# 📊 *AP Statistics Summer Work* 📊

Welcome to **AP Statistics**!
This summer assignment is meant to help you build confidence in analyzing data before the school year begins. Don't stress—plenty of space is provided for you to show your work and think things through.

## 🔍 *What's Included:*

### *1. Reading & Vocabulary (Optional)*

- Use the free website: www.stattrek.com
- Click on *"AP Statistics"* → *"AP Tutorial"*
- Review the listed subtopics and, if you'd like, complete the vocabulary list provided.
- *This section is optional and will not be graded, but it's a helpful way to get familiar with key terms.*

### *2. Practice Problems (Required & Graded)*

- After reviewing the material, complete the practice problems in the space provided.
- *This section is required and will count as your first grade in AP Statistics.*
- **This assignment will be graded as a test grade.**

Extra Notes: A graphing calculator is a required tool for this course. The TI-84 is recommended. As you complete the practice problems, reference the skills below to assist you.

### One Variable Data

| Function | When to use it | Input Command |
|---|---|---|
| 1-Var Stats (STAT, CALC) | To find mean, standard deviation, and 5 number summary for a data set. | Enter data in $L_1$ and frequency in $L_2$ if needed **1-Var Stats $L_1$** or **1-Var Stats $L_1,L_2$** |

### Two Variable Data

| Function | When to use it | Input Command |
|---|---|---|
| LinReg (a + bx) (STAT, CALC) DiagnosticOn | To find the equation for a least squares regression line. To find r and $r^2$. | Enter values in $L_1$ (explanatory) Enter values in $L_2$ (response) **LinReg (a + bx) $L_1,L_2$** |

A graphing calculator is a required tool for this course. The TI-84 Plus or the TI-84 Plus CE are the recommended calculators. As you complete the practice problems refer to the TI Guidebooks to become familiar with the list and statistical functions. For an online calculator go to https://ti84calc.com/ti84calc  or  www.alcula.com/calculators/statistics

🗓️ Suggested June Pacing (Optional Vocabulary Practice)

If you'd like a head start on AP Statistics vocabulary, here's a relaxed weekly plan just for June. This section is **not graded**, but it's a great way to feel more confident with key terms and graph types before we dive into content in August.

**Week 1: June 3 – June 7**
• Variables: Categorical, Quantitative, Discrete, Continuous
• Data Types: Univariate, Bivariate, Population, Sample

**Week 2: June 10 – June 14**
• Center & Spread: Mean, Median, Range, Outlier, Parameter, Statistic
• More Measures: Standard Score (z-score), Variance, Standard Deviation

**Week 3: June 17 – June 21**
• Shape & Distribution: Symmetry, Unimodal, Bimodal, Skewness, Uniform, Gaps
• Graph Types: Dotplots, Bar Chart, Histogram, Differences Between the Two

**Week 4: June 24 – June 28**
• More Graphs: Stemplots, Boxplots, Quartiles, IQR
• Describing Data Sets: 4 Characteristics & Comparison Graphs

📝 *July Game Plan (Required & Graded Practice Problems)*

These problems are **required** and will be **graded as a test grade** at the start of the school year. Use this weekly plan to stay on track through July!

**Week 1: July 1 – July 5**
◆ *Categorical or Quantitative?*
◆ *Statistics – What is That?* (McGuire Home Run Stats)

**Week 2: July 8 – July 12**
◆ *Actual Candy Percentages*
▪ Bar Graph & Pie Chart Practice

**Week 3: July 15 – July 19**
◆ *It's a Twister!*
▪ Create a Dotplot for Hurricane Data

**Week 4: July 22 – July 26**
◆ *Shopping Spree*
▪ Create a Stemplot
◆ *Where Do the Older Folks Live?*
▪ Complete Histogram and Frequency Table

**Week 5: July 29 – August 2**
◆ *SSHA Scores*
▪ Numerical Summaries & Parallel Boxplots

If you have any questions, you can email me at kolton.begley@knoxschools.org. Please know it may take 48 hours to receive a response in the summer, and I will not be able to answer emails from June 1-9 or from June 24 to June 30. Good luck!

# Part 1: Vocabulary List

Please define each of the following terms from the information on the stattrek website. When asked to provide a UNIQUE example or sketch of the word, provide one that is not on the website and not one that your friends use ☺

| Word/Definition | Example/Picture/Formula |
|---|---|
| Categorial Variables | |
| Quantitative Variables | |
| Discrete Variables | |
| Continuous Variables | |

| Univariate Data | |
| --- | --- |
| Bivariate Data | |
| Population | |
| Sample | |

| Median | |
|---|---|
| Mean | |
| Outlier | |
| Parameter | |

| Statistic | |
|---|---|
| Range | |
| Standard Score (z-score) | |
| Center | |

| Spread | |
|---|---|
| Variance | |
| Standard Deviation | |
| Symmetry | |

| Unimodal | |
|---|---|
| Bimodal | |
| Skewness (Left vs. Right) | |
| Uniform | |

| Gaps | |
|------|--|
| Dotplots | |
| Bar Chart | |
| Histogram | |

| | |
|---|---|
| Difference Between a Bar Chart and Histogram | |
| Stemplot | |
| Boxplots | |
| Quartiles | |

| Range | |
|---|---|
| Interquartile Range | |
| Four ways to describe data sets | |
| Types of Graphs that can be used for comparing data | |

# Part Two: Practice Problems

## Categorical or Quantitative
Determine if the variables listed below area quantitative or categorical.

1. Time it takes to get to school
2. Number of people under 18 living in a household
3. Hair color
4. Temperature of a cup of coffee
5. Height
6. Amount of oil spilled
7. Age of Oscar winners
8. Jellybean flavors
9. Country of origin
10. Number of pairs of shoes owned

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## Statistic – What is that?
A statistic is a number calculated from a sample of data. Quantitative data has many different statistics that can be calculated. Determine the given statistics from the data below on the number of homeruns Mark McGuire hit in each season from 1982-2001.

| 70 | 52 | 22 | 49 | 3 | 32 | 58 | 39 |
|----|----|----|----|---|----|----|----|
| 39 | 65 | 42 | 29 | 9 | 32 | 9 | 33 |

| | |
|---|---|
| Mean | |
| Minimum | |
| Maximum | |
| Median | |
| Q1 | |
| Q3 | |
| Range | |
| Interquartile Range (IQR) | |

## Actual Candy Percentages

Suppose that you were interested in the actual percentage of each flavor skittle that was in a bag. To do this, you decide to purchase 5 bags of skittles and count how many of each flavor was in each bag (before enjoying them, of course!) You found that there are 176 green apple, 123 strawberry, 225 grape, 252 lemon, and 237 orange.

1. Find the percent of color of skittles from the total amount in your 5 bags, rounded to the nearest percent.

2. NEATLY created a well-labeled bar graph of the distribution of colors of skittles.
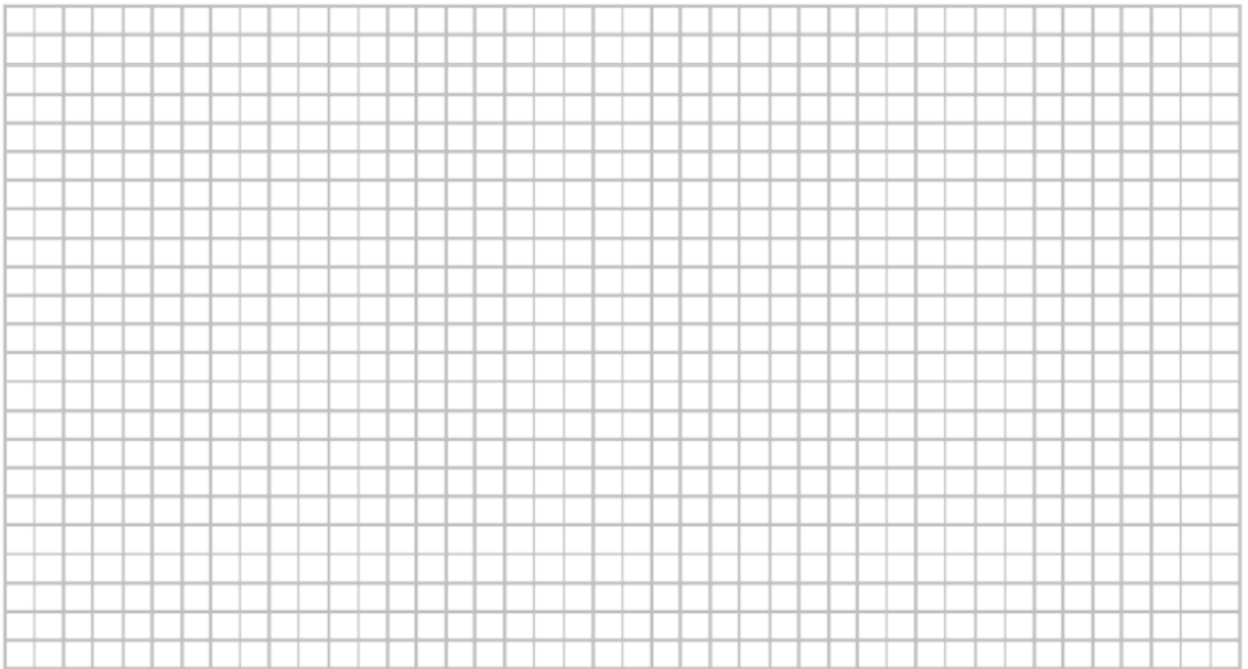
3. A pie chart is another graphical display used to show all the categories in a categorial variable relative to each other. Create a pie chart for colors of skittles.

## It's a Twister!

The data below give the number of hurricanes that happened each year from 1944 through 2000 as reported by *Science* magazine.

| 3 | 2 | 1 | 4 | 3 | 7 | 2 | 3 | 3 | 2 | 5 | 2 | 2 | 4 | 2 | 2 | 6 | 0 | 2 | 5 | 1 | 3 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 2 | 1 | 0 | 1 | 2 | 3 | 2 | 1 | 2 | 2 | 2 | 3 | 1 | 1 | 1 | 3 | 0 | 1 | 3 | 2 | 1 | 2 | 1 |
| 1 | 0 | 5 | 6 | 1 | 3 | 5 | 3 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

1. Make a dotplot to display these data. Make sure you include appropriate label, title, and scale. The graph paper below should help to ensure you space your markings consistently.
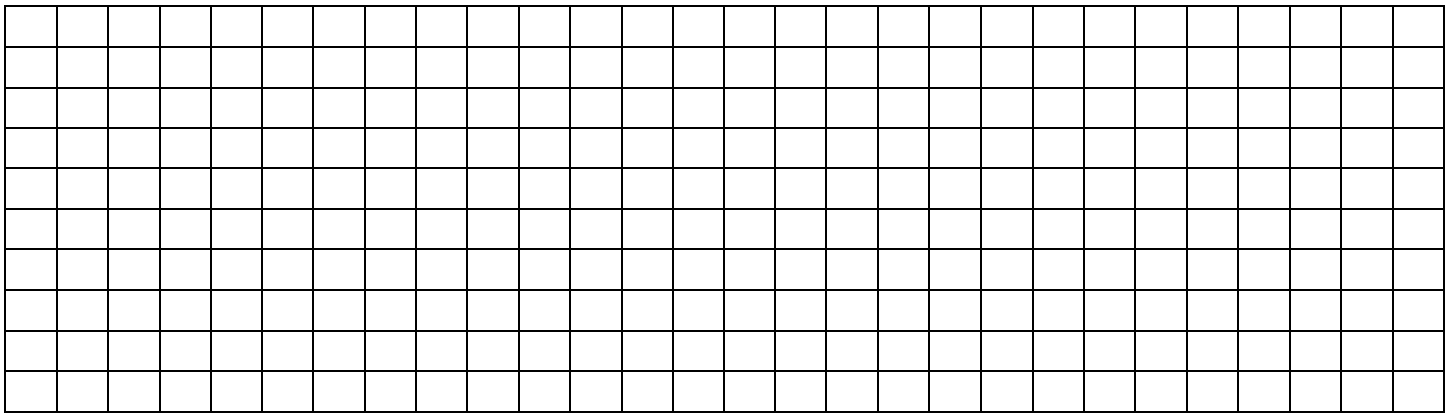
## Shopping Spree

A marketing consultant observed 50 consecutive shoppers at a supermarket. One variable of interest was how much each shopper spent in the store. Here are the data (rounded to the nearest dollar), arranged in increasing order.

| 3 | 9 | 9 | 11 | 13 | 14 | 15 | 16 | 17 | 17 |
|---|---|---|----|----|----|----|----|----|----|
| 18 | 18 | 19 | 20 | 20 | 20 | 21 | 22 | 23 | 24 |
| 25 | 25 | 26 | 26 | 28 | 28 | 28 | 28 | 32 | 35 |
| 36 | 39 | 39 | 41 | 43 | 44 | 45 | 45 | 47 | 49 |
| 50 | 53 | 55 | 59 | 61 | 70 | 83 | 86 | 86 | 93 |

1. Make a stemplot using tens of dollars as the stem and dollars as the leaves. Make sure you include appropriate labels, title, and key.

    This table gives the percentage of residents aged 65 or older in each of the 50 states.

| State | Percent | State | Percent | State | Percent |
|---|---|---|---|---|---|
| Alabama | 13.1 | Louisiana | 11.5 | Ohio | 13.4 |
| Alaska | 5.5 | Maine | 14.1 | Oklahoma | 13.4 |
| Arizona | 13.2 | Maryland | 11.5 | Oregon | 13.2 |
| Arkansas | 14.3 | Massachusetts | 14.0 | Pennsylvania | 15.9 |
| California | 11.1 | Michigan | 12.5 | Rhode Island | 15.6 |
| Colorado | 10.1 | Minnesota | 12.3 | South Carolina | 12.2 |
| Connecticut | 14.3 | Mississippi | 12.2 | South Dakota | 14.3 |
| Delaware | 13.0 | Missouri | 13.7 | Tennessee | 12.5 |
| Florida | 18.3 | Montana | 13.3 | Texas | 10.1 |
| Georgia | 9.9 | Nebraska | 13.8 | Utah | 8.8 |
| Hawaii | 13.3 | Nevada | 11.5 | Vermont | 12.3 |
| Idaho | 11.3 | New Hampshire | 12.0 | Virginia | 11.3 |
| Illinois | 12.4 | New Jersey | 13.6 | Washington | 11.5 |
| Indiana | 12.5 | New Mexico | 11.4 | West Virginia | 15.2 |
| Iowa | 15.1 | New York | 13.3 | Wisconsin | 13.2 |
| Kansas | 13.5 | North Carolina | 12.5 | Wyoming | 11.5 |
| Kentucky | 12.5 | North Dakota | 14.4 | | |

Histograms are a way to display groups of quantitative data into bins (the bars). These bins have the same width and scale and are touching because the number line is continuous. To make a histogram you must first decide on an appropriate bin width and count how many observations are in each bin. The bins for percentage of residents aged 65 or older have been started below for you.

1. Finish the chart of bin width and then create a histogram using those bins on the grid below. Make sure you include appropriate labels, title, and scale.

| Bin Widths | Frequency |
|---|---|
| 4 to <6 | 1 |
| 6 to <8 | |
| 8 to <10 | |
| | |
| | |
| | |
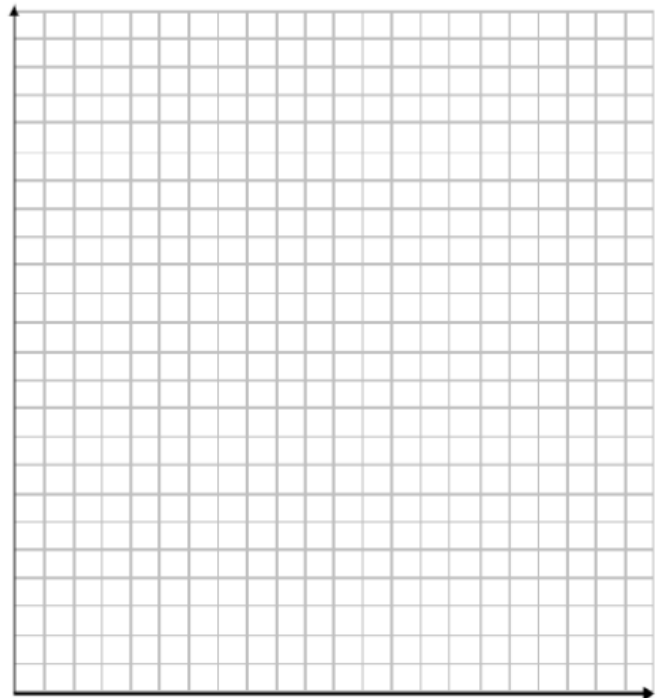
## SSHA Scores

Here are the scores on the Survey of Study Habits and Attitudes for first year college students.

| 154 | 109 | 137 | 115 | 140 | 154 | 101 | 103 | 126 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 137 | 165 | 165 | 129 | 200 | 148 | 152 | 178 | 126 |

Here are the scores on the Survey of Study Habits and Attitudes for third year college students.

| 108 | 151 | 140 | 70 | 114 | 115 | 91 | 187 | 180 | 104 |
|-----|-----|-----|----|-----|-----|----|-----|-----|-----|
| 115 | 126 | 92 | 169 | 146 | 109 | 132 | 75 | 88 | 113 |

1.  Put the data values in ascending order for each group above. Compute numerical summaries for each group.

| First Year Students | | | Third Year Students | |
|---|---|---|---|---|
| Mean | | | Mean | |
| Minimum | | | Minimum | |
| Q1 | | | Q1 | |
| Median | | | Median | |
| Q3 | | | Q3 | |
| Maximum | | | Maximum | |
| Range | | | Range | |
| IQR | | | IQR | |

2.  Using the minimum, Q1, Median, Q3, and Maximum from each group of students, make parallel boxplots to compare the distributions.