

Circle Graph Sense

Ask, organize, construct, and compare parts of a whole.

GRADE 6 • 6.PS.1

6.PS.1 "The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on circle graphs..."

NAME _____

DATE _____

Materials and setup

Use a pencil, ruler, protractor, and a spreadsheet or chart tool. Teacher provides device access before assigning Practice 4. Each student makes both a hand-drawn graph and a digital graph; save the digital file for review.

The response lists and graphs are invented classroom data, not findings about your own school. Each person in a list selected exactly one category.

THE DATA CYCLE

Ask a question, collect or acquire responses, organize them, represent them, and communicate findings. A circle graph represents one whole. Category percent = $\text{count} / \text{total} \times 100$; angle = $\text{count} / \text{total} \times 360$ degrees. All sectors together make 100% and 360 degrees.

WORKED EXAMPLE

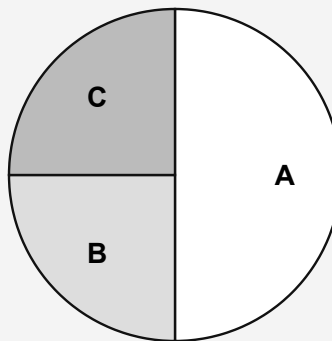
Eight students chose one reading format: 4 comics, 2 novels, and 2 magazines. How does the circle represent the whole group?

1. Comics: $4/8 = 50\%$; its angle is 180 degrees.
2. Novels and magazines: each $2/8 = 25\%$, so each angle is 90 degrees.
3. The circle has one sector per category. Counts total 8, percents total 100%, and angles total 360 degrees.

Answer:

The half-circle is comics; the two quarter-circles represent novels and magazines.

Reading formats: sample of 8



- A. Comics: 50%
- B. Novels: 25%
- C. Magazines: 25%

Total: 8 responses

PRACTICE 4 problems

1 Write a survey question and target population for these 20 responses. Why check the selection method before generalizing?
Codes: A = Art; C = Coding; M = Music; D = Drama. Each code is one student's single choice.
A C M A D C A M C A D A C M A C D M A C

ANSWER _____

2 Count each response once. Complete all four rows, then check that counts, percents and angles total 20, 100% and 360 degrees.

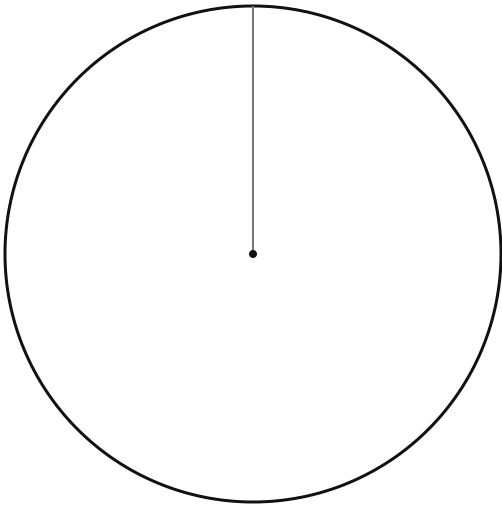
ORGANIZE THE CLUB RESPONSES

Club	Count	Percent	Angle
Art			
Coding			
Music			
Drama			

ANSWER _____

3 Use a protractor and the starting radius to construct the club circle graph by hand. Add a title and label each sector with club and percent, directly or in a keyed legend.

Graph title: _____



ANSWER _____

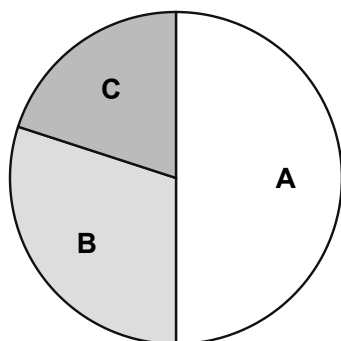
- 4** Create the same circle graph using a spreadsheet or chart tool. Enter your category counts, insert a circle/pie chart, and show its title and category/percent labels. Save the file. Compare its sectors with your hand graph and record one check or correction plus the filename.

ANSWER _____

APPLY IT Show your work

- 1** Read this different survey's circle graph. What percent chose Walking? How many of the 20 students chose Skating? Is Walking more popular than Biking and Skating combined? Explain with evidence.

Outdoor choices: sample of 20



A. Walking: 50%

B. Biking: 30%

C. Skating: 20%

Total: 20 responses

ANSWER _____

2

Compare this bar graph with the Outdoor choices circle graph above: they show the same responses. How many more students chose Walking than Biking? Which display makes that difference easier to see, and which emphasizes Walking's share of the whole? Justify both choices.

OUTDOOR CHOICES: SAME SAMPLE OF 20



ANSWER _____

CHALLENGE One step up

A principal wants club preferences for all grade 6 students. Plan a sample of 20 that includes every grade 6 homeroom fairly, with random selection within each. Explain how you would handle unequal homeroom sizes, absent students and one response per student. Why would surveying only the art club risk a misleading circle graph?

PRACTICE 1

Write a survey question and target population for these 20 responses. Why check the selection method before generalizing?

Codes: A = Art; C = Coding; M = Music; D = Drama. Each code is one student's single choice.
A C M A D C A M C A D A C M A C D M A C

Example: Which one club would you most like to join: Art, Coding, Music, or Drama? Target: all grade 6 students. We need the selection method to judge whether the sample represents them.

PRACTICE 2

Count each response once. Complete all four rows, then check that counts, percents and angles total 20, 100% and 360 degrees.

Art: 7, 35%, 126 degrees. Coding: 6, 30%, 108 degrees. Music: 4, 20%, 72 degrees. Drama: 3, 15%, 54 degrees. Totals: 20, 100%, 360 degrees.

PRACTICE 4

Create the same circle graph using a spreadsheet or chart tool. Enter your category counts, insert a circle/pie chart, and show its title and category/percent labels. Save the file. Compare its sectors with your hand graph and record one check or correction plus the filename.

Teacher checks the actual digital graph and filename: counts 7, 6, 4, 3 with 35%, 30%, 20%, 15%. A useful check compares sector sizes and matching category labels with the hand graph.

APPLY IT 1

Walking: 50%. Skating: 4 students. No: Walking equals the other two combined.

Skating is 20% of 20 = 4. Biking and Skating total 30% + 20% = 50%, equal to Walking.

APPLY IT 2

4 more students; the bar graph supports comparing counts, while the circle graph emphasizes the 50% share.

Walking has 10 and Biking has 6, so $10 - 6 = 4$. Compare bar lengths for the count difference; compare the half-circle with the whole for the share. Accept another justified choice based on the actual displays.

CHALLENGE

Use a roster-based random sample, assigning homeroom sample sizes roughly proportional to enrollment while representing each room. Follow up with absent selected students or use a stated random replacement rule; count each person once. Art-club members may favor Art and do not represent all grade 6 students. A neat circle graph does not correct a biased sample.

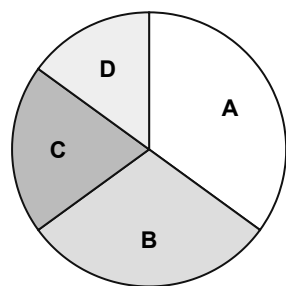
Require actual hand and digital constructions, correct labeled sectors, all data-cycle steps and comparisons of both printed graph types. Grade the digital artifact, not only a written promise. Equivalent graph orders are acceptable. The supplied responses do not establish preferences in the student's school.

PRACTICE 3

Use a protractor and the starting radius to construct the club circle graph by hand. Add a title and label each sector with club and percent, directly or in a keyed legend.

Sectors must match the four computed angles and percentages. Any starting angle or sector order is valid when the labels match.

Club choices: sample of 20



- A. Art: 35%
- B. Coding: 30%
- C. Music: 20%
- D. Drama: 15%

Total: 20 responses