

Normal Models

A Normal model can be a useful tool for interpreting what data have to say - sometimes. Your task here is to check the usefulness of such a model for data you collect or create. There are three phases in completing this task:

1. **Collect data.**

You need a data set with 30 – 50 values. Find something you are interested in. Use existing data, or create some yourself. Need an idea?

- Put 10 pennies in a glass, put your hand over the top, shake well, then dump them out on a table and count the number that came up heads.
- Roll two dice and record the total.
- Deal cards from a well-shuffled deck one at a time. Count the number of cards you have to turn over until you find an ace.
- Use some data from another class – a science experiment, perhaps.
- Look something up in an almanac. For example, there are lots of tables of data about states - crime rates, population density, median income, etc.
- Use some sports statistics – number of wins for baseball teams, scores in a golf tournament, weights of players on a football team, etc.
- Find something on the Internet – www.census.gov for example.

2. **Describe the data.**

Write a brief but thorough description of your data. Start with the W's, and remember to include visual, numerical, and verbal descriptions.

3. **Check the Normal model.**

Use the mean and standard deviation of your data to create a Normal model. Compare this model to the distribution that you found and explain why you think the model is or is not useful.

	Components	Comments
Think	Demonstrates clear understanding of the difference between distributions of actual data and models	
Show	Data, display, and statistics: <ul style="list-style-type: none"> ○ collects appropriate data ○ shows a well-constructed histogram ○ scale is appropriate for comparison ○ calculates summary statistics Normal model: <ul style="list-style-type: none"> ○ centered at mean ○ has correct cutoffs based on s ○ clearly shows the 68-95-99.7 Rule 	
Tell	Describes the data: <ul style="list-style-type: none"> ○ the W's ○ shape ○ center ○ spread ○ unusual features Evaluates usefulness of the model: <ul style="list-style-type: none"> ○ discusses shape ○ compares the actual distribution of the data to the 68%, 95%, or 99.7% ○ states a valid conclusion about the usefulness of the model 	

4 Components are scored as **Essentially correct**, **Partially correct**, or **Incorrect**

1: Data and analysis: useful data, histogram, comparative scale, and summary statistics.

E – All four requirements. P – Only 2 or 3. I – One or none.

2: Normal model: correct center, correct cutoffs, describes 68-95-99.7% regions.

E – All three requirements. P – Only 2. I – One or none.

3: Describe the data: W's, shape, center, spread, unusual features.

E – All five requirements. P – Only 3 or 4. I – Fewer than 3.

4: Evaluation: shape, distribution, conclusion

E – All three requirements. P – Only 2. I – One or none

Scoring:

- E's count 1 point, P's are 1/2
- Score = sum of components; rounding based on thoroughness and clarity of the assessment of the model.
- Grade: A = 4, B = 3, etc., with +/- based on rounding (ex: 3.5 rounded to 3 is a B+)

Name _____ AP Score _____ Grade _____