Statistics Syllabus

Course Summary

This course is meant for students ages 15 to 18 who have completed, at a minimum, the Common Core (or equivalent) curriculum for Algebra 2, Geometry and PreCalculus. Students will be exposed to the Focus Areas section listed below with a focus on AP Statistics testing, and we expect students to master the skills listed in the Expected Outcomes section listed below.

Focus Areas at this Level

Concepts, skills, and learning tools students see in this course include, but are not limited to:

- Counting principles and probability, probability trees
- Data analysis and presentation: plots, charts, graphs, sampling
- Simple distributions: skew left, skew right, linear, quadratic
- Normal distribution: standard deviation, bell curving data
- Complex distributions: binomial, geometric
- Inference: p-value, significance, confidence, confidence intervals, chi-square, regression

Expected Outcomes

Students will be **expected to adequately perform in or explain** the following areas after course completion:

- Find the probability of different countable outcomes using pick, choose, and weighted probabilities
- Determine the distribution of a data set and calculate its relevant statistics
- Analyze and interpret data sets to determine the probability of future events
- Present data in a scientific manner avoiding pitfalls and misuse of statistical analytics

Pre Requisites

Students registering for this course should be **comfortable with the following Math**:

- Algebra 2 concepts for
    - graphing, solving equations, and systems of equations with 3 unknowns
    - logarithms and exponential functions
    - polynomials (factoring, finding roots, behavior of graphs)
    - sequences and series

Students should also be **willing and able to**:

- Communicate in English at a beginner's level
- Be respectful of other students in their classes
- Practice writing things down on paper
- Share their thoughts with the instructors to help them discover solutions to their problems
- Take constructive criticism when it comes to their learning habits

Course Materials (Required)

- All classes will be taught online, via Zoom. Your student will need a device with a microphone and camera.

- Homework will be assigned via:
    - **Practice Exercises**: Khan Academy AP Statistics Course
    - **Weekly Quiz**: via Canvas
- Parents are expected to have read and understood EMC's policies
    - Parents should review the expectations in class with their student(s)

Students should also have access to:

- **Graphing** Calculator
    - AP Exams Calculator Policy – AP Students | College Board
- Paper, Pencils, Ruler and Erasers
- Colored pencils or markers
- Reliable internet connection and digital device

Homework Expectations

Homework at EMC is set up to be flexible for the needs of your student. Usually we feel students fall into three general categories:

- EMC is **replacing public school or** accelerating my student for **testing out of Math** in the future
    - All Homework is **mandatory**
- EMC is helping **improve my grades** or **skills**
    - Homework is **highly recommended**, we recommend concentrating on school homework first
- EMC is for **interest's sake** and/or for **exposure** to problem solving **before seeing it in school**
    - Homework is **recommended, yet optional**

Homework Delivery

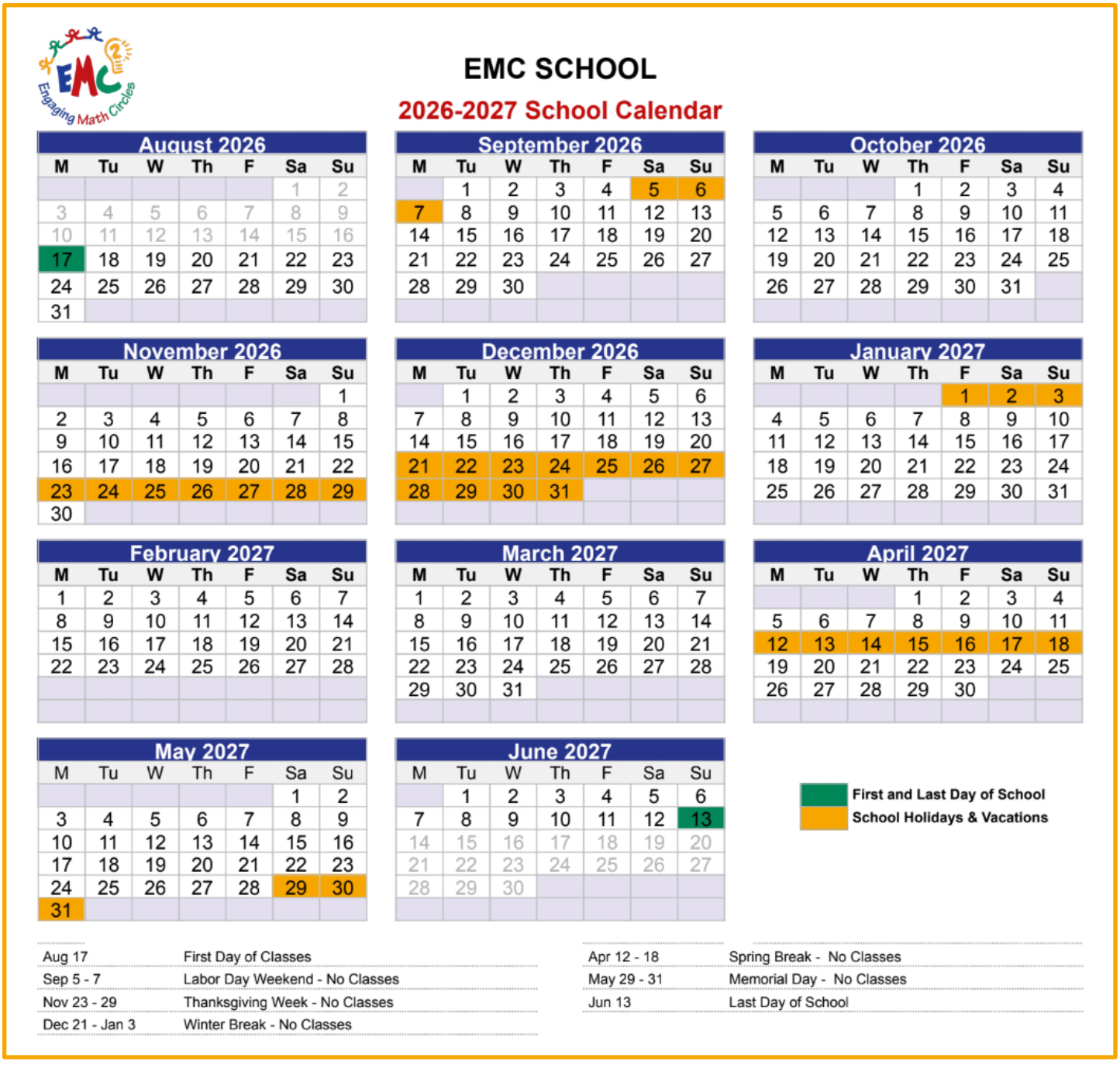
Homework is delivered in a two main ways:

- **Practice Homework**
    - Assigned through Khan Academy
    - PDFs of our lesson slides are posted weekly and include extra questions (those not covered in class)

- **Assessment Homework** (aka Quizzes, Tests)
    - Canvas, set of questions to show instructors a student's understanding of the content
    - Auto-graded upon submission
    - Instructors adjust grades after seeing results to give partial marks where appropriate, and plan to cover certain problem areas in the Homework Check portion of next class

Course Calendar

On yellow dates on the calendar below, no classes are held. Some days of the week (Sat, Sun, Mon) have less classes per year. These courses will have slightly condensed in-class schedules, and your instructor will let you know which homework assignments to do each week.



EMC SCHOOL

2026-2027 School Calendar

August 2026

M	Tu	W	Th	F	Sa	Su
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

September 2026

M	Tu	W	Th	F	Sa	Su
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

October 2026

M	Tu	W	Th	F	Sa	Su
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

November 2026

M	Tu	W	Th	F	Sa	Su
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

December 2026

M	Tu	W	Th	F	Sa	Su
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

January 2027

M	Tu	W	Th	F	Sa	Su
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

February 2027

M	Tu	W	Th	F	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

March 2027

M	Tu	W	Th	F	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

April 2027

M	Tu	W	Th	F	Sa	Su
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

May 2027

M	Tu	W	Th	F	Sa	Su
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

June 2027

M	Tu	W	Th	F	Sa	Su
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

First and Last Day of School

School Holidays & Vacations

Aug 17	First Day of Classes
Sep 5 - 7	Labor Day Weekend - No Classes
Nov 23 - 29	Thanksgiving Week - No Classes
Dec 21 - Jan 3	Winter Break - No Classes
Apr 12 - 18	Spring Break - No Classes
May 29 - 31	Memorial Day - No Classes
Jun 13	Last Day of School

Course Itinerary

Chapter	Lesson	Class Dates	Homework Assigned ***Level up*** in each link for sufficient practice
Chapter 1: Categorical Data	**1) Variation and Variables**	Aug 17- Aug 23	Individuals, variables, and categorical & quantitative data Reading bar graphs
	2) Graphing Categorically	Aug 24 - Aug 30	Read two-way frequency tables Create two-way frequency tables Analyze two-way frequency tables Interpret two-way tables Mosaic plots
	3) Two Categorical Variable	Aug 31 - Sept 6 OFF Sat Sept 5, Sun Sept 6 Labor Day	Identify marginal and conditional distributions Marginal distributions Conditional distributions
Chapter 2: Quantitative Data	**4) Plots and -grams**	Sept 7 - Sept 13 OFF Mon Sept 7 Labor Day	Reading dot plots & frequency tables Create histograms Read histograms Reading stem and leaf plots
	5) Introducing Distributions	Sept 14 - Sept 20	Shape of distributions Describing distributions Comparing distributions
Chapter 3: Quantitative Statistics	**6) Central Statistics**	Sept 21 - Sept 27	Calculating mean and median from data displays Missing value given the mean Effects of shifting, adding, & removing a data point Estimating mean and median in data displays
	7) Variability Statistics	Sept 28 - Oct 4	Interquartile range (IQR) Sample standard deviation Visually assess standard deviation Transforming data
	8) Plots, -tiles, and Outliers	Oct 5 - Oct 11	Reading box plots Interpreting quartiles Identifying outliers Calculate percentiles
Chapter 4: Normal Distribution	**9) z-scores and Density Curves**	Oct 12 - Oct 18	Calculating z-scores Comparing with z-scores
	10) Normal Distribution	Oct 19 - Oct 25	Empirical rule Normal distribution: Area above or below a point Normal distribution: Area between two points

			Normal calculations in reverse
Chapter 5: Two Variable Quantitative Data	11) Scatterplots	Oct 26 - Nov 1	Making appropriate scatter plots Positive and negative linear associations from scatter plots Describing trends in scatterplots Describing scatterplots
	12) Correlation and Residuals	Nov 2 - Nov 8	Correlation coefficient intuition Calculating and interpreting residuals Residual plots
	13) Least Squares Regression	Nov 9 - Nov 15	Calculating the equation of the least-squares line Interpreting slope and y-intercept for linear models Using least-squares regression output
	14) Departures from Linearity	Nov 16 - Nov 22	Effects of influential points Identify influential points Predict with transformed data
Holiday	**Thanksgiving**	**OFF** Nov 23 - Nov 29	**Have a great week!**
Chapter 6: Collecting Data	15) Problems with, Bias, and Random Sampling	Nov 30 - Dec 6	Identify the population and sample Generalizability of results Bias in samples and surveys Simple random samples Sampling methods Sampling method considerations
	16) Study Planning vs Experimental Design	Dec 7 - Dec 13	Types of studies Experiment designs Experiment design considerations Conclusions in observational studies versus experiments Finding errors in study conclusions
17) Winter Review		Dec 14 - Dec 20	• Review of Chapters 1 through 5
Holiday	**Winter Break**	**OFF 2 WEEKS** Dec 21 - Jan 3	**Have a great break!**
Chapter 7: Probability	18) Experimental vs Theoretical, Mutually Exclusive	Jan 4 - Jan 10	Interpret results of simulations Two-way tables, Venn diagrams, and probability Calculate conditional probability

	19) Conditional Probability, (In)dependent Events	Jan 11 - Jan 17	Probability with general multiplication rule Probability of "at least one" success
Chapter 8: Random Variables and Probability Distributions	**20) Distributions and their Statistics**	Jan 18 - Jan 24	Graph probability distributions Probability with discrete random variables Develop probability distributions: Theoretical probabilities Mean (expected value) of a discrete random variable Interpret expected value
	21) Combining Statistics	Jan 25 - Jan 31	Standard deviation of a discrete random variable Transforming random variables Combining random variables Combining normal random variables
	22) Binomial Distributions	Feb 1 - Feb 7	Identifying binomial variables Binomial probability formula Calculating binomial probability Mean and standard deviation of a binomial random variable
	23) Geometric Distributions	Feb 8 - Feb 14	Binomial vs. geometric random variables Geometric distributions Geometric probability Cumulative geometric probability
Chapter 9: Sampling Distributions	**24) Central Limit Theorem**	Feb 15 - Feb 21	Probability in normal density curves Sample means and the central limit theorem Biased and unbiased estimators
	25) Sampling for Proportions	Feb 22 - Feb 28	The normal condition for sample proportions Mean and standard deviation of sample proportions Finding probabilities with sample proportions
	26) Sampling for Means	Mar 1 - Mar 7	Mean and standard deviation of difference of sample proportions Shape of sampling distributions for differences in sample proportions Mean and standard deviation of sample means Finding probabilities with sample means Mean and standard deviation of difference of sample means Shape of sampling distributions for differences in sample means

27) Spring Review		Mar 8 - Mar 14	• Review of Chapters 6 through 8 • **Math Map** Where does this go?
Chapter 10: Categorical Inference: Proportional	**28) Confidence Intervals**	Mar 15 - Mar 21	Conditions for a z interval for a proportion Finding the critical value z* for a desired confidence level Calculating a z interval for a proportion Sample size and margin of error in a z interval for p
	29) Significance and Hypotheses	Mar 22 - Mar 28	Writing null and alternative hypotheses Estimating P-values from simulations Writing hypotheses for a test about a proportion
	30) Testing, and Error	Mar 29 - Apr 4	Conditions for a z test about a proportion Calculating the test statistic in a z test for a proportion Calculating the P-value in a z test for a proportion Making conclusions in a z test for a proportion Type I vs Type II error Error probabilities and power
	31) Two Variable Testing and Error	Apr 5 - Apr 11	Conditions for inference on two proportions Two-sample z interval for the difference of proportions Writing hypotheses for testing the difference of proportions Test statistic in a two-sample z test for the difference of proportions P-value in a two-sample z test for the difference of proportions Making conclusions about the difference of proportions
Holiday	**Spring Break**	**OFF** **Apr 12 - Apr 18**	**Have a great week!**
Chapter 11: Quantitative Inference: Means	**32) Mean Confidence**	Apr 19 - Apr 25	Conditions for a t interval for a mean Finding the critical value t* for a desired confidence level Calculating a t interval for a mean Writing hypotheses for a test about a mean Conditions for a t test about a mean Calculating the test statistic in a t test for a mean Calculating the P-value in a t test for a mean Making conclusions in a t test for a mean
	33) Two Variable Testing	Apr 26 - May 2	Conditions for inference on two means

			Two-sample t interval for the difference of means (calculator-active) Writing hypotheses to test the difference of means Test statistic in a two-sample t test P-value in a two-sample t test Making conclusions about the difference of means
Chapter 12: Categorical Inference: Chi-square	**34) Goodness of Fit**	May 3 - May 9	Expected counts in a goodness-of-fit test Conditions for a goodness-of-fit test Test statistic and P-value in a goodness-of-fit test Conclusions in a goodness-of-fit test
	35) Chi squared testing	May 10 - May 16	Expected counts in chi-squared tests with two-way tables Test statistic and P-value in chi-square tests with two-way tables Making conclusions in chi-square tests for two-way tables
Chapter 13: Quantitative Inference: Slopes	**36) Slope Regression**	May 17 - May 23	Confidence interval for slope Test statistic for slope Making conclusions about slope
Chapter 14: AB Prep	**37) Chapter 1 to 8 Review**	May 24 - May 30 **OFF Sat Sun May 29 and 30 Memorial Day**	Unit tests for each Chapter
	38) Chapter 9 to 13 Review	May 31 - June 6 **OFF Mon May 31 Memorial Day**	Unit tests for each Chapter
39) Mock AP Stats Final		June 7 - June 13	In-class **live** AP Stats practice test Solo, quiet, proctored by the instructor.