

Lesson Plan: Data Can Be Beautiful

Grade Level: Middle School (6th-8th Grades)

Duration: 8-9 x 50 minute class periods

Objective: Students will generate and record data and use data to create a 'traditional' graph (bar graph or pie chart). Students will create a more visually effective, artistic graph to convey the same data. Students analyze and interpret the information.

Arizona Science Standards:

7.SP.A.2 Use random sampling to draw inferences about a population.

Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.

7.SP.B Draw informal comparative inferences about two populations.

Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.

Cross cutting concepts: patterns; SEPs: analyze and interpret data, engage in argument from evidence, obtain/evaluate/communicate information.

Materials Needed

- *Dear Data* by Lupi and Posavec, one copy for students to view or student work from previous lessons
 - Notebook
 - Blank paper
 - Pencils, colored pencils, erasers
 - Chromebook for each student (small groups can share, but each student will need an individual trial)
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Lesson Introduction and Plan (day 1)

PDF slide deck presentation for teachers on this page

PDF slide deck for students on this page

Implementation (day 2 through 8)

1. Students access <https://az.pbslearningmedia.org/resource/mgbh.math.sp.minute/how-long-is-a-minute/>. Use other data aggregation resources if you want.
 - https://www.abcwua.org/wp-content/uploads/Education/7_MightyMacroinvertebrates.pdf
 - Data nuggets
 - <https://www.sciencejournalforkids.org/articles/lesson-ideas/graphing-scientific-data-for-students/>
 2. Collect individual data, aggregate as a class. Depending on student/class ability, either teacher or students calculate: average for each student, average for each trial by student or as a class, range, mode, etc. For exceptional education students, I provide a table with this information so students can choose what to graph. Discuss pros and cons of each measure (it's not always about averages!).
 3. Students create a bar graph or pie chart with their chosen data. See slide deck for graphing resource.
 4. Analyze and interpret. This can be whole group or small group discussion. Each student will write their analysis and interpretation in notebook.
 5. Students then create a more artistic version of the data (same measure). This is not solely an art project—graphs must be clear, informative, neat.
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Gallery walk and discussion (day 9)

Students can mount their graphs/art on construction paper. Students will present their graphs to the class and explain their graph—analysis, interpretation, why they chose that measure, critique their graph according to rubric.

Assessment, Enrichment/Extension

1. Optional assessment: given a data set, create a traditional graph and analyze/interpret the data. Quick sketch a simple artistic graph.
2. Use data collection and presentation skills with data from a trip to the Santa Cruz River or other outdoor location rich in biodiversity!

Rubric

Criteria	Exceeds	Meets	Approaching	Not met
Data	Data is accurate, clear, embedded	Data is accurate, clear, but inserted/after thought	Data is present but difficult to find. Unclear what data is.	Data is not present or unclear, inaccurate
Graphing	Relationship between variables is clear, show relationships or trends	Relationship between variables is present but lacks clarity	Relationship between variables is unclear or random	No relationship between variables is present or conspicuous
Art	Clear, neat, detailed, integrated with data. Theme is present. Composition, color, scale present.	Clear, neat, integrated with data. Composition and color present.	Rushed, somewhat careless. Lacking clear composition.	Rushed, careless, lack of color/tone and composition.