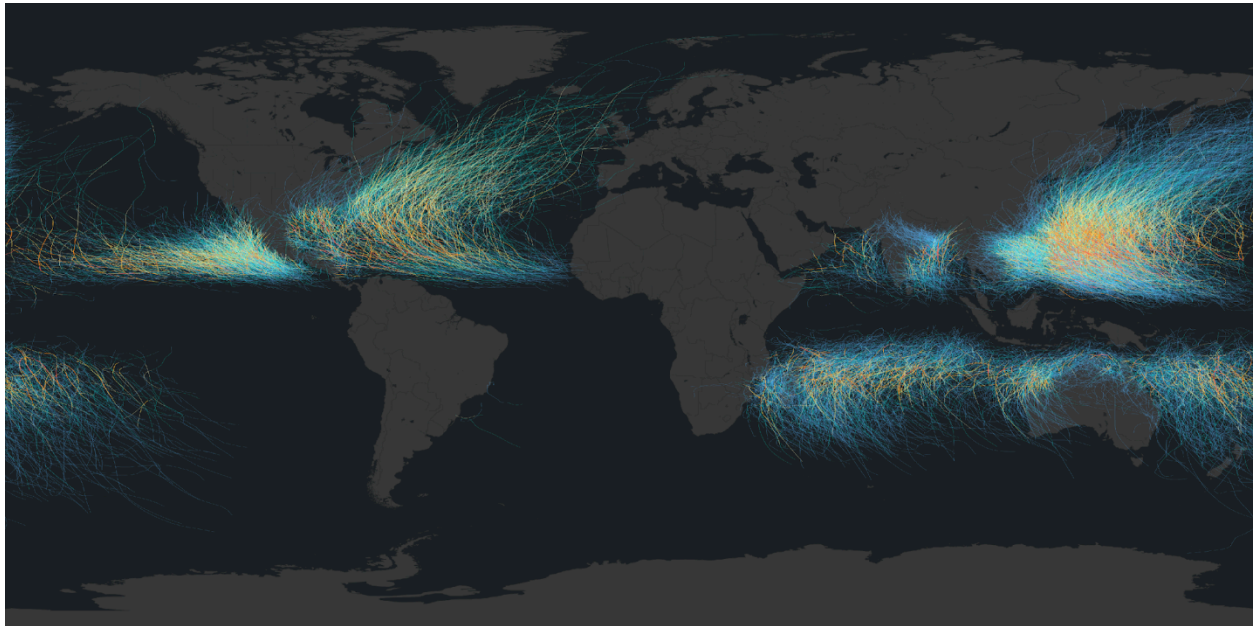
Conclusion (1 minute): Thank the class for participating in the experience and for sharing their observations.

Optional Pair-Share activity (5 minutes): allow time after the facilitated group discussion for students to share in pairs any additional thoughts or observations.

*Teacher: Now that we have all looked together I know there are still more ideas. Turn to a person sitting next to you and share more or share something you didn't share with the larger group.*

### Data-Only Visualization - Observation and Discussion

- Tell students that now you are going to use the same approach and observe a mapped dataset.   
\*It is important you do these Observation and Discussion sessions back to back. The session with the art image may be more accessible to many students and encourages those that do not usually speak up or that are uncomfortable with science/data to participate. The art image may be more engaging and personally relevant, getting the students primed in the approach of observing and talking.
- **Optional:** Share digital copies of the selected data-only visualization so that students can view on their own devices during the silent observation time. Have the students put these devices away and focus on the projected image after the observation time.
- Project the selected **data-only** visualization (no legend) visualization so that it's visible to the entire class.



*Sample SOSx Data Visualization*

- Silent Observation (1-2 minutes): Invite students to observe the data visualization without legend. Provide ~1 minute to look at the visualization silently and independently. Optional: allow an extra minute to have students journal or write down initial ideas.

*Teacher: Let's take a moment to look at this image together.*

- Facilitated Discussion Part 1 (5 minutes): Invite as many students as possible to share their ideas about what the visual patterns they see in the data visualization, using the following facilitation sequence and prompts.

*Invite Student Ideas: What's going on in this image?*

**Gesture:** As each student is speaking, use your hand, mouse, or pointer to gesture to parts of the visualization that they are referencing so that the whole class can see.

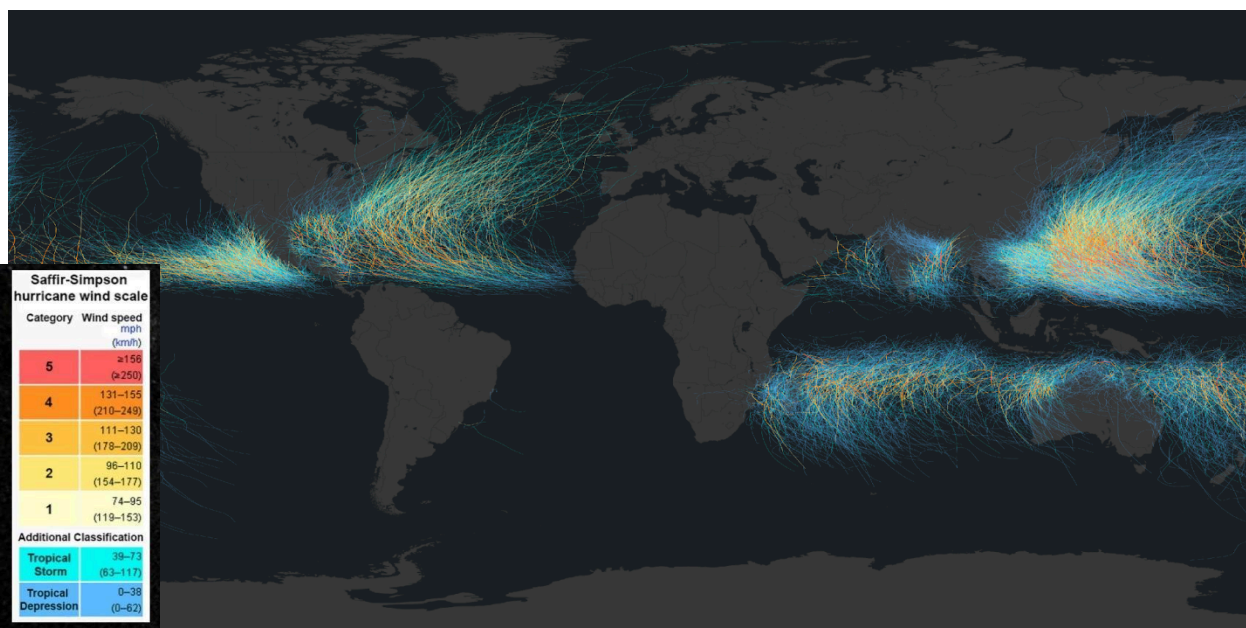
**Paraphrase:** Repeat the student's observations using different language, taking advantage of opportunities to introduce appropriate vocabulary related to the phenomenon, visualization, and/or data (e.g., scale, hemisphere, latitude/longitude, trend, variability) and without validating/invalidating their ideas.

*Ask for Evidence: What do you see that makes you say \_\_\_\_\_ ?*

*Invite More Ideas: What more can we find?*

#### Complete Data Visualization with Legend - Observation and Discussion

- Project the selected **complete** data visualization (with legend) so that it's visible to the entire class.





## Hurricane Tracks: Cumulative - 1950 - 2020

### *Sample SOSx Data Visualization with Legend*

- Silent Observation (1 minute): Invite students to look again at the data visualization that now includes a legend, providing ~1 minute to silently and independently observe.
- Facilitated Discussion Part 2 (15-20 minutes):

*Invite Student Ideas: Now that you see this addition, how has your thinking changed?*

*Gesture: As each student is speaking, use your hand, mouse, or pointer to gesture to parts of the visualization that they are referencing so that the whole class can see.*

*Paraphrase: Repeat the student's observations using different language, taking advantage of opportunities to introduce appropriate vocabulary related to the phenomenon, visualization, and/or data (e.g., scale, hemisphere, latitude/longitude, trend, variability) and without validating/invalidating their ideas.*

*Ask for Evidence: What do you see that makes you say \_\_\_\_\_ ?*

*Probe for more: What do you think [visual feature you observed] might mean?*

*Invite More Ideas: What more can we find?*

If students are having difficulty providing new observations, try asking:

*What do you wonder?*

*What jumps out at you? What do you see first?*

*Does anything in this visualization seem unusual or unexpected to you?*

*What's interesting to you? What is familiar to you?*

*If you could talk to the scientists who made this, is there anything you'd want to ask them?*

- Observation and Discussion Conclusion (1 minute): Thank the class for participating in the experience and for sharing their observations.
- Optional Pair-Share activity (5 minutes): allow time after the facilitated group discussion for students to share in pairs any additional thoughts or observations. You could use this time to have them think about additional questions they have which you will record in the next section.

*Teacher: Now that we have all looked together I know there are still more ideas. Turn to a person sitting next to you and share more or share something you didn't share with the larger group. Think about additional questions you might have. We will discuss these questions next as a class.*

Solicit & Record Questions About the Data & Phenomena (5 minutes): After students have reflected on the dataset, develop a list of questions that were generated and ask for more questions. It is at this point that you, the teacher, can interject questions that would facilitate the investigation/learning of content if the students have not yet brought it up. Ask:

*What are you curious about? What questions do we have? I'm curious why the patterns are XXXX.*

Create a digital (e.g., Google Docs) parking lot with a question list or use sticky notes, and tell students you will revisit these questions later in the program.

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