

POPULATION CENSUS (LEVEL 3)

Description	Learners will design their own census survey and gather and analyze data of the people within their family/community to understand them better.
Leading Question	Can we conduct a census to learn more about our family and community?
Total Time Required	~4.6 hours over 4 days
Supplies Required	Pen, paper, ruler, protractor, compass
Learning Outcomes	<ol style="list-style-type: none"> 1. Designing and using a survey tool to gather information 2. Calculating percentages with two-digit numbers 3. Data handling: computing mean, median, mode, frequency 4. Data handling: graphical representation of data 5. Literacy: writing summary report and reading practice 6. Statistics: interpret and present data using bar charts, pictograms and tables 7. Statistics: solve one-step and two-step questions [for example 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables
Previous Learning	8. Multiplication and division with two-digit numbers

DAY 1

Today you will start creating your census survey.

Suggested Duration	Activity and Description
5 minutes	<ul style="list-style-type: none"> ● Introduction: <ul style="list-style-type: none"> - Learners will create a census survey for their community. The purpose of a census is to find out the total number of people living in a place and understand how many of them fall into certain categories such as age groups, gender, occupation etc.

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- Learners will create and survey the population of their immediate community including their own and their relatives' households and their close neighbors. They will then try to find out how many people fall under each category (such as gender, age, occupation, education etc.). They will also find the number of school-going children in their community.
 - After completing the census, learners will then identify one issue facing the community based on the results of their census. For example, does your data reveal that there are a lot of out of school children? Do you find that many adults are unemployed?
 - Learners will then write a short essay or design a campaign poster to address the issue they have identified from the results of their survey.

20 minutes

- First, create a census questionnaire with all the questions you want to ask participants. The learner will start by thinking about what questions they should ask and write them down.
- Suggested details and questions:
 - House Number
 - What is your name?
 - How many people are in your home?
 - What is the date of birth of each person in your home, including you?
 - What is the gender of each person?
 - What is the occupation of each person?
 - Are you and your family members currently in school, not in school or finished school?
 - If you/they have completed school/college, what is their highest level of education completed?
 - Can you and everyone in your house read and write?
 - Add here any other questions that are of interest to the learner

30 minutes

- Learners will create categories for each of the responses. Suggestions:
 1. Number of people in the home:
 - a. 1-4
 - b. 5-10
 - c. More than 10
 2. Age categories:
 - a. < 10
 - b. 10-18
 - c. 19-30
 - d. 31-40
 - e. 41-50
 - f. Older than 50

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3. Education:
 - a. Not enrolled in school or college
 - b. Enrolled in school or college
 - c. Completed school or college
 4. Highest Level of Education:
 - a. Primary School
 - b. Secondary School/High School
 - c. University
 5. *What categories can you add for Gender? Come up with the options for gender*
 6. *What categories can you add for occupation? Come up with a few options for occupation. Don't forget to add a category for those who are not employed*
- If you add more questions, make sure to create categories for them.
 - The final questionnaire should look like the following:
 - House number: _____
 - What is your name?
 - How many people are in your home? _____
 - a. -4
 - b. 5-10
 - c. More than 10
 - What is the age of each person in your home, including you?
 - < 10
 - 10-18
 - 19-30
 - 31-40
 - 41-50
 - Older than 50
 - What is the gender of each person, including you?
 - Male
 - Female
 - Is everyone in your house , including you, currently in school, not in school or finished school?
 - Yes
 - No
 - If you/they have finished school, what is your/their educational status?
 - Not enrolled in school or college
 - Enrolled in school or college
 - Completed school or college
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- If you/they have completed school/college, what is the highest level of education completed?
 - Primary School
 - Secondary School/High School
 - University
- What is the occupation of each person?
 - <insert occupation categories>
- Add any other questions that you came up with here
- Make copies of the questionnaire or write the questions on different pieces of paper. You can also create the questionnaire in tabular format like the one below:

House Number	Name	How many people are in your home?	How old are you or how old is [NAME]?	What is your gender or what is the gender of [NAME]? a. Male b. Female	Are you currently in school or is [NAME] currently in school? a. Not enrolled in school or college b. Enrolled in school or college c. Completed school/college	Add other questions here...
1	Hassan	3	16	Male	Completed school/college	
1	Raniitt		18	Female	Enrolled in school/college	

- Record the responses of the person you are interviewing and **everyone in their house** on separate copies of the questionnaire or in a separate row if using the tabular format. For example, if a household has 4 members, you will interview one person but you will record his or her answers to all the questions for each member **on 4 different questionnaires or 4 different rows**.
- Group the copies of the questionnaire that belong to members of the same household together as household 1, household 2 etc. or group the responses of people that belong to same household in rows that are close to each other

10 minutes

- Present all the day's work (the questions, the answer categories and the questionnaire developed) to your class, parents or family members for feedback and suggestions for improvement. The class, parents or family members provide feedback using the following format:
 - Praise: What did you like about the learner's work done?
 - Question: Do you have any questions or clarifications about the work?

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- Suggestions: In what areas does the learner need to improve their work?
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DAY 2

Today you will interview your family and relatives.

Suggested Duration	Activity and Description
1-2 hours	<ul style="list-style-type: none"> • Today, the learner will interview his or her family and relatives. Think about how you can collect the information from the different people within your family/community. • Suggestions for conducting the interviews: <ul style="list-style-type: none"> - In person with social distancing for people in your family/community whom you can meet face-to-face - Phone/video call/text message for family members/relatives/relatives or community members who are not around at the time of the interview - Guessing/asking another family who knows information about that person • Relatives can be interviewed through text or calls. If you are interviewing in person, make sure you have a mask on and maintain social distancing norms by standing 6 feet from the person you are interviewing. • Go ahead and interview all the people in your family and/or community. • When you are interviewing people, ask them the question, then check the option in the categories that reflect their response. For example, if they graduated high school and are not in college, circle or put a check mark ✓ next to the “completed school” option of question 6 of the questionnaire above or write down the option that is applicable to them if using a table to record responses. See the example below:

House Number	Name	How many people are in your home?	How old are you or how old is [NAME]?	What is your gender or what is the gender of [NAME]? a. Male b. Female	Are you currently in school or is [NAME] currently in school? a. Not enrolled in school or college b. Enrolled in school or college c. Completed school/college	Add other questions here...
1	Hassan	3	16	Male	Completed school/college	
1	Ranjitt		18	Female	Enrolled in school/college	

- Another option if you are unable to conduct the interviews in person or phone calls is to simply guess what the responses might be or ask your family members if they know your neighbors well.

10 minutes

Reflection: Learners are encouraged to continually reflect on the exercise as they conduct it and keep improving the methods used to conduct the interviews. Below are some suggestions of reflection questions they can use through this process.

- How are the interviews going? Are you using the most efficient way of collecting the information? Can the process of collecting information be improved? If so, how?
- Are there any new things you are learning through this process?

DAY 3

Today you will look at all the answers and analyze your results.

Suggested Duration

Activity and Description

20 minutes

- Create a table summarizing the findings on age, gender, number of people and education from all the census participants in a tabular format in preparation for analysis.

See the example below:

House	Name	Age	Gender	No. of people in house	Education

1	Sarah	30	Female	3	Completed college
1	Ahmed	11	Male		In school
1	Kareem	62	Male		Completed high school
2	Sana	16	Female	5	In school

**40-60
minutes**

- Analyze your results, we will use the following probing questions:
 - In total, how many people live in all of the households you surveyed? This is called the **number of observations**.
 - How many people have completed school?
 - What is the **average** age of participants? You can find the **average** by adding all the ages and dividing by the number of observations. e.g. $(20+13+5)\div 3 = 12.7$. The average is also called the **mean**.
 - What is the average number of people living in the same house?
 - How many male participants did you find?
 - How many people were employed?
 - What is the **median** age of participants? You can find the **median** (or middle value) following these steps:
 - Look at the age column. Arrange the ages in ascending order from smallest to biggest
 - Count how many ages there are (maybe not all participants gave their age)
 - Look at the age column. Arrange the ages in ascending order from smallest to biggest
 - Count how many ages there are (maybe not all participants gave their age)
 - Find the middle value in the ordered age list. This is your **median**. The middle value should have the same number of digits before and after it if the total number of observations is an odd number. For example, if you have 15 numbers, the middle value is the seventh digit in the list. If you have an even number of total digits, for example, 20 digits, the middle value is the sum of the two middle digits (in this case the tenth and eleventh numbers) divided by 2. To illustrate, let's say this is our age distribution for 20 people we surveyed in ascending order:
 - 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

- 10 and 11 are the middle values because there is an equal number of digits before 10 and after 11. There are 9 digits before 10 and 9 digits after 11
 - To find the median: $(10 + 11) \div 2 = 21/2 = 10.5$
 - 10.5 is the median
- Find the median age of participants in your data.
- What is the **mode** of the participants' age? You can find the mode by following these steps:
 - Look at the age column. Arrange the ages in ascending order from smallest to biggest
 - Is there an age that is repeated many times? What is the most frequent age that many participants share? This is your mode. You can also have two or more modes if two different ages are repeated the same number of times. For example, if Ahmed, Sana and Sarah were all 11 years old and Kareem, Mona, and Adam were all 20 years old, and three is the most number of times that a number is repeated in your data, then your modes are 11 and 20.
- What is the **mode** of people living in the same household?
- What is the percentage of females? You can find the percentage by following these steps:
 - Calculate the total number of observations
 - Calculate the number of females
 - Divide the number of females by the number of observations
 - Multiply the answer by 100
 - $\frac{\text{Number of females}}{\text{Total number of observations}} \times 100$
 - e.g. $20/100 = 2/10$ or 0.2 . $0.2 \times 100 = 20$. Answer= 20%
- **Frequency** refers to the number of times one answer came up in your survey. For example if 5 people said they completed college, the **frequency** of college completion is 5. What is the educational category with the highest **frequency**?
- Compile and write the responses from the analysis performed on a sheet of paper.

10 minutes

Share the responses with your class, parents or family members. Parents or family members or the teacher will check if the learner has been able to perform the analysis well and provide feedback on any areas that need improvement where necessary.

DAY 4

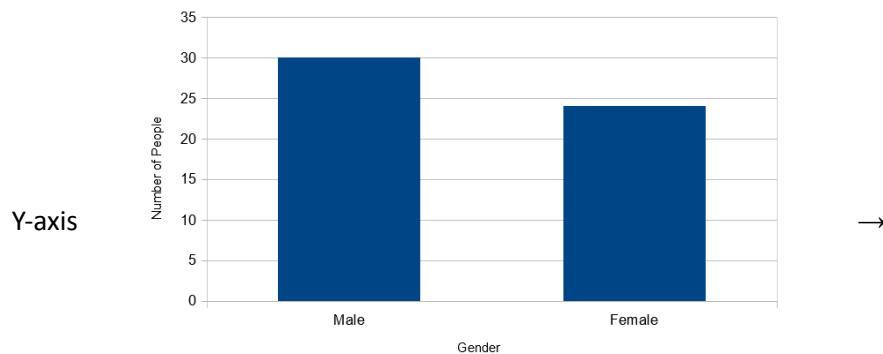
Today you will look at the results of your survey and share it with your family.

Suggested Duration

30-45 minutes

Activity and Description

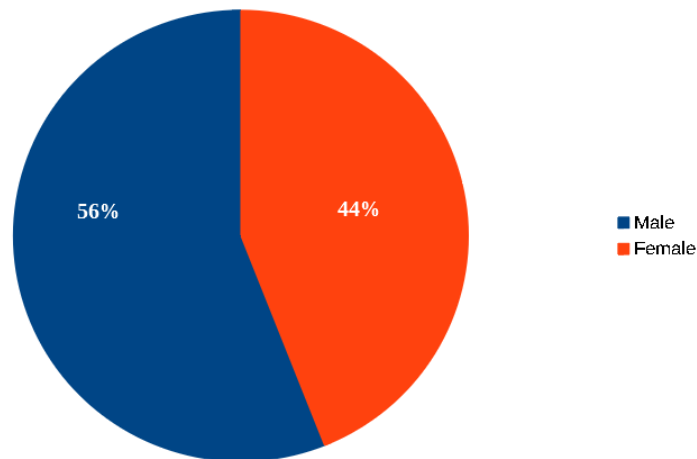
- Represent some of the information from the survey in bar graphs. First, select 2-3 categories you want to represent. Suggestions: age, number of females vs males, education levels. Draw the graphs for the categories selected.
- For example:



X-axis ↑

- Draw a vertical line on the left side of the page and then draw a horizontal line starting at the bottom of the vertical line going right as shown above. These are your axes. The y-axis is the vertical line in the graph and the x-axis is the horizontal line. These two lines should intersect at the bottom left corner of the page
- The y-axis is like a vertical number line. You can write numbers in increments of 1, 5, or any interval. If you don't have many observations, you can write numbers from 0-10 with one digit intervals e.g. 0, 1, 2, 3, 4 etc. In the graph above, numbers are written from 0-35 in 5-digit intervals (0, 5, 10, 15... etc.). This axis represents the number of people surveyed. It starts from 0 and ends with the total number of observations.

- The x-axis represents the categories of your questionnaire. Draw rectangles representing the categories of age, education, occupation etc. as shown above
 - The rectangles will be as high as the total number of each category. For example, in this graph, there are 30 male participants
 - Color or shade each rectangle using a different color or shading pattern
 - Can you find out the number of female participants in the chart above?
- **Another option** is to represent some of the categorical data (like gender) using a pie chart such as the following:

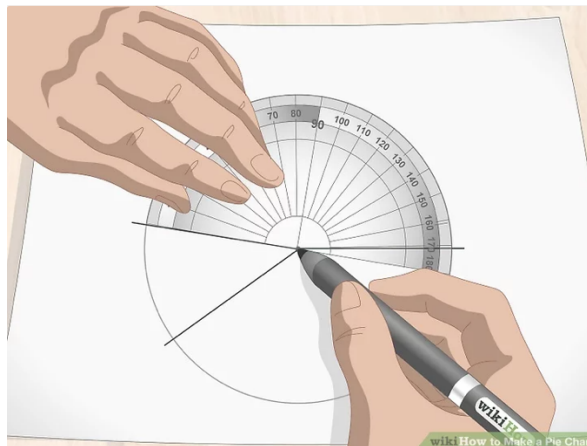
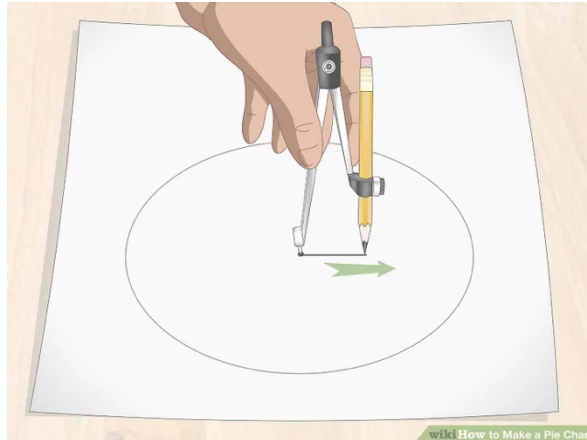


- Find out the percentage of people in each category using the percentage formula

Hint: To compute the Percentage of males =

$$\frac{\text{Number of Males}}{\text{Total number of observations}} \times 100$$

- After computing the percentage for each category, you will need to convert each percentage to degrees. Every pie chart has a total of 360° so you will convert all percentages into degrees e.g., if the males are at 56%, you will compute $\frac{56}{100} \times 360 = 202^\circ$. You will do this for all categories.
- Draw a circle (you either use the compass to draw the circle or your free hand) and use a protractor to measure off the degrees of the different categories.



Images downloaded from WikiHow: How to make a Pie Chart

After dividing the circle into different slices based on the angles you computed, color or shade each part of the circle using a different color or shading pattern

If learners do not have access to a protractor, they can divide the pie into equal parts using a ruler and then try estimating the number of pie slices that each category should have based on the percentage of respondents in each category by doing the following:

- Divide the pie/circle into 10 equal parts
- Find the percentage of males and females and write these as fractions (out of 100): 56% males and 44% females in fractions is $\frac{56}{100}$ males and $\frac{44}{100}$ females

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- Simplify the fractions to bring the denominator to 10: simplifying them, we get 5.6/10 males and 4.4/10 females
 - Rounding these, we get 6/10 males and 4/10 females
 - Therefore, 6 slices of the pie should go to men and 4 to women
 - Shade each category using a different color to distinguish between males and females
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30 minutes

- Create a brief report using the data collected to describe their family/community by writing a few sentences about the following in their notebook or piece of paper: Total number of households visited
 - Total number of people in your survey
 - Number or percentage of males vs females. Which gender category has more or fewer people than the other?
 - Average age of participants
 - Mode of number of people living in the same household. Do any households have the same number of family members?
 - Most frequently mentioned occupation
 - Any other data you have collected
 - Most frequently mentioned highest level of education
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10 minutes

Literacy extension:

From your report, what is the biggest challenge facing the community? For example, does your data reveal that there are a lot of out of school children? Do you find that many adults are unemployed? Look at any of the other questions you could have added to the survey to see if it reveals anything else about the community. Write a paragraph on what can be done to resolve the challenge OR design a poster for a campaign to end this issue.

10 minutes

- Quiz family members on some questions to test how well they know their class or family! Learners will then share the results with their family by reading their report out loud and/or showcasing the poster they designed.
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Overall Project Reflection

The learner will now think about the exercises they have completed all week and take note of any TWO of the following:

- What is the most important lesson you have learnt throughout this project?
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- What have you found challenging, puzzling or difficult to understand?
 - What question would you most like to discuss?
 - What is something that you found interesting?
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ASSESSMENT CRITERIA

- Creation of questionnaire containing questions and response categories where applicable
- Interviewing and collecting data for at least 10 people either in person or virtually
- Correctly analyzing results and answering questions listed on day 3 tasks
- Correct graphical representation of at least one data point using bar graph or pie chart
- Creation of report with insight consisting of a few sentences on key information gained from census survey.

ADDITIONAL ENRICHMENT ACTIVITIES

- Learners can add more questions to the survey and come up with the appropriate response categories
- Learners can section the data and analyze it according to a certain category. For example, they can calculate and compare the average ages of men and women in their data
- Learners can think about different ways to use this information. They can write a few sentences or a report on how their results can be useful for schools, hospitals, government officials etc.

MODIFICATIONS FOR SIMPLIFICATION

- Learners can simplify this project by reducing the number of questions or categories and/or the required analysis
- Learners can also simplify it by reducing the number of people they interview