# Teacher Strategies for Data Sensemaking

**Reference Document (10/13/25 version)**

## Headlines (Ritchhart, Church, & Morrison, 2011)

- **Sample Instruction:** Write a headline for a given data visualization that captures a key aspect that you want others to take away from it.
- **What does it promote? (Purpose):** This routine asks students to reflect, synthesize, and pull to the front and center what they have gathered from the data visualization. They shift from data exploration to communication. A classroom collection of 'Headlines' adds perspective and assessment opportunities.
- **Intentionality:** This is a great strategy when students have developed skills describing data patterns and are ready to interpret data to learn something or make claims. Some students may be 'too catchy' or 'too succinct', so consider also asking for the 'words behind the headline' to understand their choices and enrich headlines.
- **Data Puzzle Lessons that use this Strategy:**
    - Megadrought in the Colorado River Basin

## Hypothesis Array (Kastens, Krumhansl, & Baker, 2015)

- **Sample Instruction:** Given a data visualization, provide students with 2-4 possible hypotheses related to the content. Either one can completely be a hypothesis fully supported by the data, or a more advanced option is to have aspects of each hypothesis be somewhat, but not fully, supported by the data. Ask them to select and defend their choice of the best hypothesis.
- **What does it promote? (Purpose):** As students are learning to build claims or make hypotheses, the array of hypotheses options provides them with a place to start. Scaffolding what hypotheses might be made from the data and prompting students to eliminate or select from options based on how the data supports or refutes a hypothesis builds their claim making skills.
- **Intentionality:** This strategy is good for complicated systems or when students may not know enough about a system to make a thoughtful prediction themselves, this strategy initiates analysis and evidence seeking efficiently. It gives them guidance towards the big ideas you hope for them to discover while holding onto a discovery approach. Note that a good array leaves room for students to conduct further research or to consider what data would support or refute the other hypotheses.
- **Data Puzzle Lessons that use this Strategy:**
    - Snow in the Rockies

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## Notice / See, Think, Wonder (Ritchhart, Church, & Morrison, 2011)

- **Sample Instruction:** Ask students probing questions, pausing for each step:
    - What do you notice/see in the data? - What is the context of the data? What are the parts of the map/graph? How are colors being used? What kind of map is being used?What kinds of data are being used?
    - What do you think is going on? - What are these data visualizations showing you about the data? How can you describe how the variables change? What are the patterns in the data?
    - What does it make you wonder? - What could the patterns mean? How could those patterns occur? What do the patterns mean to you? How might the patterns relate to other things you know?
- **What does it promote? (Purpose):** When presented with data, as a table or visually, this routine gives space for noticing the structural details (e.g., axis labels, titles, units, color, and scale) before noticing aspects of features in the data (e.g., patterns, trends, outliers, relationships) or bring in prior knowledge for thinking and wondering about the data. As they 'think', they can make claims or generate questions related to the data. When they get to wondering, they are opening up to the reasoning and curiosity we want to come with data exploration.
- **Intentionality:** As students build confidence with data exploration, they won't need the reminder to slow down and notice for every data interaction. If there are subtleties in the context or presentation of the data that might be missed or students are making inferences that go beyond the data they are given, this is an excellent routine to pull from your toolkit.
- **Data Puzzle Lessons that use this Strategy:**
    - Not All Warming Is Equal

## Slow Reveal (Laib, 2018)

- **Sample Instruction:** Show students part of a graph (i.e., stripped of all context–axes, axis labels, annotations, legends, etc.). Discuss what the data are about and what they think it means. Add more context stepwise, discussing learning in each step. Connect ideas.
- **What does it promote? (Purpose):** As more of a data visualization is revealed, students are refining their ideas and constructing meaning. Students are both engaged and surprised as interpretations change and exercise flexibility to accept new information and ideas when making sense of data.
- **Intentionality:** When students construct graphs by hand, they draw axes, determine scales, add labels, and choose a graph type before they add the data. By flipping the process with this strategy, students spend more time considering patterns and seeking context for sensemaking. As students become more confident with their own

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data sensemaking routines, they might try to predict or consider what else the pattern could represent (which also can be reinforced using Charty Party by Very Special Games).

- **Data Puzzle Lessons that use this Strategy:**
  - The Tipping Point
  - Megafires: Rare Occurrence or the New Normal?
  - To Reflect or Not to Reflect
  - Wildfire, Drought, and the Future of Forests

## What Can / Can't You Say? (Hunter-Thomson, 2020)

- **Sample Instruction:** Once students are comfortable with the context and structural components of a dataset or data visualization, ask students to list all of the things they can say and what they cannot say from the data. Share ideas and reflect on the challenge and value of identifying what they can't say.
- **What does it promote? (Purpose):** This strategy helps define an "inference space" for students, recognizing a difference between what the data on the page might actually be showing them and what they expect the data to show them. It helps them better determine what to include in their claim with greater confidence.
- **Intentionality:** When the data we are presenting to students reveals something perhaps surprising or unexpected, this strategy pulls the students back to relying on the evidence they have before them rather than their prior experience or prior conceptions.

## Zoom In (Ritchhart, Church, & Morrison, 2011)

- **Sample Instruction:** Prompt students to look at portions of a graph or table at different scales or sample sizes to consider what they see and can say from the data. Then consider a different portion of the data and discuss how the addition of new information affects their data interpretation.
- **What does it promote? (Purpose):** Viewing data at different scales (i.e., time, distance, magnitude) affects the visual patterns and therefore the interpretation of those patterns. This strategy builds students' attention to discover the full context that may or may not be apparent in the different views and a curiosity to see the whole picture. It also helps students consider the impact of sample size.
- **Intentionality:** When a data visualization looks initially overwhelming or includes multiple visual patterns, this strategy helps bring focus to the patterns in a stepwise process. With a digital and interactive data platform, it's easy to adjust the scale of axes to present the different views.
- **Data Puzzle Lessons that use this Strategy:**
  - Megadrought in the Colorado River Basin

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# References:

Hunter-Thomson, K. 2020. Data literacy 101: What can we actually claim from our data?. Science Scope 43 (6); 20-26.

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Ritchhart R., Church M., and Morrison K.. 2011. Making thinking visible: How to promote engagement, understanding, and independence for all learners. San Francisco: John Wiley & Sons.

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