



G6
Basic

G7
Advanced

Helping With Math

GRADES

Data Collection and Representation: Frequency Distribution

Suitable for students
aged 10-12



This pack is suitable for learners aged 10-12 years old or 6th and 7th grades. The content covers fact files and relevant basic and advanced activities of frequency distribution topics that aim to develop and strengthen the learners' data collection and representation skills.

Happy National Women's History Month!



- March of every year since 1987 is dedicated to celebrating the significant contributions of women in the history of the United States.
- Women's influence in history, politics, culture, literature, entertainment, and sports, to name a few, are celebrated by reading books about renowned women, listening to podcasts, watching movies depicting women empowerment, and even attending TED talks led by women.
- Celebrating Women's History Month is a perfect opportunity to promote the often-overlooked contributions of women to US history. Names such as Abigail Adams, Susan B. Anthony, Sojourner Truth, and Rosa Parks were some of the popular and dedicated women who imprinted their legacy to US history.



DATA COLLECTION AND REPRESENTATION



Data collection skills:

- These are set of skills that allow the learners to effectively gather useful information to present and solve problems.
- When children perform a collection of data, they are utilizing several mathematical skills that are useful in solving real-world problems.

Data representation skills:

- Any information can be arranged using charts, diagrams, tables, and graphs in mathematics.
- When the data collected are arranged systematically, presentation and analysis can be quickly done. Thus, interpretation, decision making, conclusion, and recommendation about the data follows.



Did you know that when learners enjoy creating and analyzing simple bar graphs, pictographs, object graphs, and tally charts, they're practicing their computational thinking skills and engaging in the scientific method!



STATISTICAL DISTRIBUTIONS

Statistical distribution is an arrangement of data or values of a variable showing their observed or theoretical frequency of occurrence.

Statistical Distribution is used to represent collected data from a sample or population for the purpose of organized and easy to review information.



FREQUENCY DISTRIBUTION

| Type of Job | Frequency |
|----------------|-----------|
| Teacher | 55 |
| Politician | 12 |
| Police officer | 18 |
| Firefighter | 15 |

Frequency Distribution of Women's Type of Job in a Certain County

Frequency Distribution

- A graph or data set in tabular form that shows the frequency of occurrence of each possible outcome of a repetitive experiment or event.
- It can also be from a group of people's data within a given interval.

- Frequency Distribution Table (another term for frequency distribution) can cater qualitative and quantitative data.
 - Qualitative data - a type of data that describes or characterizes. Examples are color, sizes, symbols, number codes, ID numbers, etc.
 - Quantitative data - a type of data that measures a value, counts, and uses numbers. Also known as numerical data. Examples are height, weight, number of people.



STATISTICAL DISTRIBUTIONS

| Age | Frequency |
|---------|-----------|
| 15 - 18 | 20 |
| 19 - 22 | 48 |
| 23 - 26 | 50 |
| 27 - 30 | 62 |

Frequency Distribution of the Age of Women Workers in a Certain County

This frequency distribution shows the age interval of women workers in a certain county. It is an example of quantitative data (age and frequency).

We can compute the mean, median, and mode as well as the variance, standard deviation, and range.

Ungrouped vs Grouped Frequency Distribution Table (FDT)

| Type of Job | Frequency |
|----------------|-----------|
| Teacher | 55 |
| Politician | 12 |
| Police officer | 18 |
| Firefighter | 15 |

Ungrouped FDT

| Age | Frequency |
|---------|-----------|
| 15 - 18 | 20 |
| 19 - 22 | 48 |
| 23 - 26 | 50 |
| 27 - 30 | 62 |

Grouped FDT

Ungrouped FDT is a less complicated type of FDT. It is a two-column table that shows the categorical variable and its corresponding frequency. On the other hand, **Grouped FDT** is more complicated to construct. It is also a two-column table, but the difference is that its categories are divided into classes intervals. Each class interval shows its corresponding frequency.



CONSTRUCTING FDT

- **Step 1:** Make a two-column table. The first column is the title of the categorical data you want to organize. Note: You may add another column for tallying marks.
- **Step 2:** Decide which type of FDT is more appropriate. If there are too many different values, create grouped frequency distribution table. In doing so, consider the lowest and highest score or value/ Otherwise, opt to create ungrouped.
- **Step 3:** Write the data set values in the first column.
- **Step 4:** Count how many times each item/score/value occurs. In simpler words, find the frequency of each item by counting.
- **Step 5:** Write the corresponding frequency of each item/score/value.
- **Step 6:** You may write the total frequency in the last row of the table.



Susan B. Anthony (1820-1906) was an American social reformer and women's right activist.

Example:

Susan B. Anthony was one of the pioneers of the women's suffrage movement in the US. Assume that the numerical data below are the number of women who exercised their right to vote during that time. Note: these data are from random cities and counties in the US.

| | | | | |
|-----|----|-----|-----|-----|
| 85 | 90 | 76 | 90 | 100 |
| 88 | 95 | 81 | 94 | 102 |
| 86 | 78 | 90 | 88 | 90 |
| 104 | 98 | 84 | 87 | 74 |
| 91 | 93 | 100 | 101 | 104 |
| 99 | 89 | 90 | 91 | 90 |

Burning question:
Which type of FDT is more appropriate to use to represent the collected data?



CONSTRUCTING FDT

Step 1: Make a two-column table. The first column is the title of the categorical data you want to organize. Note: You may add another column for tallying marks.

| Number of Women | Tallying Marks | Frequency |
|-----------------|----------------|-----------|
| | | |

Step 2: Decide which type of FDT is more appropriate. If there are too many different values, create grouped frequency distribution table. In doing so, consider the lowest and highest score or value/ Otherwise, opt to create ungrouped.

Since there are too many values, let's construct a grouped FDT. The lowest value is 74 and the highest value is 104. Get the range. $R = 103 - 74 = 29$. Since $R = 29$, we can have 6 classes with a five-score interval. There are no strict rules in creating classes.

Step 3: Write the data set values in the first column.

| Number of Women | Tallying Marks | Frequency |
|-----------------|----------------|-----------|
| 99 - 103 | | |
| 94 - 98 | | |
| 89 - 93 | | |
| 84 - 88 | | |
| 79 - 83 | | |
| 74 - 78 | | |



CONSTRUCTING FDT

Step 4: Count how many times each item/score/value occurs. In simpler words, find the frequency of each item by counting.

Step 5: Write the corresponding frequency of each item/score/value.

Step 6: You may write the total frequency in the last row of the table.

| Number of Women | Tallying Marks | Frequency |
|-----------------|----------------|------------------|
| 99 - 103 | - II | 7 |
| 94 - 98 | III | 3 |
| 89 - 93 | - | 10 |
| 84 - 88 | - I | 6 |
| 79 - 83 | I | 1 |
| 74 - 78 | III | 3 |
| | | Total: 30 |

| Number of Women | Frequency |
|-----------------|------------------|
| 99 - 103 | 7 |
| 94 - 98 | 3 |
| 89 - 93 | 10 |
| 84 - 88 | 6 |
| 79 - 83 | 1 |
| 74 - 78 | 3 |
| | Total: 30 |

In a separate paper, construct an ungrouped FDT.

| | | | | |
|----|---|---|---|---|
| 10 | 8 | 6 | 6 | 8 |
| 9 | 9 | 7 | 7 | 7 |
| 10 | 6 | 5 | 5 | 5 |
| 8 | 9 | 8 | 8 | 9 |



TABLE OF ACTIVITIES

| Ages 10-11 (Basic) | | G6 |
|-----------------------|---------------------------------------|----|
| 1 | Ain't I a Woman? | |
| 2 | The Suffrage Movement | |
| 3 | Rosa Parks' Civil Rights Movement | |
| 4 | National Organization for Women (NOW) | |
| 5 | The Most Historic Woman of All Time | |
| Ages 11-12 (Advanced) | | G7 |
| 6 | Battle of the Sexes | |
| 7 | Women's History Month Items | |
| 8 | Space Ride with Sally Ride | |
| 9 | VAW Monthly Report | |
| 10 | Women Then and Now | |



AIN'T I A WOMAN?

G6
Basic

One of the important women in US history was Sojourner Truth. She was an African American women's rights activist, evangelist, and author who was born into slavery. The data given below are the assumed prices of young female slaves back in the early 1800s. Organize the data by tallying.



Price (in USD) of Young Enslaved Female
During the Early 1800's

| | | | | |
|-----|-----|-----|-----|-----|
| 100 | 120 | 150 | 110 | 100 |
| 110 | 110 | 120 | 150 | 120 |
| 120 | 150 | 100 | 100 | 100 |
| 120 | 110 | 100 | 150 | 100 |

Sojourner Truth (1797-1883) was an African American woman who was famous for her speech phrase, "Ain't I a woman?". She was considered one of the world's best-known human rights crusaders.

| Price (in USD) | Tally |
|----------------|-------|
| | |
| | |
| | |
| | |
| Total | |

What can you say about the collected data above? What is your view about slavery in the US history?



THE SUFFRAGE MOVEMENT

G6
Basic

The Woman's Suffrage Movement was considered a decades-long fight to win the right of American women to vote. Let's assume that the data below are the number of women per household who can cast their votes. Represent the data collected using an ungrouped FDT.

| | | |
|---|---|---|
| 2 | 3 | 1 |
| 0 | 2 | 5 |
| 1 | 5 | 4 |
| 4 | 4 | 1 |
| 2 | 5 | 3 |
| 3 | 1 | 0 |



| | | |
|---|---|---|
| 4 | 2 | 2 |
| 1 | 3 | 3 |
| 2 | 2 | 1 |
| 2 | 4 | 3 |
| 1 | 3 | 2 |
| 3 | 4 | 0 |



ROSA PARKS' CIVIL RIGHTS MOVEMENT

G6
Basic

Rosa Parks was undeniably one of the significant women in US history. Her devotion to fighting for the equal rights of African Americans imprinted her legacy. Given below is a 30-day report of racial discrimination in Alabama. Can you organize it by constructing an FDT? After that, interpret the data.

30-Day Incident Report of Racial Discrimination in Alabama

| | | | | |
|----|----|----|----|----|
| 12 | 10 | 15 | 13 | 11 |
| 15 | 15 | 10 | 10 | 12 |
| 10 | 13 | 11 | 14 | 14 |
| 14 | 15 | 10 | 11 | 14 |
| 11 | 11 | 13 | 11 | 14 |
| 12 | 12 | 10 | 11 | 13 |

Use the remaining space of this page for your answers.



NATIONAL ORGANIZATION FOR WOMEN (NOW)

G6
Basic

In 1966, the National Organization for Women (NOW) was founded. It aims to promote feminist ideals, eliminate discrimination, protect the rights of women, and many more. Given below is the profile of its new members based on race. Analyze the FDT and answer the questions that follow.

| Race | Number of Members |
|-------------------|-------------------|
| White Americans | 98 |
| African Americans | 105 |
| Chinese | 43 |
| Arab | 74 |
| Hispano | 82 |

1) Write a general interpretation of the collected data.

2) How many new members are there in all? Are the African Americans equivalent to more than 50% of the organization's new members? Why or why not?

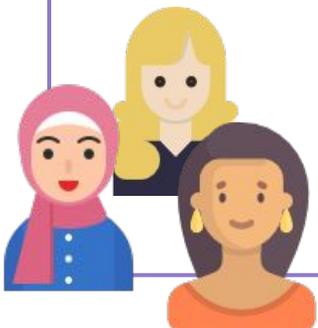
3) What is the range of the distribution? Which race has the lowest frequency? Highest frequency?



THE MOST HISTORIC WOMAN OF ALL TIME

G6
Basic

Who do you think is the most historic woman of all time in the US? Ask 30 individuals about their pick and present your findings using FDT. If the list of women is more than 10, present only the top 7 choices with their corresponding frequency.



BATTLE OF THE SEXES

G7
Advanced

Battle of the Sexes was a highly publicized tennis match between **Billie Jean King** and **Bobby Riggs** on **September 20, 1973**. The triumph of King over Riggs had become a historic moment for women in the US back then. Given below is the FDT about King's practice time (in minutes) in preparation for the said match.



A photograph of Billie Jean King and Bobby Riggs during the "Battle of Sexes" tennis match on September 20, 1973.

| Practice time (in minutes) | Frequency |
|----------------------------|-----------|
| 110 - 115 | 8 |
| 104 - 109 | 10 |
| 98 - 103 | 15 |
| 92 - 97 | 11 |
| 86 - 91 | 9 |
| 80 - 85 | 7 |

- 1) How many classes are there?
- 2) What is the range of the distribution?
- 3) What is the class interval?
- 4) What is the total frequency?
- 5) What can you say about the King's practice time?



WOMEN'S HISTORY MONTH ITEMS

G7
Advanced

Jessica is a member of the Women Empowerment Club in her school. Together with her other club member, she is selling souvenir items for the celebration of women's history month. Create a grouped FDT representing her sales for the entire month of March. Let the class interval be equal to 11.

| | | | | |
|-----|-----|-----|-----|-----|
| 150 | 160 | 120 | 100 | 150 |
| 167 | 175 | 175 | 170 | 110 |
| 120 | 125 | 140 | 150 | 160 |
| 155 | 130 | 100 | 158 | 158 |
| 150 | 140 | 120 | 135 | 155 |
| 165 | 170 | 140 | 100 | 100 |

Women Empowerment Club Daily Sales (in USD) for the month of March



SPACE RIDE WITH SALLY RIDE

G7
Advanced

Sally Ride was the first American woman in space. The FDT below shows the assumed number of people who filed an application to go to space in 1983. Using your understanding of FDT, compute for the mean of the grouped data.

| Age | Frequency (F) | Classmark (X) | X * F |
|---------|---------------|---------------|-------|
| 43 - 47 | 18 | | |
| 38 - 42 | 45 | | |
| 33 - 37 | 40 | | |
| 28 - 32 | 30 | | |
| 23 - 27 | 9 | | |
| 18 - 22 | 10 | | |
| Total | | | |

To compute for the mean, follow these steps:

- 1) Fill in the classmark column. To get the class mark, get the middle score of each class.
- 2) Multiply each class mark to its corresponding frequency.
- 3) Add the values you obtained from step 2.
- 4) Divide the value you obtained from step 3 by the total frequency. The result is the mean of the distribution. Round off your answer to the nearest tenths.

The mean age of applicants is _____.



VAW MONTHLY REPORT

G7
Advanced

Violence against women is still one of the prevalent issues in society. Given below is the monthly report of gender-based violence prepared by a certain local police station. Analyze the data. Was there an error in data representation? Explain.

| Number of Incidents | Tallying Marks | Frequency |
|---------------------|----------------|------------------|
| 99 - 103 | | 7 |
| 94 - 98 | | 3 |
| 89 - 93 | - - | 10 |
| 84 - 88 | - | 6 |
| 79 - 83 | | 1 |
| 74 - 78 | | 3 |
| | | Total: 30 |

| Number of Incidents | Frequency |
|---------------------|------------------|
| 99 - 103 | 7 |
| 94 - 98 | 3 |
| 89 - 93 | 10 |
| 84 - 88 | 6 |
| 79 - 83 | 1 |
| 74 - 78 | 3 |
| | Total: 30 |



WOMEN THEN AND NOW

G7
Advanced

Conduct a simple survey about women. Your topic of interest might be in the past or happening at present. Make sure that the data you will obtain are numerical and present it using a grouped FDT. Also, provide a brief summary of your study.



ANSWER GUIDE

Activity 1

| Price (in USD) | Tally |
|----------------|-----------|
| 100 | IIII - II |
| 110 | IIII |
| 120 | IIII |
| 150 | IIII |
| Total | 20 |

Activity 3

| No. of Incidents Reported | Frequency |
|---------------------------|-----------|
| 10 | 6 |
| 11 | 7 |
| 12 | 4 |
| 13 | 4 |
| 14 | 5 |
| 15 | 4 |
| Total | 30 |

Activity 5

Answers may vary.

Activity 2

| No. of women | F |
|--------------|-----------|
| 0 | 2 |
| 1 | 4 |
| 2 | 3 |
| 3 | 3 |
| 4 | 3 |
| 5 | 3 |
| Total | 18 |

| No. of women | F |
|--------------|-----------|
| 0 | 1 |
| 1 | 3 |
| 2 | 6 |
| 3 | 5 |
| 4 | 3 |
| Total | 18 |

Activity 4

1) Possible answer: Most of the new members are African Americans, while the least are Chinese. The new members are composed of different races such as White Americans, African Americans, Chinese, Arab, and Hispano.

2) $98 + 105 + 43 + 74 + 82 = 402$ new members. No, the African American members are not equivalent to 50% of the entire number of new members of the organization. 105 is not 50% of 402 but 201.

3) The range is $105 - 43 = 62$. The race with the lowest frequency is Chinese, while the highest is the African American race.



ANSWER GUIDE

Activity 6

- 1) There are 6 classes.
- 2) The range is 35.
- 3) The class interval is 6.
- 4) The total frequency is 60.
- 5) King had practiced for a minimum of 80 minutes and a maximum of 115 mins. She had a very long practice time. Maybe that is the reason why she was one of the best tennis players of all time.

Activity 8

| Age | F | Class mark (X) | X * F |
|---------|-----|----------------|-------|
| 43 - 47 | 18 | 45 | 810 |
| 38 - 42 | 45 | 40 | 1800 |
| 33 - 37 | 40 | 35 | 1400 |
| 28 - 32 | 30 | 30 | 900 |
| 23 - 27 | 9 | 25 | 225 |
| 18 - 22 | 10 | 20 | 200 |
| Total | 152 | | 5335 |

The mean age is 35.1 years old.

Activity 7

| Practice time (in minutes) | Frequency |
|----------------------------|-----------|
| 166 - 176 | 6 |
| 155 - 165 | 6 |
| 144 - 154 | 4 |
| 133 - 143 | 4 |
| 122 - 132 | 2 |
| 111 - 121 | 3 |
| 100 - 110 | 5 |

Activity 9

There are errors in indicating the frequency of each class. Below is the original and corrected FDT.

| Number of Incidents | F | F |
|---------------------|---------------------|------------------|
| 99 - 103 | 7 | 5 |
| 94 - 98 | 3 | 2 |
| 89 - 93 | 10 | 11 |
| 84 - 88 | 6 | 8 |
| 79 - 83 | 1 | 1 |
| 74 - 78 | 3 | 4 |
| | Total: 30 | Total: 31 |

Act. 10: Answers may vary.



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