

Pennies From Heaven

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Objective(s):

CCSS.MATH.CONTENT.6.SP.A.1

Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.

CCSS.MATH.CONTENT.6.SP.A.2

Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.

CCSS.MATH.CONTENT.6.SP.A.3

Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.

CCSS.MATH.CONTENT.6.SP.B.5

Summarize numerical data sets in relation to their context, such as by:

CCSS.MATH.CONTENT.6.SP.B.5.A

Reporting the number of observations.

CCSS.MATH.CONTENT.6.SP.B.5.B

Describing the nature of the attribute under investigation, including how it was measured and its units of measurement.

CCSS.MATH.CONTENT.6.SP.B.5.C

Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered.

CCSS.MATH.CONTENT.6.SP.B.5.D

Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.

Description:

The focus of this activity is to describe the shape of a distribution and to describe the center and spread.

Materials:

Have each student in the class bring 25 pennies to class (**NOT** from a bank roll). Note: have extra pennies available for students who forget to bring theirs to class.

Act I. Pennies From Heaven: <https://www.youtube.com/watch?v=8ROPFoA6ngI>

1. How old do you think the oldest, newest, and average penny age will be?
2. What do you think the shape of the distribution of all of the ages of the pennies from the class would look like? Draw a sketch below.
3. What data would you need to collect to confirm/reject your hypotheses?

Act II.

4. Choose a single penny *at random* from the 25 pennies you brought to class. Record the age of the penny on the table at the front of class.

Date	Age

5. As a group, create a dot plot of the data collected.

6. Describe the distribution of penny ages by its SOCS.

S –

O – (formally determine the outliers using the IQR rule.)

C – Estimate the values **BEFORE** you do any calculations! Include a comparison between the mean and median.

S –

Act III. Extension:

7. Suppose we randomly selected samples of size $n = 5$ (instead of single pennies) and plotted the average age. Do you think the distribution will be similar or different? Will there be more, less, or the same variability? Sketch and describe what you think the distribution will look like.

8. We now collect samples of size $n = 5$, determine the average age of each sample, and plot them.

9. As a group, create a dot plot of the data collected.

10. Describe the distribution of penny ages by its SOCS.

S –

O – (formally determine the outliers using the IQR rule.)

C – Estimate the values **BEFORE** you do any calculations! Include a comparison between the mean and median.

S –

11. What do you think would happen if the sample size was even larger than $n = 5$ such as $n = 25$? $n = 50$? $n = 1000$?