# Data Literacy Mini-lessons

Using data and graphs to support and supplement science curricula

## Mini Lesson key ideas:

1.  **Ask statistical questions**:

* Observe and measure a group, not just a single example.
* Recognize different kinds of questions about groups (e.g. variability within a group, how variability compares between two or more groups, how two measures are related, or how a measure changes through time).
* Choose what type of graph to use based on the kind of question.

2.  **Variability**: Show and describe how a measurement varies within a group

3.  **Compare groups**: Show if two or more groups are the same or different in a measure

4.  **Correlation**: Show if two numeric factors are correlated

5.  **Time series**: Show how a factor changes through time

6.  **Proportions**: Show how a whole is proportioned into parts

7.  (Use **Question, Evidence, Claim, Reasoning** when communicating ideas scientifically)

**Mini-lesson components**

**Starting activity (PRE)**:

A brief (5-10 min) problem or activity for students to try. Use to stimulate their thinking and interest and to assess their starting level of skill or understanding.

**Direct instruction (INSTR)**

A short set of slides, video, or guided activity that explains or demonstrates a concept or skill. Designed to be either teacher-facilitated or for students to use self-guided.

**Guided practice (PRAC)**

Short, guided problem sets in the context of a curriculum topic that students can do to practice a skill or concept working with data sets and graphs.

**Applied problem (APPL)**

A more open-ended activity in which students gather their own data and apply data and graphing skills and concepts to develop evidence to answer a question.

# Target

## Mini-Lesson 1: Statistical thinking

* ***Science Framework****: Formulate and refine questions that can be answered empirically in a science classroom and use them to design an inquiry or construct a pragmatic solution.*
* ***Math Common Core****: Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers (Math 6 SP-1).*
* ***Science framework****: Communicate scientific ideas using tables, graphs and diagrams…*

## Mini-Lesson 2: Show & describe variability

* ***Science Framework****: (Stability and change): Students…come to recognize that both the regularities of a pattern over time and its variability are issues for which explanations can be sought.*
* ***Math Common Core****: Understand that a set of data collected to answer a statistical question has a distribution, which can be described by its center, spread, and overall shape. (Math 6 SP-2).*
* ***Math Common Core****: Display numerical data in plots on a number line, including dot plots, histograms, and box plots. (Math 6 SP-4).*
* ***Math Common Core****: Summarize numerical data sets in relation to their context. (Math 6 SP-5).*

## Mini-Lesson 3: Compare groups

* ***Science Framework****: Use spreadsheets, databases, tables, charts, graphs, statistics, mathematics, and information technology to collate, summarize, and display data and to explore relationships between variables…*
* ***Math Common Core****: Informally assess the degree of visual overlap of two numerical data distributions with similar variability, measuring the difference between the centers by expressing it as a multiple of a measure of variability. (Math 7 SP-I3).*

## Mini-Lesson 4: Correlations

* ***Math Common Core****: Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. (Math 8 SP-1).*
* ***Math Common Core****: Informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line. (Math 8 SP-3).*

## Mini-Lesson 5: Time series

* ***Science Framework****: (Stability and change): Students…come to recognize that both the regularities of a pattern over time and its variability are issues for which explanations can be sought.*

## Mini-Lesson 6: Proportions

***Math Common Core****: Use ratio and rate reasoning to solve real-world and mathematical problems (Math: 6RP-3).*

## (Mini-Lesson 7: Question, Evidence, Claim, Reasoning)

***Science framework****: Engage in argument from evidence.*