**Lesson 2: How Do You Wake Up in the Morning?**

**Overview & Big Idea**: This lesson is designed to promote the idea that graphs can be used to answer questions, but only after data is organized in an easily readable form. Students work to develop categories that work to organize and structure. The displays are then used to answer questions about how students wake up in the morning.

**Tools**: Post-it notes (unlined-all the same color and size), black markers/pens, large unlined chart paper (3 pieces).

*Part 1: Collecting, Organizing, & Displaying Data*

**Activity Structure:** Starting at tables or desks, students will be asked to record how they wake up in the morning on a post-it note, and then they place the note on a large piece of paper on the board. The teacher will use questioning to help students organize the data into an easily readable display. Students will most likely start with a large number of categories as they usually see small differences as separate from one another. Reasoned decisions will need to be made by the students to construct categories in order to sort the ways they wake up. Remember, these ideas and the reasoning about the sort needs to come from the students. It may take several revisions before an easily readable and transportable display takes shape.

*Collecting Data*

* Write your name on the sticky-note and *draw a picture* that shows how you wake up in the morning.
* Put your post it notes on the poster paper in front of the class.
  + *Notes will most likely be scattered all over the board.*
  + *Ask students to take a minute to look at all the ways their classmates wake up.*

*Displaying & Comparing Data*

Point to the posted notes:

* Is this easy to read?
  + *Question Function:* A call for analyzing the organization system
* Can we tell easily how girls and boys in our classroom wake up?
  + *Question Function:* A specific question about the data that draws our attention to the organization system.
* Why is this so difficult to read?
  + *Question Function:* A request for reasoning about the difficulty with the organization system.
  + *Expect a range if ideas about why the data is difficult to read.*
  + *Record student ideas on a chart to discuss later in relation to the display the class creates. These ideas can serve as a basis for reasoning about organizing information.*

*Motivating the Need for Categories*

* Are there really 20 different ways of waking up?
* Is there anything alike about what we wrote?
* What makes something alike?
  + *Question Function:* A call for categorization
* What makes something different?
* What do we do with something different?
  + *Question Function:* Looking for attributes that can serve as rules for structuring categories.
  + The math idea here is equivalence. Equivalent ways to wake up are determined by an attribute that certain data points have in common. Attribute structure the rules that help students sort the data into categories.

*Motivating the Need of an Organized Data Display*

* How could we organize our information to make it easier to read?
* How would you like me to place our information on a new piece of paper?
* How would you show our information at a quick glance?

*Developing Audience Awareness*

* If we gave this chart to \_\_\_\_\_\_\_\_\_’s class, would they be able to quickly understand what our data was saying? (Telling us?)
* Did we include all the information on our display that helps other students know what our information is about?
* Did we organize our information in a way that we (and others) can use the data to answer questions?

*Promoting a Unchanging Display*

* Did we organize our information in a way that we could take it to another class and it will not get messed up?
* How could we use the changes/decision we made to make a display that could be used by other classes? How can we preserve our display?

*Using the Data Display to Answer Questions*

* What did we find out about how students in our class wake up?
* What did we find out about how the girls in our class wake up? Boys?
* How many different ways do students wake up in our class?
* Which way of waking up is used the most by students in our class?
* Which way of waking up is used the least?
* How many more students wake up by \_\_\_\_\_\_ than by \_\_\_\_\_\_ (choose categories to compare?
* Ask students to come up with comparisons of their own and write a story problem to go with that comparison.

*Predicting Based on a Sample*

* How do you think students in the other [*your grade-level*] classrooms wake up?
* Why do you think that?

*Part 2: Sharing & Comparing Data Displays*

*(Choose 1 or 2 Extensions)*

**Extension 1:** *Comparing Graphs*- Borrow a “Waking Up” graph from a classroom that is two grade-level steps away from yours. Compare and contrast the structure of the graphs. Discuss possible reasons for similarities and differences.

**Extension 2:** Use the other grade levels’ graph to answer the questions in the “*Using the Data Display to Answer Questions*” section above.

**Extension 3:** Write a paragraph for each graph that summarizes the findings at each grade level. Draw some conclusions about how students in your grade level wake up compared to how students in another grade level wake up. Record any further questions you want to explore about how students wake up.