Lesson Guide
In
Elementary Mathematics
Grade 6

Chapter V
Graph
Circle Graph
Lesson Guides in Elementary Mathematics
Grade VI

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The Lesson Guides in Elementary Mathematics were developed by the Department of Education through the Bureau of Elementary Education in coordination with the Ateneo de Manila University. These resource materials have been purposely prepared to help improve the mathematics instruction in the elementary grades. These provide integration of values and life skills using different teaching strategies for an interactive teaching/learning process. Multiple intelligences techniques like games, puzzles, songs, etc. are also integrated in each lesson; hence, learning Mathematics becomes fun and enjoyable. Furthermore, Higher Order Thinking Skills (HOTS) activities are incorporated in the lessons.

The skills are consistent with the Basic Education Curriculum (BEC)/Philippine Elementary Learning Competencies (PELC). These should be used by the teachers as a guide in their day-to-day teaching plans.
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<td>✓</td>
</tr>
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Interpreting Data Presented in a Circle Graph

I. Learning Objectives

Cognitive: Interpret data presented in a circle graph
Psychomotor: Read data presented in a circle graph
Affective: Be aware of one’s responsibility

II. Learning Content

Skill: Reading and interpreting data presented
Reference: BEC PELC V.A.1
Materials: circle graphs
Value: Awareness of one’s responsibility

III. Learning Experiences

A. Preparatory Activities

1. Drill

   Strategy: Pass It On
   Materials: pieces of paper, flash cards, ball pen
   Mechanics:
   1) Divide the class into groups with equal number.
   2) Flash an equation, e.g. 50% of 40.
      The first pupil writes his answer on the piece of paper provided.
   3) When the teacher says “Pass” the pupils passes the paper to the pupil next to him, who
      in turn solves the equation shown by the teacher.
   4) The process continues until everyone has participated.
   5) The group with the most number of correct answers wins.

2. Review

   Study this bar graph. Answer the question after it.

   Lina's Grade in the 5 Major Subjects

   Math | Science | English | Filipino | Makabayan

1) What is the grade of Lina per subject?
2) In what subject did she get lowest? highest?
3) What is her average grade?
3. Motivation

What kind of graph showed Lina’s grade? What data were we able to gather? What are some of the ideas you can get from this graph? Do you know of any other kinds of graphs? (Guide the pupils to be able to tell the kind of graph – pie/circle graph.)

B. Developmental Activities

1. Presentation

Present the lesson using different activities:

a. Activity 1 – Class Work

Materials: Graph of Garbage Collection in Metro Manila

Mechanics:
1) The teacher presents the graph.

2) What kinds of garbage are enumerated in the graph?
3) How many percent does each represent?
4) What is the total percent?
5) Complete the table.

<table>
<thead>
<tr>
<th>Garbage</th>
<th>Percent</th>
<th>Computation</th>
<th>Mass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vegetable</td>
<td>10%</td>
<td>10 x 2 000</td>
<td>200 metric ton</td>
</tr>
<tr>
<td>Plastic</td>
<td>60%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cans</td>
<td>15%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottles</td>
<td>10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper</td>
<td>5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6) What is the greatest amount of garbage that is thrown?
7) Which of these garbage are biodegradable? non-biodegradable?
8) What can you do to help lessen the problem of garbage? Why?

b. Activity 2 – Group Work

Materials: Graph on Water Consumption

1) Present a graph: Use of 30 m³ for one month.
2) Group answers the question:
a) What is the total consumption for one month?
b) How many cubic metres were used for:
   • washing clothes
   • bathing
   • cooking and other things
c) What can you say about the data presented?
d) Convert the fractional part shown to percent.
   • washing clothes
   • bathing
   • cooking and other things

c) Representative of each group writes their report.
d) Discussion follows.

**c. Activity 3 – Cooperative Learning**

**Materials:** activity cards

**Mechanics:**
1) Present a graph: Total expenses for lunch of Ms. Condolon - 50.
2) Each group is given an activity card.
   a) How much is her budget for lunch?
   b) What percent of the 50.00 did she spend for each kind of food?
   c) Convert your percent to fraction. Which of them did Ms. Condolon spend the most?
   d) What can you say about her lunch?
   e) Do you think she ate a balanced diet? Explain.

2. **Fixing Skills**

Study the graph of Emmanuel’s Activity in a Day.

**Discussion:**
1) What is the graph about?
2) How many hours are there in a day?
3) Change the data.
   - percent
   - fraction
4) What trait does Emmanuel show in the graph?
5) If you were Emmanuel would you have the same budget of time? Why or why not?

3. Generalization
   How does a circle graph help in interpreting data?

C. Application

A. The circle graph shows the percent of various age groups in a certain barangay. There are 6200 people in this barangay.
   1) How many percent belong to over 60?
   2) How many persons belong to each age group?
      20-39 __________ 40-60 __________ 40-60 ________
      under 20 __________ over 60 __________
   3) What can you say about the population of this barangay?

B. Read, analyze and answer.
   1. How much is allotted for each item.
      Food __________ Rent __________ School and allowance __________
      Clothing __________ Savings __________ Miscellaneous __________

   2. Which item gets the smallest share in the budget? Biggest?

   3. Why are the miscellaneous items not included in the budget as separate items?
IV. Evaluation
The circle graph shows favorite sports among 100 persons.

1) Find the percent of each sport.
2) Find the fractional part represented by each sport.
3) What conclusions can you make out of the data shown?

V. Assignment
1) Bring: compass, ruler, crayons, pencil, coupon bond.
2) Make a list of things you do in 24 hours.

Organizing Data and Constructing a Circle Graph

I. Learning Objectives

Cognitive: Organize data and construct a circle graph
Psychomotor: Draw a circle graph based on data presented
Affective: Be systematic and orderly in doing things

II. Learning Content

Skill: Organize data and construct a circle graph
Reference: BEC PELC V.A.2, 2.1
Materials: ruler, compass, protractor, coupon bond, crayola
Value: Being systematic and orderly

III. Learning Experiences

A. Preparatory Activities

1. Mental Computation

   Use of cross number puzzle

   Materials: chart, pentel pen, flash cards, art paper, pair of scissors, paste
1) The teacher shows the chart with the outline of the puzzle.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>b</td>
<td>c</td>
<td>d</td>
</tr>
<tr>
<td>e</td>
<td>f</td>
<td>g</td>
<td>h</td>
</tr>
</tbody>
</table>

ACROSS

a) \( \frac{1}{2} \) of 70
b) 25% of 360
c) \((2 \times 15) + 7\)
d) one complete revolution
e) 7 multiplied by itself
f) \(10^2\)

DOWN

a) \( \frac{1}{12} \) of 360
b) 97 \times 10
c) 10% of 300
d) one number for 13 and 6
e) a single number for \(2^4 \times 3\)

2. Review

Family Income: ₱13,000 a month

1) Which item has the biggest allocation?
2) How much is the budget for food?
3) Which item has the least allocation?
4) How much is spent for:
   • education
   • savings
   • shelter

3. Motivation

Do you do your homework and study every day? How many minutes do you spend for each subject area?

Mia is a very conscientious pupil, she sees to it that she follows strictly her schedule. Here is a sample of her schedule:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>15</td>
</tr>
<tr>
<td>Math</td>
<td>15</td>
</tr>
<tr>
<td>Science</td>
<td>10</td>
</tr>
<tr>
<td>Filipino</td>
<td>5</td>
</tr>
<tr>
<td>Makabayan</td>
<td>15</td>
</tr>
</tbody>
</table>

Discussion:
1) Who does her homework and study her lessons every day?
2) How many minutes a day does she study?
3) Do you think Mia is doing the right thing? Explain.
4) Mia would like to present her schedule for doing her school work in a circle graph. Let us help her do it.
B. Developmental Activities

1. Presentation

a. Activity 1 – Whole Class Activity

   Materials: art paper, paste, pair of scissors, coupon bonds, protractor, ruler

   Mechanics:
   1) The teacher presents the data.

   Mia’s Schedule of Study

<table>
<thead>
<tr>
<th>Subject</th>
<th>Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>15</td>
</tr>
<tr>
<td>Math</td>
<td>10</td>
</tr>
<tr>
<td>Science</td>
<td>15</td>
</tr>
<tr>
<td>Filipino</td>
<td>5</td>
</tr>
<tr>
<td>Makabayan</td>
<td>15</td>
</tr>
</tbody>
</table>

   2) Discussion:
   a) Find the total minutes.
   b) Form a fraction by having the minutes per subject as the numerator and the total the denominator.
      Ex.: English \( \frac{40}{240} = \frac{1}{6} \) hence represent \( \frac{1}{6} \)
   c) To check if their answer is correct let them add the fractions. The sum should be equal to 1. (The LCD is 24.)
   d) Let them keep the data on equivalent fractions.
   e) Form a group of 5 seeing to it that each member has different colors of art paper. Let each member of the group cut 5 circles of the same size. Let each pupil cut the pieces as shown by the data. Ask the pupils to exchange their pieces seeing to it that everyone has a complete set of 5 pieces.
   f) Ask the pupils to paste the pieces side by side without overlapping to form a circle.
   g) Ask each pupil to measure the angles of each piece, then find the total.
   h) How many degrees is represented by:
      \[
      \begin{align*}
      \frac{1}{6} & \quad \frac{1}{6} \\
      \frac{1}{4} & \quad \frac{1}{3} \\
      \frac{1}{8} & \quad \frac{1}{8} \\
      \end{align*}
      \]
      What is the total?
   i) How did you get the number of degrees represented by an item?

b. Activity 2 – Individual Work

   Materials: coupon bond, compass, protractor, ruler, pencil, crayons

   Mechanics:
   1) Present the problem:
      The members of the Math Club elected their officers. There are 4 candidates for president and 100 members voted. This is how the members voted:
   2) Let us make a circle graph for the election result.
      Steps:
      a) Find the percent of vote each candidate received.
      Edna = \( \frac{35}{100} = 0.35 \) or 35%
      Ron = \( \frac{28}{100} = 0.28 \) or 28%
      Rojan = \( \frac{22}{100} = 0.22 \) or 22%
Cheska = \frac{15}{100} = 0.15 \text{ or } 15% \text{ or } 15% \text{ or } 15%

Total votes is 100%.

b) Determine how many degrees correspond to each percent. The whole circle measures 360°.
35% of 360 = 126
28% of 360 = 100.8 \text{ round to 101}
22% of 360 = 79.2 \text{ round to 79}
15% of 360 = 54

c) Draw a circle. Determine the center and draw a radius. Use a protractor and with the center as the vertex and the radius as a side, measure any of the angles found in step 2. Then draw a line to show the division.
d) Label the sectors and put a title to your graph.

c. Activity 3 – Group Work

Materials: coupon bond, compass, protractor, ruler, pencil, crayons

1) You can make a survey in your class and make a circle graph out of it.
Ex. favorite color, favorite subject, favorite fruit
Note: Make sure pupils vote only once.
Teacher can limit the choices by listing down the items.

2) Follow the steps as in Activity 2.

2. Fixing Skills

Construct a circle graph with the given data.

<table>
<thead>
<tr>
<th>Laborer's</th>
<th>Numbers</th>
<th>Percent</th>
<th>Degrees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpenter</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrician</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masons</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plumbers</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odd-job Man</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Generalization

How do we construct circle graph?

C. Application

There was a survey conducted among 1,000 rural families regarding their income. Follow the steps and make a circle graph.

<table>
<thead>
<tr>
<th>Income Level</th>
<th>Number</th>
<th>Percent</th>
<th>Degrees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under ₱1,000</td>
<td>36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>₱1,000 – ₱1,999</td>
<td>137</td>
<td></td>
<td></td>
</tr>
<tr>
<td>₱2,000 – ₱2,999</td>
<td>210</td>
<td></td>
<td></td>
</tr>
<tr>
<td>₱3,000 – ₱4,999</td>
<td>311</td>
<td></td>
<td></td>
</tr>
<tr>
<td>₱5,000 – above</td>
<td>306</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1,000</td>
<td>100%</td>
<td>360°</td>
</tr>
</tbody>
</table>

IV. Evaluation

<table>
<thead>
<tr>
<th>Ride</th>
<th>No. of Pupils</th>
<th>Percent</th>
<th>Degrees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School Bus</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private Car</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public Jeepney</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking</td>
<td>21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>----</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) How many pupils are there?  
2) What is the title of the graph?  
3) Make a circle graph.

V. Assignment

Make a circle graph on how you spend your 24 hours.  
Be sure to make a table before doing the circle graph.