# MODULE 3 OVERVIEW

TEKS* Addressed:
8.5C, **8.5D, 8.5I,** 8.11A, 8.11B, 8.11C
*Bold TEKS = Readiness Standard

# Data Data Everywhere

Sessions: **23**

' Scatter plots
' Bivariate sets of data
' Trend lines to make predictions

## Why is this module named *Data Data Everywhere*?

*Data Data Everywhere* teaches the importance of representative samples, including random samples, for the purpose of making generalizations about the populations represented by the samples. To prepare to use random samples to compare samples from populations, students first compare the measures of center and measures of variability of two different populations. Students are introduced to mean absolute deviation as an additional measure of variability to compare data sets.

mean abs deviation and comparisons

Continuing with the expansion of their study of statistics, students construct scatterplots and describe observed data addressing questions of association. They contrast bivariate sets of data that suggest a linear relationship from those that do not. They use a trend line to approximate the suggested linear relationship to make predictions. This knowledge is foundational for work that students will continue to do in future courses as they fit functions to data using regression models.

### *The Research Shows . . .*

"Every person should be able to use sound statistical reasoning to intelligently make evidence-based decisions. We need statistical literacy to succeed at work, stay informed about current events, and be prepared for healthy, happy and productive life."

*GAISE Report, 2020* | Page 5

Real wld connections

## What is the mathematics of *Data Data Everywhere*?

prior knowledge
"Arc of learning"

*Data Data Everywhere* contains two topics: *Patterns in Bivariate Data* and *Variability and Sampling*. Students will apply the skills of describing functional relationships and constructing linear models. They build off their prior knowledge and experience in the study of data displays, distribution, and numerical summaries of data with measures of center and variability.

Topic 1: patterns in Bivariate Data

Topic 2: variability & sampling

1 DAY PACING = 45-MINUTE SESSION

Possible Learning Targets

## 12 SESSIONS
11 LEARNING • 1 ASSESSMENT

## TOPIC 1 *Patterns in Bivariate Data*

**Learning Together:** 8 Sessions

TEKS: 8.5C, **8.5D**, **8.5I**, 8.11A

Students employ the statistical process as they did in prior grades, but now they apply the process to bivariate, rather than univariate, data.

- Students learn new terminology for describing scatterplots.
- Students determine, construct, and analyze trend lines for scatterplots that reveal a linear association to make predictions.

possible learn Targets

**Learning Individually:** 3 Sessions

Targeted Skills Practice for *Patterns in Bivariate Data*

- Students determine whether data represent a positive linear association, negative linear association, non-linear association or no association.
- Students construct scatterplots and describe patterns and make predictions.
- Students use a straightedge to draw lines of best fit.
- Students use equations to solve real-world problems.

## 11 SESSIONS
10 LEARNING • 1 ASSESSMENT

## TOPIC 2 *Variability and Sampling*

possible learn Targets

**Learning Together:** 7 Sessions

TEKS: 8.11B, 8.11C

Students learn the meaning of, and procedure for, calculating mean absolute deviation of a data set.

- Students calculate the mean absolute deviation of two data sets.
- Students compare data sets using measures of variability, interquartile range, and mean absolute deviation.
- Students generate random samples to determine statistics from populations and use those random samples to make conclusions, first about population, and then about two populations.
- Students use measures of center and variability and numerical displays of data.

**Learning Individually:** 3 Sessions

Targeted Skills Practice for *Variability and Sampling*

- Students calculate mean absolute deviation.
- Students use random number tables to create random samples and make inferences.
- Students analyze data plots to answer questions.

## How is *Data Data Everywhere* connected to prior learning?

*Data Data Everywhere* relies on students' understanding of writing equations of lines from a graph in the form $y = mx + b$. Students will plot scatterplots and draw trend lines for those scatterplots that show a linear association. They will use the trend line and the equation representing that trend line to make predictions for the situation.

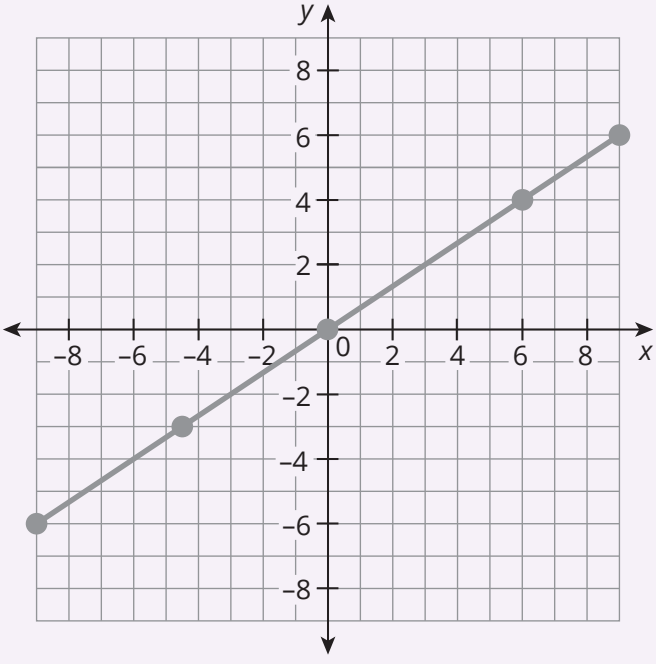
### Math Representation

Over a certain number of hours, the pool manager fills a pool at a constant rate with water to reach the desired level at 3:00 p.m.

The independent quantity, graphed on the *x*-axis, is the signed difference in hours between 3:00 p.m. and the current time. The dependent quantity, graphed on the *y*-axis, is the signed difference in inches between the desired water level and the current level.

The point $(-4.5, -3)$ means that at 10:30 a.m., the water level was 3 inches below the desired level.

**Filling a Pool**




Next, students will use the numeric and graphical displays they learned in previous grades to compare populations. Students learn to analyze statistics drawn from samples of populations, focusing on the validity and usefulness of appropriately generated data.

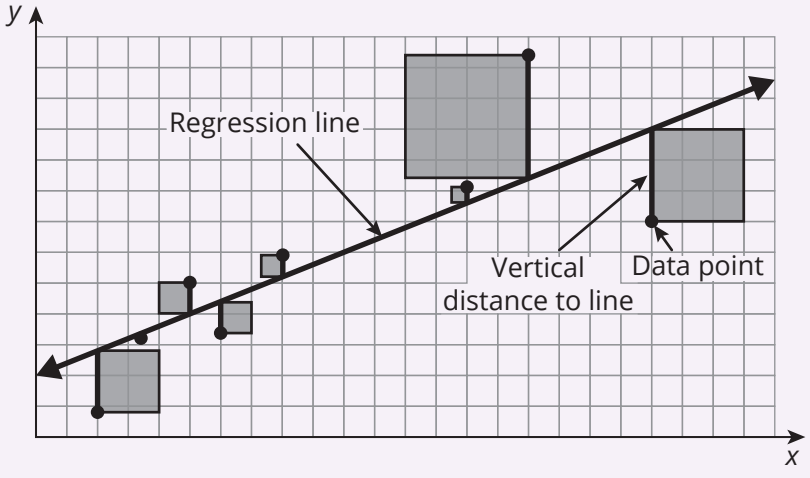
## When will students use knowledge from *Data Data Everywhere* in future learning?

The content in *Data Data Everywhere* provides the basis for the majority of students' future algebra and statistical studies. In future courses, students will engage in more rigorous study of bivariate data. They will develop formal methods for calculating a regression and analyzing a line's fit and other functions to data.

**Math Representation**

The method that your technology uses to give the trend line is the Least Squares method.

This method creates a trend line, also called a line of best fit, that contains the centroid of the data set and has the least possible vertical distances for each given data point to the regression line.




Future Learning
Arc of Learning

Conceptual understand. of linear regression

# 3 Data Data Everywhere

## MODULE 3 Assessment Summary

| Topic | Topic Title | Name | Administered | TEKS* |
|---|---|---|---|---|
| 1 | Patterns in Bivariate Data | End of Topic Assessment | After Topic 1 | 8.5C<br>**8.5D**<br>**8.5I**<br>8.11A |
| 2 | Variability and Sampling | End of Topic Assessment | After Topic 2 | 8.11B<br>8.11C |

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