Data Analysis: Inference and Models Grade: 5

Standard 5.DA.IM.01
Refer to **data** sets to highlight or propose cause-and-effect relationships, predict outcomes, or communicate ideas.

Essential Skills
Use **data** to justify how you answer a question, detect a pattern, or infer causation, correlation or draw a conclusion.

Essential Questions
What features are important when considering if a **data** set is a representative sample, useful to make predictions and draw conclusions?
How can you collect data, so patterns discerned, predictions made, and conclusions drawn are as accurate as possible?

Explanation
Students will understand that **data** is information or facts that can be collected by people and **computing devices** and can be used to support a claim or make a prediction. Students should use data as evidence to identify trends, predict outcomes, highlight differences, and/or communicate insights and ideas. Different types of displays may lead to different conclusions. Students will begin to understand that a data set can be of varying quality and the quality can affect the **validity** of the conclusions or predictions. Factors such as the size of the sample, how representative of the whole a sample is, and the method of data collection all influence the **reliability** of a data set. Students should note that in a class of 30, a sample of 20 students should give a relatively accurate representation (all other factors being equal) however in a school population of 600 a sample of 20 students would not be likely to give an accurate representation.

Think of this as similar to….
When you look at a photograph you can gather information such as place, time of day, etc. But sometimes the information is not clear, or the photograph can be misleading.

Implementation Examples—What would this look like in the classroom?

Title	Description	Link	Content Connection & Notes
Journey North	**Grade 3**--Journey North contains crowdsourced data about the movement and appearance of various species across North America as the seasons change. Students will examine the data from the Journey North site and determine which data is most reliable. They can compare years (there was less data collected in the early years of the site) as well as comparing the quantity and reliability of data for the different organisms represented. **Grade 4**--Students will analyze the reliability of the data on the site in general and evaluate the pros and cons of the fact that it is crowdsourced (inexperienced collectors, much larger sample size than if only scientists collected, potential for error). The size of the data sets, and their size relative to the entire population, should also be evaluated by the students. (Estimated total Monarch butterflies in North America is 30,000; 3000 sightings recorded; Does a sample of one tenth of a class of 30 have the same reliability as a sample of one tenth of 30,000?) **Grade 5**-- Students will ask a question, draw a conclusion and decide which display best supports their claim. They will use the data to justify their conclusion, how the data display demonstrates the conclusion."	The inquiry guide which contains a wealth of information about lessons of the types described and more.	This lesson also aligns with **CS** DA.CVT.01; **MATH** 3.MD.B.3, **NGSS** 3-LS3-1
Simulating Experiments	**Grade 3**--Students run a simulation (of how many apples the elephant and hippo collect, and how long it takes to collect all the apples) multiple times in Sprite Lab. Students change the number of trials conducted and/or the number of apples collected and determine how that changes the data. **Grade 4**--Students can change variables in the simulation and collect data about the effect of the variable on the outcome. Students identify features that make the data set more consistent and what they can do to make their predictions more reliable. **Grade 5**-Students draw a conclusion about the effect of a specific change in a variable on the outcome of the simulation (for example, the faster the elephant, the more apples it collects) and use data to support their claim. They have to justify their conclusion from their data display."	Simulating Experiments	This lesson also aligns with **CS** DA.CVT.01 and **MATH** 3. MD.B.3 --if students use scaled picture or bar graphs (e.g., if each square represents 2 apples)

Title	Description	Link	Content Connection & Notes
Math Disneyland Parking Challenge	**Grade 5**--This lesson has students apply multiplication and division skills to solve the real-world problem of parking at Disneyland. Students calculate how much a parking structure will cost to build and how profitable it will be and make a recommendation about whether or not to build the parking structure. They create a display to justify their recommendation and explain why that display is best to make their case. The display is incorporated into a brochure, a recommendation to Disney or an ad about the parking structure.	Disneyland Parking Challenge	This lesson also aligns with **CS**.5.DA.IM.01, **MATH**.5.NBT.B.5, 5.NBT.B.6, and **ELA** W.5.2

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