SECONDARY
JHS

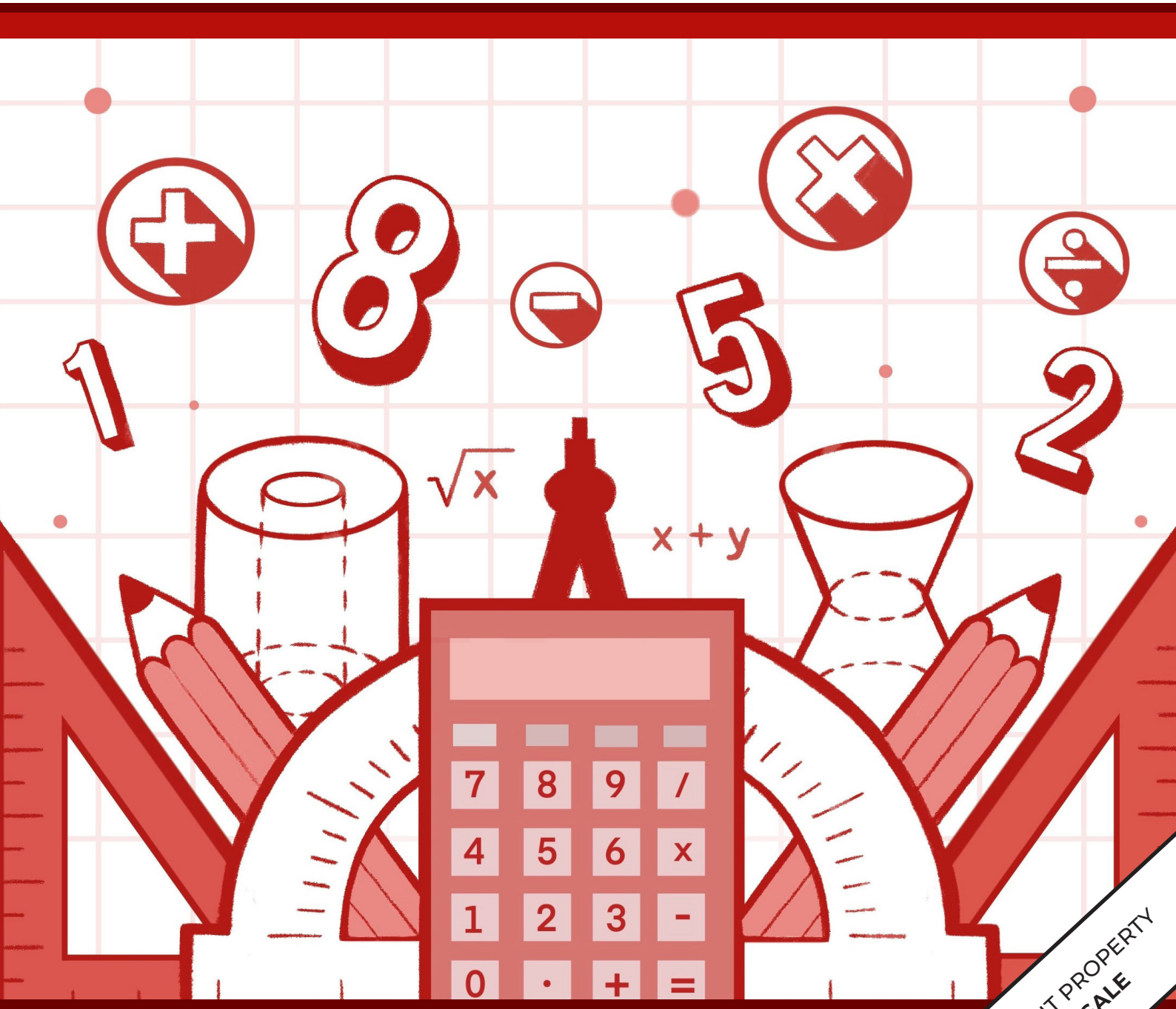
DepED DEPARTMENT OF EDUCATION

ALS Alternative Learning System LIFELONG LEARNING

LEARNING STRAND 3
MATHEMATICAL & PROBLEM-SOLVING SKILLS

SESSION GUIDES FOR MODULE 6:
SO THAT'S WHAT NORMAL IS!

ALS Accreditation and Equivalency Program: Junior High School



UNESCO United Nations Educational, Scientific and Cultural Organization

KOICA Korea International Cooperation Agency

LEARNING STRAND 3

SESSION GUIDES

Alternative Learning System - Accreditation and Equivalency (ALS-A&E)

JUNIOR HIGH SCHOOL: MATHEMATICAL AND PROBLEM-SOLVING SKILLS

SESSION GUIDES FOR MODULE 6 (SO THAT'S WHAT NORMAL IS!)

ALS Accreditation and Equivalency Program: Junior High School
Learning Strand 3: Mathematical and Problem-Solving Skills
Session Guides for Module 6 (So That's What Normal Is!)

Published in 2020 by the United Nations Educational, Scientific and Cultural Organization
UNESCO Office, Jakarta
Jalan Galuh II No. 5, Kebayoran Baru, Jakarta, Indonesia

and

Department of Education
DepEd Complex, Meralco Avenue, Pasig City, Philippines

This educational resource material was developed and printed through the project "Better Life for Out-of-School Girls to Fight Against Poverty and Injustice in the Philippines" with financial support from Korea International Cooperation Agency (KOICA).

Printed by APC Printers Corporation
Printed in Makati City, Philippines

ISBN 888-888-8888-88-8

DEVELOPMENT TEAM

Jenelyn Marasigan Baylon	Master Teacher I, ALS Task Force (On-detail)
Kristine Lee S. Lumanog	Education Program Specialist II, ALS Task Force (On-detail)
Judy R. Mendoza	Project Development Officer III, Bureau of Learning Resources
Reyangie V. Sandoval	Education Program Specialist II, Bureau of Learning Resources
Josephine C. Intino	Senior Education Program Specialist, Bureau of Curriculum Development
Eric U. Labre	Senior Education Program Specialist, Bureau of Learning Resources
Roderick P. Corpuz	Supervising Education Program Specialist, ALS Task Force
Daisy Asuncion O. Santos	Chief Education Program Specialist, Bureau of Learning Resources
Marilette R. Almayda	Director III/Head, ALS Task Force
Ariz Delson Acay D. Cawilan	Officer-In-Charge, Office of the Director IV, Bureau of Learning Resources
G. H. S. Ambat	Assistant Secretary for Alternative Learning System Program and Task Force
Tonisito M. C. Umali	Undersecretary for Legislative Liaison Office, External Partnership Service and Project Management Service
Leonor Magtolis Briones	Secretary

Ermil P. Gabuat/ Christian Renegado	Author
Ramonette Ruzgal	Content Expert
Bernadette Sison	Admin and Finance Staff
Mildred Parbo	Project Lead
Ma. Teresita Medado	President

Content and Language Evaluators and Instructional Design Reviewer

Elizabeth B. Dizon	Schools Division Office of Cavite Province, Department of Education
Antonio Palma Gil	Regional Office XI – Davao, Department of Education
Ringwald Sarmiento	Freelance Language Editor

United Nations
Educational, Scientific and
Cultural Organization

Ade Sandra	Admin and Finance Assistant
Rusyda Djamhur	Project Assistant
Marmon Abutas Pagunsan	National Project Consultant
Remegio Alquitran	National Project Officer
Maria Karisma Bea Agarao	National Programme Coordinator
Mee Young Choi	Head of Education Unit
Shahbaz Khan	Director and Representative

User's Guide

For the ALS Teacher/Instructional Managers/Learning Facilitator:

Welcome to the session guide of this module entitled So That's What Normal Is! under Learning Strand 3 Math and Problem-Solving Skills of the ALS K to 12 Basic Education Curriculum (BEC).

The module and the session guides were collaboratively designed, developed and reviewed by select DepEd field officials and teachers from formal school and ALS, and private institutions to assist in helping the ALS learners meet the standards set by the ALS K to 12 Basic Education Curriculum (BEC) while overcoming their personal, social, and economic constraints in attending ALS learning interventions.

This learning resource hopes to engage the learners in guided and independent learning activities at their own pace and time. Furthermore, this also aims to help learners acquire the needed 21st Century skills while taking into consideration their needs and circumstances.

As an ALS Teacher/Instructional Manager/Learning Facilitator, you are expected to orient the learners on how to use this module. You also need to keep track of the learners' progress while allowing them to manage their learning. Moreover, you are expected to encourage and assist the learners as they do the tasks included in the module.

SORTING THROUGH THE NUMBERS
Session Guide No. 1

I. **Duration of Session:** 3 hours

II. **Key Understandings to be Developed**
- Variables and its classifications
- Ungrouped and Grouped Data
- Frequency Distribution Table

III. **Learning Objectives**
1. Organize information collected in a frequency distribution table. (LS3MP-SP-PSF-JHS-3)
2. Exhibit honesty and accuracy in collecting and reporting mathematical data. (LS3MP-NS-PSA-BL/LE/AE/JHS-6)

IV. **Resources** (if available)
- Handout (list of information template) for activity

V. **Activity**
1. Ask the learners to find 10 people in the barangay/community and ask permission to get some information from them. *The activity is designed to simulate the process of gathering raw data with which information can be induced from.*

Age: _____
Birth Month: _____
Sex (Biological): _____
Number of siblings: _____

2. Ask the learners to prepare a simple presentation of their work to the rest of the class.

Example:

AGE	BIRTH MONTH	SEX	NUMBER OF SIBLINGS
12	August	Male	3
20	June	Female	6
…	…	…	…

VI. Analysis

1. Based on the activity, ask the question: *What information did you ask from the people?*

2. Explain that the process of getting raw data is the first step in making conclusions to describe a group of people or objects accurately. This same process is done in getting the census that gathers massive amounts of data from the population such as age, income, number of members in the family, etc.

3. Explain the importance of gathering information using surveys to describe the characteristics of group of people.

VII. Abstraction/Generalization

1. Present the definition and examples. See page 7–20
2. **Data:**
   - Provide other examples aside from the Learner's Module.

     *For example, if a **variable** is the subject grade, then the numerical value or grades of one student such as 75, 80, 90 or 100 is the **data**. The collective grade of a section or a class is called the **data set.***

   - Explain the difference between discrete and continuous variables, then ask the students to an example of discrete and continuous variable.

Examples of a **discrete variable:** number of students in a class, siblings, and TV's

Examples of **continuous variable:** height of a person, weight of a watermelon

- Ask the learners to provide examples of data from the information they obtained from the activity.
- Use the answers of the learners to differentiate qualitative and quantitative data.

Qualitative	:	Birth Month, Sex
Quantitative	:	Age, Number of Siblings

- Emphasize the importance of understanding ungrouped and grouped data.

  An **ungrouped data** is the raw data that we take from observations and experiments which are not yet organized in any way. It is basically a group of numbers listed.

  When an ungrouped data is arranged from lowest to highest (ascending order) or from highest to lowest (descending order) it is called an **array.**

  Grouped data, on the other hand, is the data that has been bundled together in categories or ranges.

- Explain the use and importance of the frequency distribution table.

  A **frequency distribution table (FDT)** is a table form containing the classes (ranges of values) and frequencies. A **class** is a grouping of values. A **frequency** is the number of times the data occurred.

- Discuss the important terms such as range, class interval, class limit and class width before constructing a frequency distribution table.

  Range is the difference between the highest value and the lowest value. It can be represented by the formula $R = H - L$, where H – highest value and L – lowest value.

  Example: Highest value = 82, Lowest value = 67
  Range= 82 – 67 = 15

  Class or **class interval** is the interval of data values
  Class limits refers to the highest number (upper limit) and lowest number (lower limit) in a class.
  Class width or **class size** is the difference between the upper or lower limits of two consecutive class intervals. To get the class width, we use the formula:

$$\text{class width} = \frac{R}{\text{number of class intervals}}$$

- Emphasize on the importance of being careful and accurate in using the formulas.

VIII. Application

1. Ask the learners to define variable and data
2. Ask the learners to identify the different types of data.
3. Present the *Sharpening Your Skills* and *Treading the Road to Mastery* assessments on pages 21–23 which aim to practice the following skills:

   a. distinguishing between discrete and continuous variables.
   b. arranging set of values in an array and solving for the range.
   c. organizing data by tallying according to the class limits.
   d. constructing a frequency distribution table correctly.

4. Process the activity by allowing learners to explain their answers. See page 15 for the answer key

IX. Concluding Activity

End the session by reviewing the key understandings developed and relating the concepts of variables, data, and frequency distribution table to real-life scenarios. *Best if the key understanding comes from the learners and encourage them to cite another real-life application of variables, data, and frequency distribution.*

WHERE IS NORMAL?
Session Guide No. 2

I. **Duration of Session:** 3 hours

II. **Key Understandings to be Developed**
- Measures of Central Tendency

III. **Learning Objectives**
1. Illustrate the measures of central tendency (mean, median, mode) of a statistical data. (LS3MP-SP-PSF- JHS-23)
2. Calculate the measure of central tendency of ungrouped and grouped data. (LS3MP-SP-PSF- JHS-24)

IV. **Resources**
- Any measuring tool for the activity

V. **Activity**
1. Form three groups with 10–15 members each. Ask each group to use a measuring tool and take height measurements of 10 to 15 of their classmates. *The activity is designed to introduce the concept of average and most common value.*
2. Give time for learners (10 minutes) to do the activity and answer the questions related to the heights of their friends.
3. Ask each group to share their answers to the class.

VI. **Analysis**
1. Based on the activity, ask the learners the following questions:
   - What is the tallest height? What is the shortest height?
   - Compute for the sum of all the heights you listed. Divide the sum by the number of the people you used in the list.
   - If you arranged the values of height in lowest to highest order, what value(s) would be in the middle?
   - What value shows the greatest number of times in the list?

2. Explain that the goal of answering the questions is for them to have an idea of the three measures of central tendency and how it is important in collecting and gathering data.

VII. Abstraction/Generalization

1. Present the definition and examples. See page 27–39
2. **Statistics:**
   - Explain that statistics involves all process of survey until the preparation of visual graphs that show a summary of the data to understand the meaning easily.

3. **Measures of central tendency:**
   - Explain that the computed values for the central tendencies are usually regarded as the normal values of a group or population such as normal IQ, height, weight, age expectancy, etc.
   - Emphasize that different formulas and processes are used to find the measures of central tendencies for grouped and ungrouped data.

   For ungrouped data, use the example below.

   2, 7, 6, 2, 3, 4

   1. **Mean**

$$\bar{x} = \frac{\Sigma x}{n} = \frac{2 + 7 + 6 + 2 + 3 + 4}{6} = \frac{24}{6} = 4$$

   2. **Median**

   Arrange in ascending order: 2, 2, 3, 4, 6, 7

   2, 2, 3, 4, 6, 7

   Get the average of the two middle numbers:

$$\tilde{x} = \frac{3 + 4}{2} = 3.5$$

3. **Mode**
   The most occurring value is 2.

For grouped data

1. **Mean**

$$\bar{x} = \frac{\sum fX}{n}$$

where f - frequency
X - class mark
n - number of data

2. **Median**

$$\tilde{x} = L_B + \left(\frac{\frac{n}{2} - f_x(\text{before})}{f_{med}} \right)(i)$$

where L_B - lower boundary of the median class
f_x (before) - cumulative frequency before the median class
f_{med} - frequency of the median class
i - class width
n - number of data

3. **Mode**

$$\hat{x} = L_B + \left(\frac{d_1}{d_1 + d_1} \right)(i)$$

where L_B - lower boundary of the modal class
d_1 - difference between frequency of modal class and frequency below
d_2 - frequency of the median class
i - class width

- Familiarize the learners with the processes of calculating measures of central tendency, especially for grouped data as elaborated in the Learner's Module to assist the students in following the directions correctly.

- Make sure to explain the difference among the three measures of central tendency.

  Mean ($\bar{x}$)
  The mean is also called the **average,** which is obtained by summing up the data values divided by the number of data set. This is a result of balancing out all the values in a data set.

  Median ($\tilde{x}$)
  The middle value of the data array is called the median. It is obtained by arranging the data sets in ascending or descending order. If the number of data values are even, there the two middle numbers in the data set. To find the median, get the average of the two middle numbers.

  Mode ($\hat{x}$)
  The mode is the value that occurs most often in a data set.

- Guide the learners in computing the measures of central tendency, especially in applying the formulas.

VIII. Application

1. Ask the learners to discuss the different measures of central tendency.
2. Present the *Sharpening Your Skills* and *Treading the Road to Mastery* assessments on pages 43–45 which aim to practice the following skills:

   a. solving for the measures of central tendencies for ungrouped data.
   b. setting up the columns for class boundaries, midpoint and cumulative frequency in a frequency distribution table of a grouped data.

c. setting up the columns for class boundaries, midpoint and cumulative frequency in a frequency distribution table of a grouped data.
d. solve for the measures of central tendencies of a grouped data.

3. Process the activity by allowing the learners to explain their answers.
See page 15 for the answer key

IX. Concluding Activity

End the session by reviewing the key understandings developed and relating the concepts of measures of central tendency to real-life scenarios. *Best if the key understanding comes from the learners and encourage them to cite another real-life application of measures of central tendency.*

LET ME SHOW YOU
Session Guide No. 3

I. **Duration of Session:** 3 hours

II. **Key Understandings to be Developed**
- Constructing statistical graphs

III. **Learning Objectives**
1. Interpret the legend in a graph. (LS3MP-SP-PSF-JHS-7)
2. Analyze and draw conclusions from statistical data presented in graphs and tables. (LS3MP-NS-PSF-JHS-11)
3. Construct pictographs, bar graphs, line graphs, and pie/circle graphs to organize, present, and analyze data from everyday life situations. (LS3MP-NS-PSF-JHS-12)
4. Translate data into graph or chart. (LS3MP-NS-PSF-JHS-13)

IV. **Resources** (none)

V. **Activity**
1. Ask the learners to help Idette and Boying graph some data they collected from the community. Form at least 5 groups. The activity is designed to let the learners recall and practice creating the different types of graphs that should have been learned previously.

CLASS INTERVAL (age)	FREQUENCY (number of interviewee)
11 – 20	5
21 – 30	3
31 – 40	2

See page 47 for the rest of the data to help Idette and Boying.

2. Ask each group to prepare a simple presentation of their work to the rest of the class.

VI. Analysis

1. Explain that graphs, as visual representation of data, allow an easy understanding of meanings behind a collection of numbers.

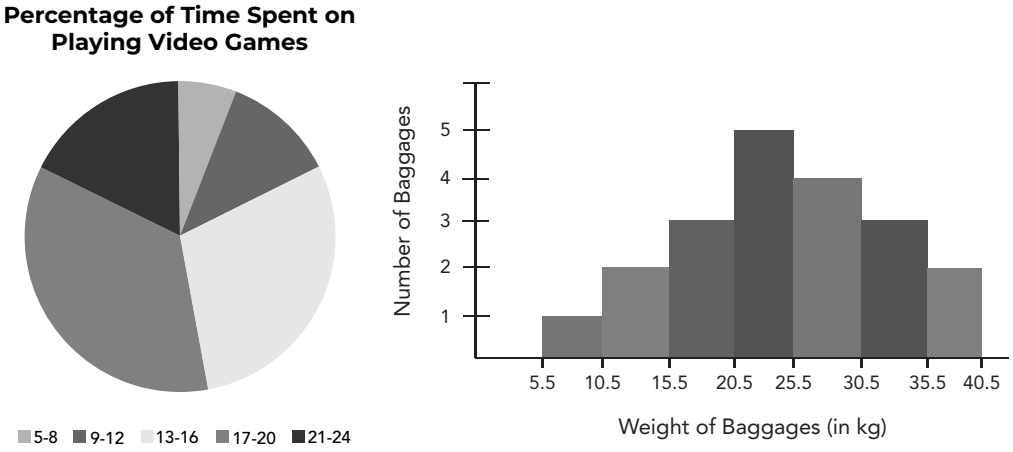
2. Emphasize the correct use and placement of the following:

   - the height of bars to use corresponding to the frequency of each category
   - the correct placement of the percentages in each portion of the circle
   - identifying the correct values corresponding to specific months using the points

3. Introduce that there are certain parts of a frequency distribution table that can be presented into graphs like those in the activity.

VII. Abstraction/Generalization

1. Present the different statistical graphs.



2. Emphasize on the proper labeling of each graph as well as the important parts of frequency distribution table related to them.
3. Emphasize that these graphs are helpful in analyzing and interpreting data.

VIII. Application

1. Ask the learners to discuss the different statistical graphs and their uses.

   - A **frequency polygon** is a graph that displays the data by using lines formed by connecting points plotted for the frequencies at the **midpoints** of the classes. The points have heights equal to the frequency of each class. The frequency polygon shows the development of the data from one class to the next.
   - A **histogram** is a graph that displays the data by using side-by-side vertical bars (unless the frequency of a class is 0) with **heights equal to the *frequency*** of each class interval.
   - **Pie graphs** are used to show the distribution of frequencies between classes in the FDT. It is also called a circle graph because the graph is in the form of a circle and is divided into slices to show numerical proportions.
   - The **cumulative frequency table** or **OGIVE (o-jive)** is a graph that represents the progression of the cumulative frequencies for the classes in a frequency distribution table. Since it uses cumulative frequency, Ogive describes how many numbers lie below or above a data.

2. Present the *Sharpening Your Skills* and *Treading the Road to Mastery* assessments on pages 62–65 which aim to practice the following skills:

   a. adding the percentage column in a frequency distribution table and constructing a pie chart for grouped data.
   b. constructing an Ogive and a frequency polygon using a frequency distribution table.
   c. adding important columns to create a histogram.
   d. constructing a histogram correctly. See page 15 for answer key

IX. Concluding Activity

End the session by reviewing the key understandings developed and relating the concepts of statistical graphs to real-life scenarios. *Best if the key understanding comes from the learners and encourage them to cite another real-life application of measures of statistical graphs.*

PRE-ASSESSMENT

PAGE 2

1. a
2. d
3. d
4. a
5. d
6. d
7. c
8. c
9. c
10. b
11. b
12. b
13. b
14. b
15. a

LESSON 1: SORTING THROUGH THE NUMBERS

SHARPENING YOUR SKILLS

PAGE 24

ACTIVITY I

1. discrete
2. continuous
3. continuous
4. continuous
5. discrete
6. discrete
7. continuous

ACTIVITY II

1. 21, 30, 31, 37, 39, 44, 44, 78, 170, 632

   range = 611

   range = 246

2. 4, 6, 37, 43, 44, 50, 66, 82, 181, 250

   range = 7

   range = 23.5

3. 12, 12, 12, 12, 12, 12, 13, 14, 14,15, 15, 15, 15, 16, 16, 16, 16, 16, 16, 16, 17, 17, 18, 18, 19

4. 7.5, 16, 17, 17, 18.5,19, 20, 20, 20, 20.7, 21.5, 22, 22, 23, 23.5, 24, 25.3, 27.1, 28, 31

TREADING THE ROAD TO MASTERY

PAGE 26

1. **Range** = 110 – 54 = 56

   Class Size = $\frac{56}{5}$ = 11.2 → 12 (round up)

CLASS INTERVAL	*f*
54 – 65	9
66 – 77	8
78 – 89	8
90 – 101	2
102 – 113	3

2. **Range** = 57 – 12 = 45

   Class Size = $\frac{45}{4}$ = 9 → 10

CLASS INTERVAL	*f*
12 – 21	10
22 – 31	18
32 – 41	8
42 – 51	3
52 – 61	1

LESSON 2: WHERE IS NORMAL?

SHARPENING YOUR SKILLS

PAGE 43

ACTIVITY I

1. **Mean** = 107.7 **Median** = 109 **Mode** = 104, 109
2. **Mean** = 6.5 **Median** = 6.4 **Mode** = 6.2
3. **Mean** = 903.75 **Median** = 810 **Mode** = No mode

ACTIVITY II

1.

CLASS BOUNDARIES	MIDPOINT (X)	CUMULATIVE FREQUENCY (f_c)
89.5 – 98.5	94	6
98.5 – 107.5	103	28
107.5 – 116.5	112	71
116.5 – 125.5	121	99
125.5 – 134.5	130	108

2.

CLASS BOUNDARIES	MIDPOINT (X)	CUMULATIVE FREQUENCY (f_c)
9.5 – 20.5	15	2
20.5 – 31.5	26	10
31.5 – 42.5	37	25
42.5 – 53.5	48	32
54.5 – 64.5	59	42
64.5 – 75.5	70	45

TREADING THE ROAD TO MASTERY

PAGE 45

CLASS BOUNDARIES	MIDPOINT (X)	CUMULATIVE FREQUENCY (f_c)
12.5 – 19.5	16	2
19.5 – 26.5	23	9
26.5 – 33.5	30	21
33.5 – 40.5	37	26
40.5 – 47.5	44	32
47.5 – 54.5	51	33
54.5 – 61.5	58	33
61.5 – 68.5	65	35

Mean = 33.8
Median = 31.5
Mode = 30.6

LESSON 3: LET ME SHOW YOU

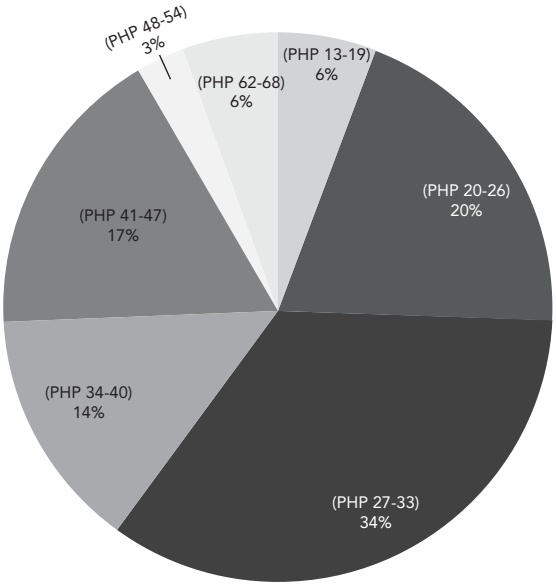
SHARPENING YOUR SKILLS

PAGE 62

ACTIVITY I

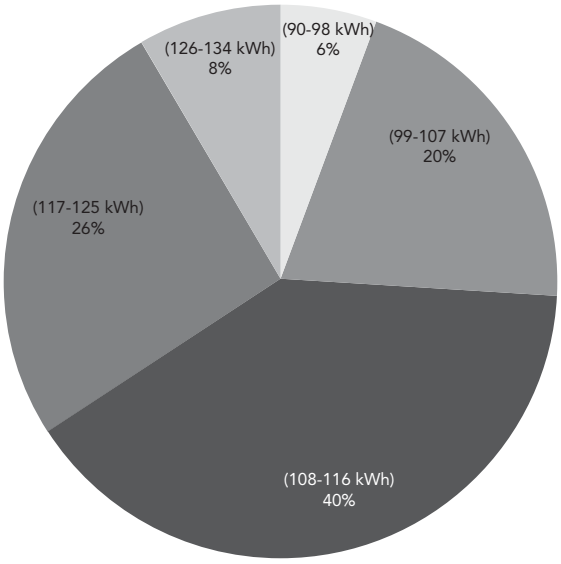
1. Price per Kilo of Rice

CLASS INTERVAL	PERCENTAGE
13 – 19	6%
20 – 26	20%
27 – 33	34%
34 – 40	14%
41 – 47	17%
48 – 54	3%
55 – 61	0%
62 – 68	6%



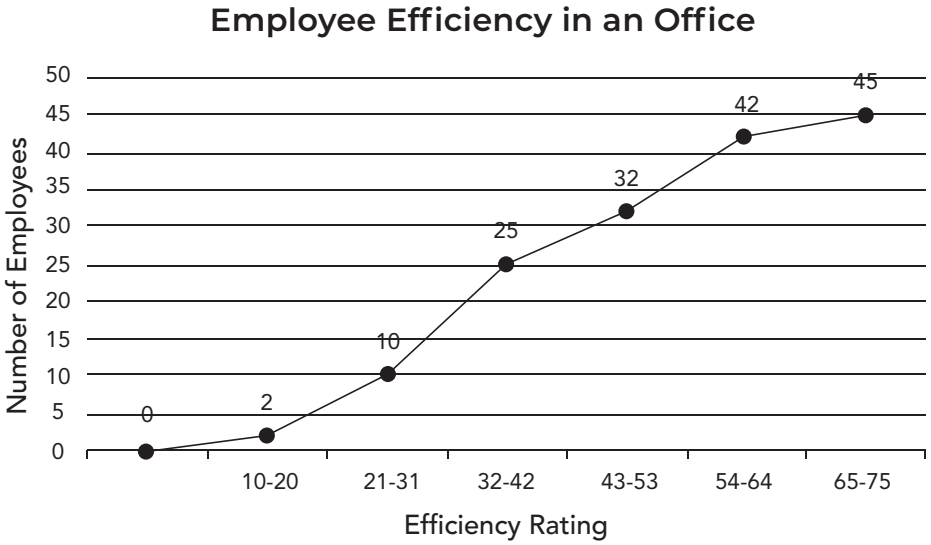
2. Monthly Wattage Use of Households

CLASS INTERVAL	PERCENTAGE
90 – 98	6%
99 – 107	20%
108 – 116	40%
117 – 125	26%
126 – 134	8%

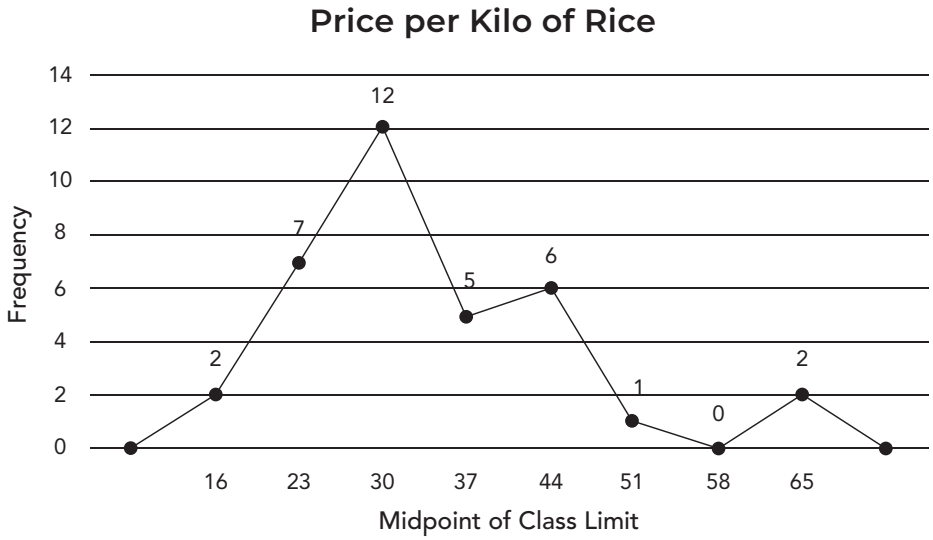


ACTIVITY II

1.



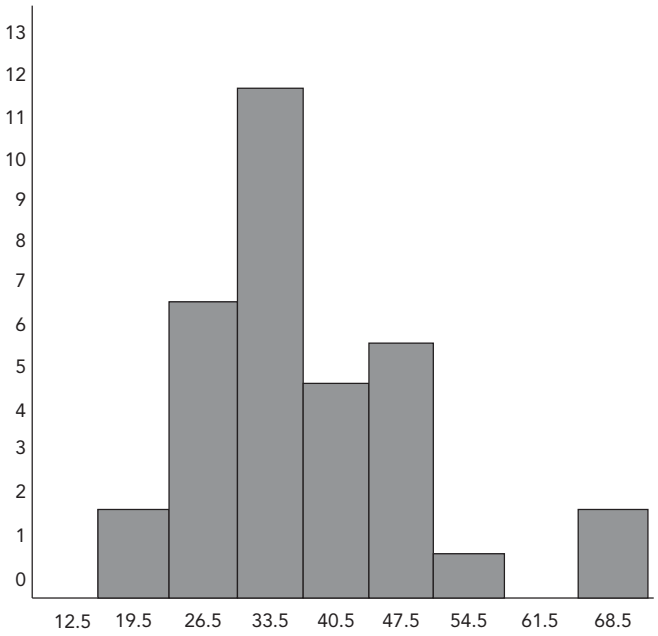
2.



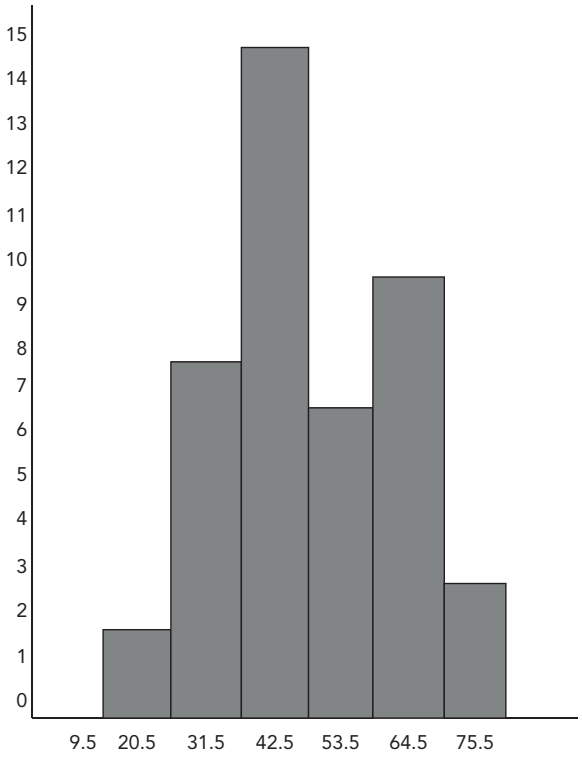
TREADING THE ROAD TO MASTERY

PAGE 64

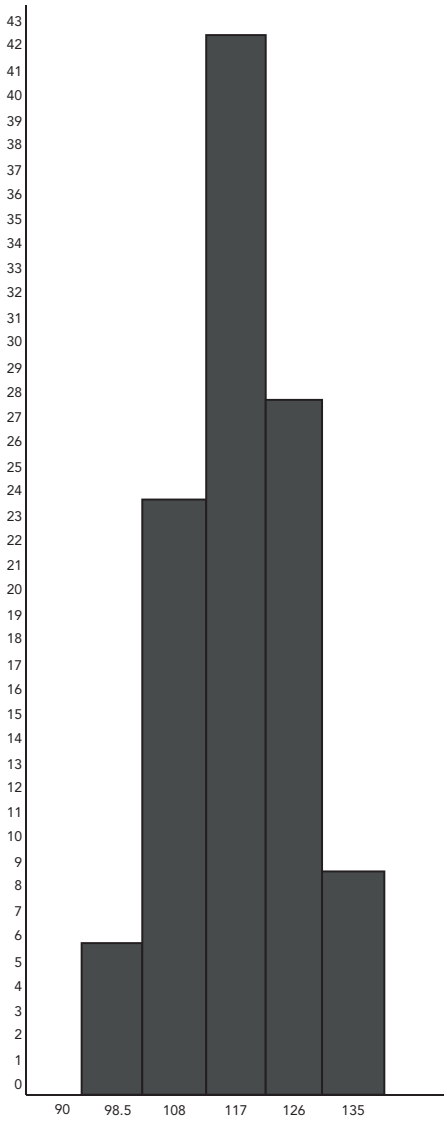
1.



2.



3.


43
42
41
40
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
90
98.5
108
117
126
135

The development and printing of this teaching resource was made possible with the cooperation of Asia Pacific College. This is a component of the project "Better Life for Out-of-School Girls to Fight Against Poverty and Injustice in the Philippines" implemented by UNESCO Office, Jakarta in partnership with the Department of Education. This initiative received a generous financial support from Korea International Cooperation Agency (KOICA).

For inquiries, please contact:

Department of Education, Bureau of Learning Resources (DepEd BLR)

Office Address	:	Ground Floor, Bonifacio Building, DepEd Complex, Meralco Avenue, Pasig City, Philippines 1600
Telefax	:	+63-2-8631-1072; +63-2-8634-1054; +63-2-8631-4985
Email Address	:	blr.qad@deped.gov.ph; blr.lrpd@deped.gov.ph