

Summary Sheet of Instruction for Sampling Snoops

Teachers can use this sheet:

- As a guide for this lesson to show how the standards will be addressed.
- As a cross-reference for the Curriculum Map for the Unit Plan: Statistical Sleuths.

Things to instruct in this lesson plan to ensure alignment:

Instruct on how to read and interpret data displayed in a histogram (MAE13181).
Instruct on how to know whether a sample is biased (MAE33284).

Things to review with students based on prior knowledge:

How to evaluate the hypothesis by making inferences and drawing conclusions based on statistical results (MAE33183).
How to identify different types of sampling techniques (for example, random and systematic) (MAE33283).

Things students need to practice:

Read and interpret data displayed in a histogram and a table (MAE13181).
Formulate a hypothesis and design an experiment (MAE33181).
Evaluate the hypothesis by making inferences and drawing conclusions based on statistical results (MAE33183).

Parts of the standard(s) that will not be covered in this lesson:

The student will NOT *use* the different types of sampling techniques in this unit. If the teacher wishes to include this component, they may integrate the necessary instruction to do this (MAE33283).
The student will not read and interpret data displayed in variety of ways. They will only read and interpret data displayed in histogram and a table (MAE13181).

Formative assessment for this lesson:

Students will know and be able to...

MAE13181 Read and interpret data displayed in a variety of forms, including histograms.
MAE33181 Formulate a hypothesis and design an experiment.
MAE33183 Evaluate the hypothesis by making inferences and drawing conclusions based on statistical results.
MAE33283 Knows whether a sample is biased.
MAE33284 Identifies and uses different types of sampling techniques (for example, random, systematic, stratified).

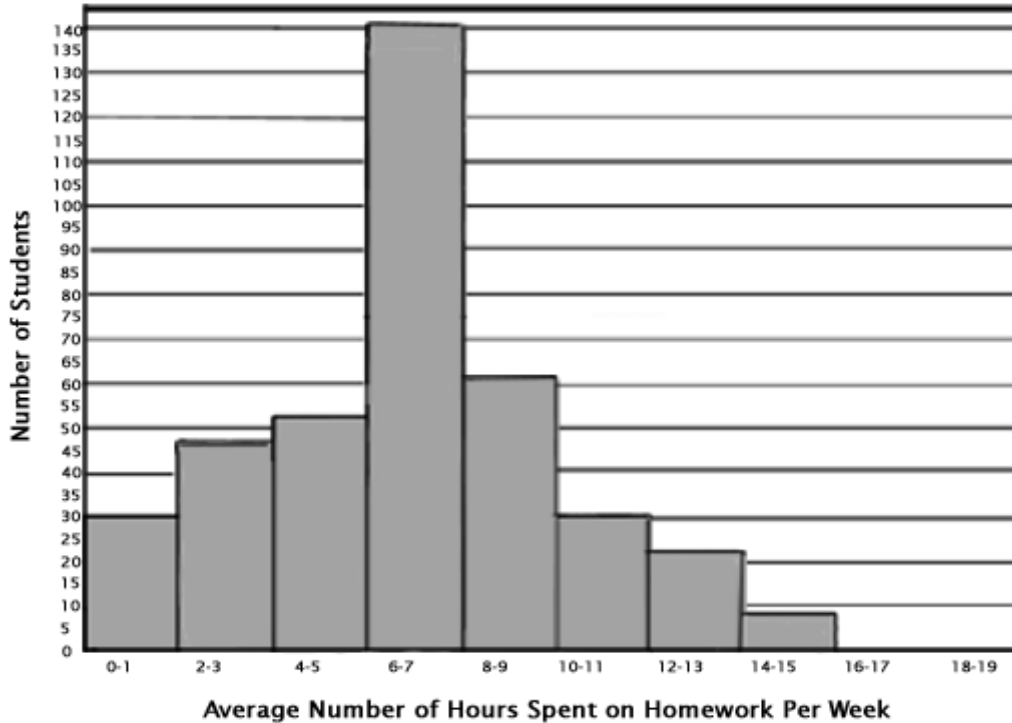
Experimental Design Rubric

Levels of Achievement Standard → ↓	4 Exemplary	3 Good	2 Acceptable	1 Unacceptable
MA.E.3.3.1.8.1 The student formulates a hypothesis and designs an experiment.	The hypothesis is logical. The experiment is designed to test the hypothesis.	The hypothesis is mostly logical. The experiment is designed to test only a portion of the hypothesis.	The hypothesis is somewhat logical, AND/OR the design of the experiment is flawed and only partially tests the hypothesis.	The hypothesis lacks logical reasoning, AND/OR the design of the experiment is incorrect and neglects to test the hypothesis.
MA.E.3.3.1.8.3 The student evaluates the hypothesis by making inferences and drawing conclusions based on statistical results.	Using data collected from the experiment, a logical conclusion is made based on accurate results. Following the experiment, the results acquired completely support the original hypothesis.	Using most of the data collected from the experiment, a logical conclusion is made based on the results; however, some bias is present. Following the experiment, the results acquired mostly support the original hypothesis.	Using some of the data collected from the experiment, an illogical conclusion is made, AND/OR following the experiment, the results acquired somewhat support the original hypothesis.	Without using the data collected from the experiment, an inaccurate conclusion is made, AND/OR following the experiment, the results acquired refute the original hypothesis.

Histogram Activity Sheet

Marie conducted a survey of 390 eighth grade math students at Mystery Falls Middle School at the end of the school year. She asked them what the average number of hours each had spent on math homework per week. Here are the results:

Eighth Grade Math Students at Mystery Falls M.S.



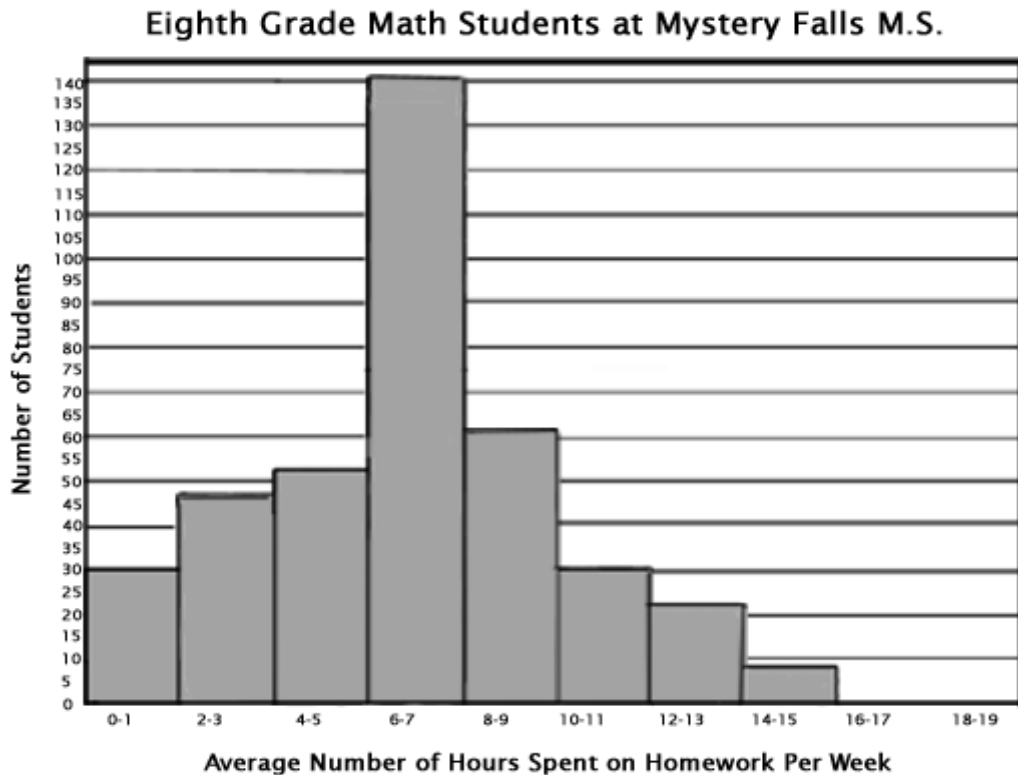
- a. Approximately how many students completed 10 or more hours of homework per week?

- b. How many hours did the most number of students spend on homework (which interval)? *Also*, which measure of central tendency does this interval represent?

SPECIAL NOTE: Use the Frequency Table for 8th Grade Students at Mystery Falls Middle School **Teacher Resource** to see the specific statistics for this histogram (page 6 of this associated file). You may want to show students how a histogram is created from a frequency table; however, this is an optional extension for the teacher to decide because the standard MA.E.3.3.2.8.3 does not address the construction

of a histogram. Also, this is question # 4 from the diagnostic assessment for the Unit Plan: Statistical Sleuths.

Answer Key for the Histogram Activity Sheet



Part A- Since the question asks for the *approximate* answer, there are several possible answers. The actual answer is 61 students. An answer between 56-66 would be acceptable.

Part B- Most of the students at Mystery Falls Middle School spent between 6-7 hours on homework per week. This interval is also the **mode** of the data because most of the data falls into this interval.

Special Note: When reviewing the correct answers for the “Histogram Activity Sheet,” do not show the students the frequency table until after they have read and interpreted the data from the histogram.

Data Detective Diary #6 Reference Sheet

HYPOTHESIS: Mario believes that students who do between 4 and 10 hours of homework per week in mathematics make better grades (a B average or higher) than students who do less than 4 hours or more than 10 hours.

Number of hours spent on homework per week in mathematics ↓	Number of students with an A	Number of students with a B	Number of students with a C	Number of students with a D	Number of students with an F	Total number of students
0-3 hours	2	4	5	38	37	=86
4-10 hours	60	70	100	12	1	=243
11+ hours	15	25	21	0	0	=61
Total number of students	77	99	126	50	38	=390

Frequency Table for 8th Grade Students at

**Mystery
Middle**

**Falls
School**

Teacher Resource	
Number of hours spent on homework/week	Number of students in 8 th grade math
0-1	30
2-3	46
4-5	52
6-7	140
8-9	61
10-11	30
12-13	22
14-15	9
16-17	N/A
18-19	N/A



Calculator Problem

Some teachers believe that students have become dependent on calculators, causing students to simply type in the numbers and take whatever answer they get. Students accept the answer provided by the calculator (right or wrong), regardless of the reasonableness of the answer. While other teachers are concerned that students have stopped trying to learn math operations because they think, “If the calculator can do it, why do I have to remember how to do it?”

Students have a different idea about the use of calculators. They believe that calculators enable them to do the work faster which in turn allows them to complete more work in a class period. Also, when calculators are used to do simple math, students feel they have more time to think through the actual math problem.

To help settle this argument, you have been asked to present the students’ ideas at the next math department meeting. The question posed to you is, “Approximately how many hours would a calculator save in work time per week for the average eighth grade student in math?”