

Pathways Planning

Select a topic: CMS ___ ATLAS ___ Cosmic ___ LIGO ___ "neutrino" ___

Task: The goal is to develop a pathway of activities designed to take student from no understanding of data use to success at asking their own research question to be answered using a large data set (Level 3).

Skill/Knowledge needed for success at Level 3	Activity that develops the Skill/Knowledge	Does the Activity Exist?	What Level is this Activity

Level Definitions

Level 0 – The student builds background skill and knowledge needed to do a Level 1 activity. Students analyze one variable; they determine patterns, organize into a table or graphical representation and perform simple calculations. Example in statistics—Number of times a rolled die returns a particular number

Level 1 – Students analyze two variables; they calculate descriptive statistics, seek patterns, identify outliers, confounding variables and perform calculations to reach findings; they may also create graphical representations of the data. Data set used are small in size ~1 – 10 events. Example in oceanography – temperature measure at various ocean depths – determine thermocline

Level 2 – Students analyze two or more variables; they calculate descriptive statistics, seek patterns, identify outliers, confounding variables and perform calculations to reach findings; they may also create graphical representations of the data. Data sets used are medium in size ~100 events. Example in climate change – CO₂ data correlated with ice core data over time

Level 3 – Students analyze two or more variables through guided inquiry; correlations; they transform provided data into usable form; they calibrate or determine useful data. Data sets used are large in size ~1000 events or more. Example in biology: determine the “carrying capacity” of a population given density and density-independent factors.

Level 4 – This is TBD, but may involve students writing or modifying code.