

7



Mathematics

Quarter 4 - Module 2: Gathering & Organizing Statistical Data



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Mathematics Grade 7

Quarter 4 - Module 2: **Gathering & Organizing Statistical Data**

First Edition, 2021

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Region I

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Target

Statistics plays a vital role in our daily living. Programs of the government are guided with accurate study of the situations and information through statistical investigation. We also use statistics in our homes, schools, industries, hospitals, banks and many other places

Accuracy of data is the bases of any statistical investigation. To ensure it the researcher must know the right sources and the appropriate method of collecting it. This module discusses how to collect and organize data by using tables.

After going through this module, you are expected to:

- gathers statistical data (**M7SP-IVb-1**)
- organizes data in a frequency distribution table (**M7SP-IVb-1**)

Subtasks:

1. gather statistical data
2. identify the different methods of gathering data
3. organize data using frequency distribution table

Before going on, check how much you know about this topic. Answer the pretest on the next page in a separate sheet of paper.

For numbers 11 – 15, consider the frequency distribution table below.

Class Interval	Tally	Number of students (Frequency f)
36 – 40		1
31 – 35		3
26 – 30		7
21 – 25		6
16 – 20		5
11 – 15		2
6 – 10		2
1 – 5		1
	Total	27

11. What is the class size of the frequency distribution table?
A. 24 B. 25 C. 26 D. 27
12. What is the class frequency of 16 – 20?
A. 4 B. 5 C. 6 D. 7
13. Identify the lower class limit of 21 – 25.
A. 20.5 B. 21 C. 25 D. 25.5
14. In the class interval 31 – 35, what is the class mark?
A. 31 B. 32 C. 33 D. 34
15. What is the upper class boundary of 6 – 10?
A. 5.5 B. 6 C. 10 D. 10.5

*For you to understand the lesson well, do the following activities.
Have fun and good luck!*

Lesson

1

Gathering Statistical Data

Basically, statistics refers to the science of collection and interpretation of data. Reliability of the research may also depend on proper gathering of statistical data. Let us learn the basic methods of collecting data.



Jumpstart

Preliminary Activity

In a Grade 7 class, one of the activities is to know what month babies are born. The class registered their birthday as follows.

JEUZ JICKAIN	Jan 15	ALYANA JAMECA	Oct 29
JOHN RAY	Aug 14	DANIELLA	Dec 16
DAVID MATTHEW	Jan 10	ALIYA FOVI	Sept 13
REYNCENT DREW	April 4	BIANLLYN	May 9
R-WIN	Dec 3	AKISHA JAMAIRE ANNE	Nov 1
MIL MARVYN	Sept 21	REANA	May 9
SEAN AZRAEL	July 18	BEA NICOLE	Jan 18
OXEN CYB	Jan 4	RUTHLYN	March 25
JOHN DARWIN	Nov 4	IRENEBERT	Oct 27
FRANCIS NATHANIEL	March 24	ANDREA NICOLE	March 31
ROBIN	Sept 5	ANGEL RHYSS	Mach 17
PAUL JHUMEL RYHAN	Aug 17	SABRINE JOY	Nov 12
JEROME HOWARD	June 6	TRESEVEE	July 7
ZEG XYRUS	June 30	JANAIAH PHIA	Feb 22
JAE-MIN	Sept 19	KRIZELLE	March 12
KARL CHRISTIAN	May 5	MARRIANE	July 28
VINCE GABRIEL	May 31	JEE LIANE	Aug 14
PAULINE	April 28	MISHA KASSANDRA	Nov 23
JAYROSE	May 20	NOEMI	Feb 7
GABRIELLE ED	July 17	PRINCESS MARYAN	Dec 27
TRISHA LYN	June 12		

Organize the data in the table.

Popular Birth Months												
Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Number of students												

1. In what month were most students in the class born?
2. How many of them were born in this month?
3. In what month were the least number of students in the class born?
4. How many were born in this month?
5. What information can you get from the data?



Discover

The registration made by the class is an example of gathering data. And these data were just a part of the whole group. But this part will represent the entire set being defined.

This set being considered is called population and the considered part of this group is called the sample.

Population, as used in statistics, refers to the set of people, objects, measurements, or events that belong to a defined group.

Sample is any subset of elements drawn by some appropriate method from a defined population.

Data is a collection of information about a study under investigation. Data come in different quantities. Some data sets consist of numbers and others are non-numerical. To distinguish the two, the terms quantitative data and qualitative data are often used.

Quantitative data have numerical value. Example is the number of members in a household. While qualitative data do not have numerical value. Like, the source of income of the household.

Quantitative data (or variable) consist of numbers representing counts or measurements.

Qualitative data (or categorical, or attribute) can be separated into different categories that are distinguished by some non-numeric characteristics.

There are different methods used in the collection of data. Some common ways are listed below.

Methods of Collecting Data

1. Interview method

This is a method of direct exchange between the interviewer and the interviewee. This method provides consistent and more precise information but it is time-consuming, expensive, and has limited field coverage. Example: we can get actual television rating by doing actual interview

2. Questionnaire method

Prepared list of questions is given to the respondents to answer. The list of questions which is intended to elicit answers to the problems of the study is called questionnaire. This method is inexpensive and can cover a wide area in a shorter span of time. However, there is a chance of non-response especially when questions are not easily understood. Example: collecting customers' opinion towards a certain product.

3. Registration method (Documents and records).

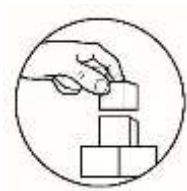
Related information written in record data banks, newspapers, magazines, world wide web, and the like are the main source of data. The sources are governed by law, rules and regulations, and including ethical responsibilities. Example: search of the countries not affected by covid19 in the year 2020.

4. Observation method.

The required information is obtained through direct investigation, measurement or counting. The method requires recording of behavior at the appropriate time and situation. Example: the PHILVOVS observing the volcanic activity of Mayon Volcano in Albay

5. Experiment method

Data is obtained through actual and real experiments. This method determines the cause-and-effect relationship of a certain phenomenon. This is usually use in science researches. Example: a pharmaceutical company developing a vaccine for covid-19.



Explore

Activity 1.1 **Familiarize Me!**

Identify what type of data is gathered in each situation.

1. Pets owned by of your neighbors.
2. The mass of milkfish harvested every month.
3. The number of passengers allowed in the public utility vehicles during the new

normal.

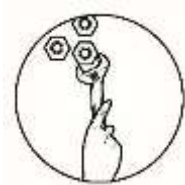
4. The quarantine classification of the towns of La Union.
5. The number of advertisements aired by the number 1 TV station every commercial break.
6. The employment status of Filipinos ages 20- 50.
7. The quantity of mangos in a every crate.
8. The number of enrollees in the past 4 years in your school.
9. The favorite subject of your classmate.
10. The number of hours you are studying and answering your printed module.

Activity 1.2 **What Best Suits Me?**

Determine the most appropriate data collection method is the best to apply in each situation.

1. Seeking the opinion of those who do not want to be vaccinated with a covid-19 vaccine in an online survey by answering the posted questions.
2. Searching the record of Department of Foreign Affairs regarding the negative rate results of the swab tests of repatriated OFW for the past 2 months.
3. The PAG-ASA broadcasting the typhoon trends for the next 3 days.
4. Collecting a first-hand information from the secretary of DOH an update of the improving national status about covid-19.
5. Testing the effectivity rate of a newly developed vaccine for a certain disease.
6. Recording the outcomes of tossing 5 coins in 4 succeeding events.
7. Getting information about the quality of the rice you are buying by asking the merchant.
8. Searching the Philippine population for past 10 years.
9. Recording the water level of Benga Dam for 4 consecutive weeks.
10. Searching for the number of persons in a certain barangay who became a plantito/plantita during the pandemic brought by covid-19.

*Great job! You have understood the lesson.
Are you now ready to summarize?*



Deepen

Let us enrich your knowledge by doing a simple data gathering available in your household. Follow the directions below.

Activity 1.3 I Am a Researcher

Directions:

1. Select a situation from the list and record the data needed.
2. Identify whether the data you collected is a qualitative data or a quantitative data.
3. Describe what method/s did you use in obtaining the data.

Situations (select one only):

1. Record the following information of every member of your household. The information needed are: age, height, weight, favorite color, favorite food.
2. Record the different kinds of plants you have in your backyard/garden and how many of each kind are there.
3. Record the number of hours you finish answering your module in each subject. Record also the questions you have not answered, if any.
4. Record the number of daily recoveries from covid-19 for 5 consecutive days as declared by Department of Health. Write also the coverage days.

Consider the scoring Rubric in doing this activity.

Rubric

Score	Presentation of data gathered
5	Data are systematically enumerated and presented in organize manner.
4	Data are systematically enumerated and presented with a minimal disorder.
3	Data are enumerated and presented.

Score	Classifying the data and using appropriate method
5	Classified/grouped the data as qualitative or quantitative correctly and uses the most appropriate method of collecting the data
4	Classified/grouped all data as qualitative or quantitative with minimal error and/or uses any possible method of collecting the data
3	Did not classify/group the data as qualitative or quantitative with minimal error and/or uses any possible method of collecting the data

Lesson

2

Frequency Distribution Table

Information from the collected data cannot easily understood if it is not organized. To help us organize the data, a table is used. Reading tables can be done more easily because the needed information can be seen in a glance.



Jumpstart

Recall the two types of data: quantitative and qualitative. In qualitative data, which provide non-numerical measures, we often interested in determining the number of quantities appearing in such category.

Sample of 30 people were surveyed on the favorite types of social media they are logging in. the responses are recorded below.

Figure 1.1



Legend:



Facebook

Wattpad



Instagram

Twitter

We cannot directly get any useful information from the data because it is not organized. The frequency distribution table is very useful in organizing the data and converting the qualitative data into quantitative data.







Discover

The data collected in a survey can be presented using a frequency distribution table.

Table 1.1 shows the frequency distribution table from the survey.

Frequency Table of the Favorite Social Media

Type	Tally	Number of people (frequency f)
	 	14
	 	7
		5
		4
	Total	30

The **frequency distribution table** is a table that displays the number of data entries for the different categories, values of counting variable or class interval. One way of counting the data entry is by *tallying* and is group by five with the fifth tally crosses the first four. This entry is called **frequency**. The total frequency is called the **sample size**. In table 1.1, the frequency of Facebook as the favorite social media is 14 and the sample size is 30.

Example 1.

Make a frequency distribution table for the 60-item test result of a class.

The scores are as follows:

24	45	32	47	21	46	39	41	11	44
33	38	30	41	45	20	29	57	53	32
34	51	41	31	50	36	18	38	29	35
31	49	33	37	25	29	34	39	40	26

Solution:

Step 1: Determine the **range** of the data. The range obtains by subtracting the lowest score from the highest score.

$$\text{Range} = \text{Highest score} - \text{Lowest score}$$

$$= 57 - 11$$

$$= 46$$

Step 2: Decide the number of class interval. Divide the range with the desired number of class interval. Suppose we decided to have about 10 intervals.

$$\text{Class interval (CI)} = \text{Range} \div 10$$

$$= 46 \div 10$$

$$= 4.6$$

$$= 5$$

❖ Note that the ideal number of class interval is 5 to 20.

Step 3: Write the class interval that covers all the data. The upper limit of the intervals must be multiple of the interval. Therefore, the lowest class interval is 11-15. Note that the number of class intervals maybe one greater than the decided number of intervals.

Class Interval	Tally	Frequency (<i>f</i>)
11-15		

Step 4: Record the amount of data in each class.

Table 1.2 Frequency Distribution of a Test Result

Class Interval	Tally	Number of students (Frequency <i>f</i>)
56 – 60		1
51 – 55		2
46 – 50		4
41 – 45	 	6
36 – 40	 	7
31 – 35	 	9
26 – 30	 	5
21 – 25		3
16 – 20		2
11 – 15		1
	Total	40

Parts of a Frequency Distribution Table

Class Interval (*CI*) - the numbers defining the classes

Class Limits – the extremes of the class interval. The lower extreme is called the lower class limit while the upper extreme is called the upper class limit.

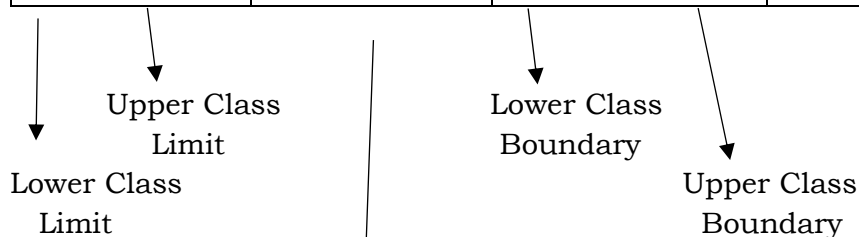
Class Boundaries- the true limits of the class interval

Class Size – the number of scores included in a class interval

Class Mark – the midpoint value of a class interval

Frequency – the number of times a score or an observation appears

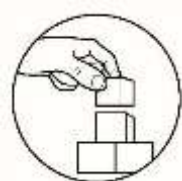
Class Interval	Class Mark	Class Boundary	Tally	Frequency (<i>f</i>)
46 - 50	48	45.5 - 50.5		4



$$\text{Class Mark} = \frac{\text{Lower Class Limit} + \text{Upper Class Limit}}{2}$$

$$= \frac{46 + 50}{2}$$

$$= 48$$



Explore

Let us consider the table of frequency distribution below and be familiarized with the different terms needed in the succeeding topic in the statistics.

Activity 2.1 Examine the frequency distribution below and answer the questions that follows.

Table 1.3 Frequency Distribution of a Test Result

Class Interval	Tally	Number of students (Frequency <i>f</i>)
67 - 72		1
61 - 66		2
55 - 60		8
49 - 54		11

43 – 48		
37 – 42		18
31 – 36		
25 – 30		8
19 – 24		4
13 – 18		3
7 – 12		1
	Total	

Answer what is ask in each problem.

1. How many class intervals are there in table 1.3?
2. What is the class frequency of the class intervals 43 – 48 and 31 – 36?
3. What is the class size of the frequency distribution table?
4. Determine the interval of each class.
5. Complete the needed value in table below.

Interval	Class Mark	Upper class limit	Lower class limit	Upper class boundary	Lower class boundary
55 - 60	58.5				
19 – 24			19		
37 – 42				42.5	



Deepen

Activity 2.2 I Can Make It

Make a frequency distribution table with 10 intervals for the 50-item test result of a class. The scores are as follows:

19	42	32	44	31	40	39	41	28	34
43	28	30	31	45	46	29	49	43	32
24	41	41	31	30	36	28	38	29	25
23	39	39	37	25	27	34	29	40	26
39	33	35	25	32	40	25	31	23	46

Consider the scoring Rubric in doing this activity.

Rubric

Score	Presentation of frequency distribution table
10	Presented the frequency distribution table orderly and all entries are correct.
9	Presented the frequency distribution table orderly but with minimal incorrect entries.
8	Presented the frequency distribution table with minimal disorder and with minimal incorrect entries.
7	Presented the frequency distribution table with minimal disorder and with many incorrect entries.



Gauge

Assessment

Answer what is asked, describe or defined and write the letter of your choice in your answer sheet.

1. What is a collection of information about a study under investigation?
A. data B. population C. range D. sample
2. What is the method of collecting data wherein the researcher obtains the data through actual and real experiment?
A. Experiment B. Interview
C. Observation D. Questionnaire
3. Which of the following method requires recording of behavior at the appropriate time and situation?
A. Experiment B. Interview
C. Observation D. Questionnaire
4. Which of the following is an example of a quantitative data?
A. The age group of teachers in school.
B. The mass of milkfish harvested per week.
C. The favorite subject of the student respondents.
D. The reason of buying a certain brand of sardines.
5. Identify the most appropriate method of collecting data from the situation:
"Collecting a first-hand information from the vaccine czar an update about the national vaccination for covid-19. What method is to be used?
A. Experiment B. Interview
C. Observation D. Registration
6. What is the information to be collected from one of the situations is a qualitative data?
A. The quantity of apples in every box.
B. The game avatars of the online game mobile legend.
C. The body mass index (BMI) of the Grade 7 students.
D. The number of hours working over time of the employees in a company.

7. What is the set of people, objects measurements or events that belong to a defined category?
- A. data B. population C. range D. sample
8. What is the table that displays the number of data entries for the different categories, values of counting variable or class interval?
- A. population B. sample
C. sample size D. frequency distribution
9. In the set of scores; 17, 15, 26, 21, 12 19, 15, 22, 11, and 20. What is the range?
- A. 4 B. 11 C. 15 D. 26
10. When the set of data has a range of 72 and 10 as the decided number of class intervals, what is the interval of each class?
- A. 5 B. 7 C. 9 D. 11

For numbers 11 – 15, consider the frequency distribution table below.

Class Interval	Tally	Number of students (Frequency f)
50 – 56		2
43 – 49		4
36 – 42	 	6
29 – 35	 	7
22 – 28	 	5
15 – 21		3
8 – 14		2
1 – 7		1
	Total	

11. What is the class size of the frequency distribution table?
- A. 25 B. 30 C. 35 D. 40
12. What is the class frequency of 29 – 35?
- A. 7 B. 6 C. 5 D. 4
13. What is the lower-class limit of 43 – 49?
- A. 42.5 B. 43 C. 49 D. 49.5
14. In the class interval 15 – 21, what is the class mark?
- A. 15 B. 17 C. 18 D. 21
15. What is the upper-class boundary of 36 – 42?
- A. 35.5 B. 36.5 C. 42 D. 42.5

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