



Bridging for Math Strength Resources

Standards of Learning Curriculum Framework

Standard of Learning (SOL) 5.16

a) represent data in line plots and stem-and-leaf plots;

c) compare data represented in a line plot with the same data represented in a stem-and-leaf plot.



Student Strengths	Bridging Concepts	Standard of Learning
Students collect categorical data and represent data in bar graphs and pictographs. Students ask questions about data.	Students compare data represented in different forms (bar graphs, pictographs, line graphs, charts). Students can interpret data that is represented in a variety of forms.	Students can a) represent data in line plots and stem-and-leaf plots; c) compare data represented in a line plot with the same data represented in a stem-and-leaf plot.

Understanding the Learning Trajectory

Big Ideas:

- Statistics involves a four step process: formulating questions, collecting data, analyzing data and interpreting results.
- Different graphs are appropriate for different types of data, and provide different information about the data set. The choice of graphical representation can affect how well the data are understood (Van de Walle et al., 2018).
- Range can affect the choice of graph we utilize to represent the data. A large range may be better represented on a stem-and-leaf plot while a smaller range could be represented on a line plot.

Formative Assessment:

- VDOE Just in time Quick Check SOL 5.16a [PDF](#) / [Desmos](#)
- VDOE Just in time Quick Check SOL 5.16c [PDF](#) / [Desmos](#)

Important Assessment Look Fors:

- The student uses tens digits as the stems and ones digits as the leaves in a stem-and-leaf plot.
- The student lists all stems: 50-90 even though there are no data points in the 60s.
- The student lists data from least to greatest.
- The student lists every data point in the stem-and-leaf chart including recurring data points.
- The student uses an 'x' to represent each data point on the line plot number line.
- The student creates an appropriate title for the data set.

Purposeful Questions:

- What is the best way to organize this set of data?
- What do the stems/leaves represent in this chart?
- How do you represent the same data point more than once on the stem-and-leaf plot?
- How do you show that there were no data points in the 60s?
- What does each 'x' represent in the line plot?
- What do the numbers on your line plot number line represent?

Bridging Activity to Support Standard	Instructional Tips
Routine: Notice and Wonder Slow Reveal Graphs	In this set of slides, students have the opportunity to analyze and interpret a variety of graphs. Students should ask questions about what they are seeing and think about what the data means. In a Slow Reveal routine, you first present a graph without numbers and slowly reveal more information on the graph, rather than presenting the entire graph from the beginning. Throughout the routine, students are encouraged to explore the given information, notice, wonder, and predict the missing information as the graph continues to gradually reveal more information. Students have great conversations as they turn-and-talk and share their predictions, noticings, and wonderings about each graph.
Rich Tasks: Dear Data YouCubed	This task gives students the opportunity to work through the entire data cycle. They will need to collect, analyze, interpret and communicate about data. Students should be given the opportunity to think about the best representation for the data they collected and have the chance to create multiple representations of their data so that they can be compared/contrasted. Other options for this activity: A. Make it a new graph: Have groups analyze one of the provided graphs and determine how they could represent one aspect of it in either a bar graph, pictograph, line graph, and/or chart. Students will then create the graph and can share their graphs in a gallery walk. This version will allow students to determine which characteristics of the data are best represented by each type of graph and discuss how that graph accurately represents the data. B. One graph multiple ways: At the beginning of class ask students a question and have them record the possible responses (you may want to make this categorical or quantitative data depending on where your students are). Have the class determine the best way to collect the data. Present the question: Of all the ways you have learned to represent data in the past - bar graphs, pictographs, line graphs, charts - which ways could you graph this data? Which one would you use and why? Then have students graph the data and justify their reasoning. At the end of the activity you can share how students' graphs are similar or different. Which graph was best? Why? C. Class Data Rich task: Over 2-3 days collect data from the class that would result in them needing to create a bar graph, pictograph, line graph, and (if desired, line plot

	or stem-and-leaf plot). For a line graph, they could even plot the number of students in class each day- that may also be a good one for a line plot introduction! After you've collected the data, present it to them and have them work to determine the best way to graph each set of data <i>or</i> break them into groups to do so.
Games: Play Ball Math Academy	This set of sports themed games lends itself to data collection and representation. Students can create and interpret many types of graphs after collecting data by playing the games. For games where students collect numerical data, have them create stem-and-leaf plots and line plots.
Other Resources: • VDOE Mathematics Instructional Plans (MIPS) ◦ Statistics: Learning about Our Class from Mystery Data (Word) / PDF version • VDOE Algebra Readiness Remediation Plans ◦ Data Organizers (Word) / PDF version ◦ Graph Match (Word) / PDF version ◦ Interpreting Graphs (Word) / PDF version ◦ Mystery Data (Word) / PDF version ◦ Stem and Leaf Plot (Word) / PDF version • VDOE Word Wall Cards: Grade 5 (Word / PDF) ◦ Line Plot ◦ Stem-and-Leaf Plot Learning Trajectory Resources: Charles, R. (2005). Big ideas and understandings as the foundation for elementary and middle school mathematics. <i>Journal of Mathematics Education Leadership</i>, 7(3), NCSM. Clements, D. H., & Sarama, J. (2019). Learning and teaching with learning trajectories [LT]2. Marsico Institute, Morgridge College of Education, University of Denver. https://www.learningtrajectories.org/ Common Core Standards Writing Team. (2019). Progressions for the Common Core State Standards for Mathematics. Tucson, AZ: Institute for Mathematics and Education, University of Arizona. Richardson, K. (2012). How Children Learn Number Concepts: A Guide to Critical Learning Phases. Bellingham: Math Perspectives Teacher Development Center. Van De Walle, J., Karp, K. S., & Bay-Williams, J. M. (2018). <i>Elementary and Middle School Mathematics: Teaching Developmentally</i>. (10th edition) New York: Pearson (2019:9780134802084) VDOE Curriculum Framework for All Grades - Standard of Learning Curriculum Framework (SOL)	