

Statistics in Real Life Activity Pack

20 Real-World Activities for Grades 7–10

- ◆ Sports • Health • Social Media • Food • Environment
 - ◆ Mean, Median & Mode • Box Plots • Histograms
- ◆ Misleading Graphs • Sampling Bias • Survey Design
 - ◆ Misleading Graph Analysis Set (5 Examples)
 - ◆ Survey Design & Analysis Project Guide
 - ◆ Sports Statistics Data Activity
 - ◆ Student Statistical Report Template
 - ◆ Complete Answer Keys

UM Printables

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SUPPLEMENTARY RESOURCES

- Misleading Graph Analysis Set (5 Detailed Examples)
- Survey Design & Analysis Project Guide
- Sports Statistics Data Activity (Comprehensive)
- Student Statistical Report Template

- Complete Answer Keys

Introduction & How to Use This Pack

Welcome to **Statistics in Real Life** — a comprehensive activity pack designed to help Grades 7–10 students develop meaningful statistical literacy through real-world contexts they encounter every day. From analyzing sports performance to evaluating health claims, from understanding social media data to investigating environmental trends, this resource makes statistics relevant, engaging, and accessible.

What's Included:

- ◆ **20 Activity Packs** — Each activity includes a real-world scenario, authentic data, guided questions, and extension tasks.
- ◆ **5 Core Statistical Skills** — Mean/Median/Mode, Box Plots, Histograms, Misleading Graphs, Sampling Bias & Survey Design.
- ◆ **5 Real-World Themes** — Sports, Health, Social Media, Food, and the Environment.
- ◆ **Misleading Graph Analysis Set** — 5 detailed examples of deceptive data visualization with guided analysis.
- ◆ **Survey Design & Analysis Project Guide** — Step-by-step instructions for conducting a statistical survey.
- ◆ **Sports Statistics Data Activity** — A comprehensive multi-sport data analysis challenge.
- ◆ **Student Statistical Report Template** — A structured framework for writing formal statistical reports.
- ◆ **Complete Answer Keys** — Detailed solutions for every activity.

How to Use This Pack:

- ◆ **For Classroom Teachers:** Activities can be used as warm-ups, group work, homework, or formative assessments. Each activity is self-contained and can be completed in 20–30 minutes.
- ◆ **For Homeschool Parents:** Use the activities sequentially or select those that align with your current curriculum. The answer keys provide full support for grading and discussion.
- ◆ **For Tutoring:** Select specific skill areas (e.g., box plots or misleading graphs) and use the relevant activities for targeted practice.
- ◆ **Extension Ideas:** Each activity includes an extension/reflection question that challenges students to think critically. Use these for differentiated instruction or enrichment.

Skills & Themes Quick Reference:

Activity	Theme	Skill
1	Sports	Mean / Median / Mode
2	Sports	Box Plots
3	Sports	Histograms
4	Sports	Misleading Graphs
5	Health	Mean / Median / Mode
6	Health	Box Plots

7	Health	Histograms
8	Health	Sampling Bias
9	Social Media	Mean / Median / Mode
10	Social Media	Box Plots
11	Social Media	Histograms
12	Social Media	Misleading Graphs
13	Food	Mean / Median / Mode
14	Food	Box Plots
15	Food	Histograms
16	Food	Survey Design
17	Environment	Mean / Median / Mode
18	Environment	Box Plots
19	Environment	Histograms
20	Environment	Misleading Graphs

Activity 1: Basketball Points Analysis

Theme: Sports

Skill: Mean / Median / Mode

Scenario: Maya is the star player on her school's basketball team. She recorded her points scored in each of the team's 12 games this season. Her coach wants to understand Maya's typical performance and consistency. Use the data below to analyze Maya's scoring.

Data — Maya's Points per Game:

Game	1	2	3	4	5	6	7	8	9	10	11	12
Points	15	22	18	22	30	12	22	17	25	14	22	19

Questions:

1. Calculate the **mean** number of points Maya scored per game. Show your work.

2. Find the **median** of Maya's points. List the data in order first.

3. Identify the **mode** of the data set. How many times does it appear?

4. Which measure of center (mean, median, or mode) best represents Maya's typical performance? Explain your reasoning.

5. Maya's teammate Li scored an average of 19.2 points per game over the same 12 games. Compare Maya's and Li's performance using the mean. Who scored more on average?

- **Extension:** *If Maya scores 35 points in the next game (Game 13), recalculate the mean, median, and mode. Which measure changed the most? What does this tell you about the effect of outliers?*

Activity 2: Track & Field Sprint Times

Theme: Sports

Skill: Box Plots

Scenario: Coach Ramirez recorded 100-meter dash times (in seconds) for 7th-grade and 8th-grade students during track tryouts. He wants to compare the two grade levels using box plots. Analyze the data to find the five-number summary for each group and construct parallel box plots.

Data — 100m Dash Times (seconds):

Student	1	2	3	4	5	6	7	8	9	10	11	12
7th Gr	14.2	15.1	13.8	14.5	15.3	14.0	13.5	14.8	15.6	14.1	13.9	14.7
8th Gr	13.2	12.8	14.0	13.5	12.5	13.1	12.9	13.8	13.3	12.7	13.0	13.6

Questions:

- Sort each data set in ascending order. Write the sorted lists below.

7th Grade (sorted):

8th Grade (sorted):

- Find the **five-number summary** (minimum, Q1, median, Q3, maximum) for each grade level.

	Minimum	Q1	Median	Q3	Maximum
7th Grade					
8th Grade					

- Calculate the **interquartile range (IQR)** for each group. What does the IQR tell you about the spread of times?

- On graph paper, construct **parallel box plots** for both grade levels using the same scale. Label all key values.

Activity 17: Monthly Temperatures

Theme: Environment

Skill: Mean / Median / Mode

Scenario: A science class tracked the average high temperature (in °F) in their city for each month of the year. They want to find the typical temperature for the year using mean, median, and mode, and consider which measure is most useful for describing a climate with distinct seasons.

Data — Average Monthly High Temperatures (°F):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temp (°F)	31	35	46	59	70	80	85	83	76	64	48	34

Questions:

1. Calculate the **mean** temperature for the year. Show your work.

2. Find the **median** temperature. List the data in order first.

3. Does this data set have a **mode**? If so, what is it? If not, explain why.

4. The mean temperature is about 59°F. Does this number accurately represent what the weather “feels like” during the year? Why or why not?

5. In this case, would the mean, median, or mode be the most useful measure for a tourist deciding when to visit? Explain your reasoning.

Activity 18: Air Quality Index

Theme: Environment

Skill: Box Plots

Scenario: An environmental club tracked the Air Quality Index (AQI) for 12 days during summer in two different cities: an industrial city and a coastal city. They want to compare the air quality using parallel box plots. (Note: Lower AQI values indicate cleaner air. 0–50 is “Good,” 51–100 is “Moderate,” 101–150 is “Unhealthy for Sensitive Groups.”)

Data — Air Quality Index (AQI):

Day	1	2	3	4	5	6	7	8	9	10	11	12
Industrial	45	52	68	75	80	85	90	95	105	115	120	150
Coastal	20	25	28	30	35	38	40	42	45	50	55	60

Questions:

1. Find the **five-number summary** for each city.

	Minimum	Q1	Median	Q3	Maximum
Industrial					
Coastal					

2. Calculate the **IQR** for each city.

3. On graph paper, construct **parallel box plots** using the same scale for both cities.

4. Compare the two box plots. Which city has better air quality overall? Support your answer with data from the five-number summaries.

5. Using the AQI scale provided in the scenario, how many days in the Industrial city were considered “Unhealthy for Sensitive Groups” (AQI 101–150)?

■ **Extension:** Use the $1.5 \times IQR$ rule to check for outliers in the Industrial city data. Is the day with an AQI of 150 considered an outlier? Show your work.

Complete Answer Keys

Note to Teachers: Detailed answers are provided for all computational and conceptual questions. Student answers to open-ended or extension questions may vary; focus on the reasoning and use of statistical vocabulary.

Activity 1: Basketball Points Analysis

1. Mean = $238 / 12 = 19.83$ points per game.
 2. Sorted: 12, 14, 15, 17, 18, 19, 22, 22, 22, 22, 25, 30. Median = $(19 + 22) / 2 = 20.5$.
 3. Mode = 22 (appears 4 times).
 4. The median or mode is best. The mean is pulled down slightly by the 12-point game; the mode (22) and median (20.5) better reflect her most common scoring outcome.
 5. Maya's mean (19.83) is greater than Li's (19.2), so Maya scored more on average.
- Extension: With 35 points, Mean = $273 / 13 = 21.0$. Median = 22. Mode = 22. The mean changed the most (from 19.83 to 21.0), showing that the mean is heavily influenced by outliers.

Activity 2: Track & Field Sprint Times

1. 7th Sorted: 13.5, 13.8, 13.9, 14.0, 14.1, 14.2, 14.5, 14.7, 14.8, 15.1, 15.3, 15.6. 8th Sorted: 12.5, 12.7, 12.8, 12.9, 13.0, 13.1, 13.2, 13.3, 13.5, 13.6, 13.8, 14.0.
2. 7th Grade: Min=13.5, Q1=13.95, Med=14.35, Q3=14.95, Max=15.6. 8th Grade: Min=12.5, Q1=12.85, Med=13.15, Q3=13.55, Max=14.0.
3. 7th IQR = $14.95 - 13.95 = 1.0$. 8th IQR = $13.55 - 12.85 = 0.7$. The 7th grade times are more spread out.
5. The 8th grade ran faster; their entire box plot is shifted to the left (lower times).

Activity 3: Soccer Goals per Season

1. 0–2: 3, 3–5: 7, 6–8: 7, 9–11: 3.
3. The distribution is symmetric.
4. $7 + 3 = 10$ players. $10 / 20 = 50\%$.
5. Bronze: 3, Silver: 7, Gold: 7, Platinum: 3.

Activity 4: Who's the Best Player?

1. Graph X makes the difference look huge because the y-axis is truncated (starts at 24).
2. Graph Y gives an accurate impression because the y-axis starts at 0, showing the bars are nearly identical.
3. Difference = $25.2 - 24.8 = 0.4$ ppg. Percentage = $(0.4 / 24.8) \times 100 \approx 1.6\%$.
5. Truncating the y-axis exaggerates small differences. A good rule is to start the y-axis at zero for bar charts, or clearly mark the break if starting at a different value.

Activity 5: Daily Screen Time

1. Mean = $57 / 15 = 3.8$ hours.
2. Sorted: 1.5, 2.0, 2.0, 2.5, 3.0, 3.5, 3.5, 3.5, 4.0, 4.0, 4.5, 5.0, 5.5, 6.0, 7.0. Median = 3.5 hours.
3. Mode = 3.5 hours.
5. 13 out of 15 students exceed 2 hours. $(13/15) \times 100 \approx 86.7\%$.

Activity 6: Hours of Sleep

1. Sorted: 5.5, 6.0, 6.5, 7.0, 7.0, 7.5, 7.5, 8.0, 8.0, 8.5, 9.0, 9.0, 10.0.
2. Min=5.5, Q1=6.75, Med=7.5, Q3=8.75, Max=10.0.
3. IQR = $8.75 - 6.75 = 2.0$ hours.
5. 5 out of 13 students got 8 or more hours. $(5/13) \approx 38.5\%$.

Extension: Mean = $99.5 / 13 \approx 7.65$ hrs. Mean and Median (7.5) are very close, indicating a roughly symmetric distribution.

Activity 7: Heart Rate After Exercise

1. 110–119: 3, 120–129: 6, 130–139: 6, 140–149: 4, 150–159: 1.
3. The distribution is roughly symmetric, centered around the 120-139 range.
4. $6 + 4 + 1 = 11$ students.
5. $(6 + 6) / 20 = 12 / 20 = 60\%$.

Activity 8: Health Survey Bias

1. The population is all students at the high school.
2. Convenience sampling.
3. It introduces bias because students near the cafeteria at 7:30 AM are likely there for breakfast, overrepresenting breakfast eaters. Students who skip breakfast aren't there.
4. A random sample: Get a list of all students and use a random number generator to select 50 names.
5. The percentage would likely be lower, as the original survey missed students who skip breakfast and go straight to class or arrive later.

Activity 9: Social Media Followers

1. Mean = $3250 / 15 \approx 216.67$ followers.
2. Sorted: 150, 160, 175, 180, 185, 190, 195, 200, 200, 210, 215, 220, 230, 240, 500. Median = 200.
3. Mode = 200.
4. The median or mode is best because the mean is pulled significantly upward by the outlier (500), making it higher than 13 of the 15 values.
5. Without 500, Sum = 2750. New Mean = $2750 / 14 \approx 196.43$. The mean drops significantly, showing how much the outlier affected it.

Activity 10: Daily Social Media Time

1. Sorted: 30, 35, 40, 45, 50, 55, 60, 60, 65, 70, 75, 80, 90, 115.
 2. Min=30, Q1=42.5, Med=60, Q3=77.5, Max=115.
 3. IQR = $77.5 - 42.5 = 35$ minutes. The middle 50% of students spend between 42.5 and 77.5 minutes on the app.
 5. Disagree. 115 minutes is significantly above the Q3 of 77.5, making it an outlier compared to the rest of the group.
- Extension: $1.5 \times 35 = 52.5$. Upper bound = $77.5 + 52.5 = 130$. Since $200 > 130$, it would be an outlier.

Activity 11: Likes per Post

1. 10–29: 4, 30–49: 6, 50–69: 6, 70–89: 2, 90–109: 2.
3. The distribution is slightly skewed right.
4. $4 + 6 = 10$ posts. $10 / 20 = 50\%$.

Activity 12: Social Media Growth Charts

1. Carlos: $(1500-1000)/1000 = 50\%$. Maya: $(5500-5000)/5000 = 10\%$. Both are correct.
2. Graph Y, because 50% growth looks much more impressive than 10%, even though the absolute gain is the same.
3. Graph X, because it shows she gained the exact same number of subscribers as Carlos.
5. Answers vary. Brands often care about absolute reach (Maya has more total subscribers to advertise to), while investors might care about growth rate (Carlos is growing faster).

Activity 13: Sugar Content in Drinks

1. Mean = $540 / 15 = 36$ grams.
 2. Sorted: 10, 15, 20, 25, 30, 35, 35, 40, 40, 40, 40, 45, 50, 55, 60. Median = 40 grams.
 3. Mode = 40 grams.
 4. 11 out of 15 drinks exceed the 25g daily limit.
- Extension: New data: 10, 15, 20, 25, 30, 35, 35, 40, 40, 40, 40, 45, 50, 0, 0. New Mean = $425/15 \approx 28.33\text{g}$. New Median = 35g. Mode = 40g. Mean and median drop, but mode stays the same.

Activity 14: Fast Food Calories

2. Min=350, Q1=475, Med=625, Q3=775, Max=1100.
 3. IQR = $775 - 475 = 300$ calories.
 5. $1.5 \times \text{IQR} = 450$. $Q3 + 450 = 1225$. Since $1100 < 1225$, the 1100-calorie sandwich is NOT an outlier by this rule, though it is the maximum.
- Extension: Without 1100, $n=11$. New Med = 600. New Q1 = 450. New Q3 = 750. New IQR = 300. The median shifts down slightly; IQR stays the same.

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