POPULATION CENSUS

Ages 8-10 (Level 2)

Description:	Learners will design their own census survey and gather and analyze data
Leading question:	Can we conduct a census survey to find out information about our family and community?
Age group:	8-10
Subjects:	Mathematics (data handling)
Total time required:	~ 4.6 hours over 4 days
Self-guided / Supervised activity:	Medium supervision
Resources required:	Pen, paper, ruler

Day	Time	Activity and Description
1	5 minutes	Introduction: - 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. - 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. - Learners will then write a short essay summarizing their findings
	20 minutes	First, learners will create a census questionnaire with all the questions they want to ask participants. The learner will think about what they should ask and write the questions down. Suggested questions: - What is your name? - How many people are in your home? - What is the age of each person in your home, including you? - What is the gender of each person? - What is the occupation of each person? - Are they currently in school, not in school or finished school? - Can you and everyone in your house read and write?
	30 minutes	Learners will create categories for each of the responses. Suggestions: - Number of people in the home: ○ 1-4

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		○ 5-10 ○ More than 10 - Age categories: ○ Under 18 ○ 18-30 ○ 30-60 ○ Over 60 - Education: ○ Not enrolled in school or college and school / college age ○ Not completed school/college and not school/college age ○ Enrolled in school or college ○ Completed school - Gender categories: ○ Male ○ Female - Can you and everyone in your house read and write? ○ Yes ○ No - *What categories can you add for occupation? Come up with a few options for occupation.* If you add more questions, make sure to create categories for them. The final questionnaire should look like the following: 1. What is your name? 2. How many people are in your home? a. 1-4 b. 5-10 c. More than 10 3. What is the age of each person in your home, including you? a. Under 18 b. 18-30 c. 30-60 d. Over 60 4. What is the gender of each person, including you? a. Male b. Female 5. What is the highest level of education of everyone in your house? a. Not completed school / college b. Not enrolled in school or college c. Enrolled in school or college d. Completed school 6. Can you and everyone in your house read and write? a. Yes b. No

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		7. What is the occupation of each person? a. *<insert occupation categories>* Create answer sheets following the template below for each person you interview: Answer sheet 1 House: 1 Name: Hassan Q1. 5-10 Q2. Under 18 Q3. Male Q4. Not enrolled in school Q5. Yes Q6. (no answer) Record the responses of the person you are interviewing and ***everyone in their house*** on separate answer sheets. For example, if Hassan's household has 4 family members, you will only interview Hassan but you will record his answers to all the questions for each member of his family ***on 4 different answer sheets.*** Group the answer sheets that belong to members of the same household together and write house 1, house 2 etc on the top of the page.
2	1-2 hours	Today, the learner will interview his or her family and relatives. Options for conducting the interviews: - In person with social distancing - Phone/video call or SMS - Guessing or asking family members if they know the answer 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. When you are interviewing people, ask them the question, then check the option in the categories that reflects 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

<table>
<tr><td></td><td></td><td>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</td></tr>
<tr><td>3</td><td>20 minutes

40-60 minutes</td><td>Learners will create a table like the following and enter the details of all participants. The rows represent the names of the people surveyed and the columns represent the questions in the questionnaire. Add columns for all the questions you included in your questionnaire:

Row ⟷

<table>
<tr><td>Name</td><td>Age</td><td>Gender</td><td>No. of people in house</td><td>Education</td></tr>
<tr><td>Sarah</td><td>30</td><td>Female</td><td>3</td><td>Completed college</td></tr>
<tr><td>Ahmed</td><td>11</td><td>Male</td><td></td><td>In school</td></tr>
<tr><td>Kareem</td><td>62</td><td>Male</td><td></td><td>Completed high school</td></tr>
<tr><td>Sana</td><td>16</td><td>Female</td><td>5</td><td>In school</td></tr>
</table>
Column ↕

When you interview people living in the same house, enter the total number of people living in that house only one time. For example, in the table above, 3 people - Sarah, Ahmed, and Kareem - live in the same house. 3 is entered in the column of no. of people in house only one time in the row of the.

Analyze your results:
- 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?
- How many male participants did you find?
- How many people were employed (had jobs)?
- Arrange the ages of all the people in your survey in descending order (biggest to smallest) and find the middle value.
- Are there more males or females in your survey?
- Which category has said that they completed school more than the other - males or females?</td></tr>
</table>

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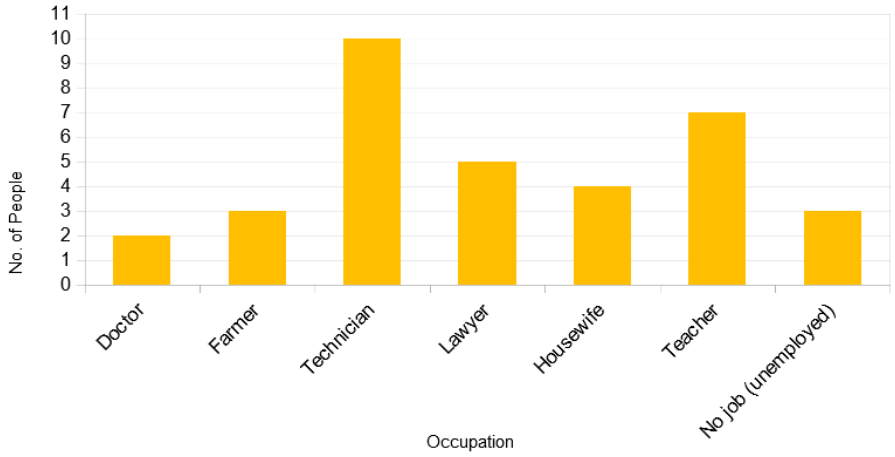
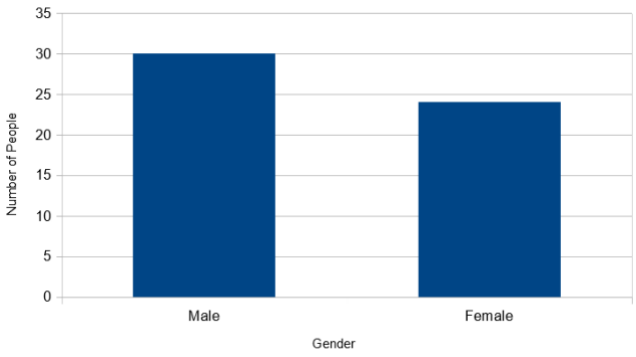
		- How many school-going children did you find? Are there children who should be in school but are not attending any school? - Imagine that everyone in your survey said that they have 7 people living in their home. What would the total number of people living in all the homes be? (hint: multiply 7 by the number of observations) - Imagine that you survey your neighborhood and find out that 230 people out of all the 1000 people living there cannot read or write. What is the number of people who **can** read and write?
4	15 minutes 30 minutes	Learners will analyze the results of this fictional survey of a big family and answer the following questions:  - How many farmers live in this house? - Are there more lawyers than teachers? - How many people in total live in this house? - How many people living in this house are employed (have jobs)? - What is the most frequent (or common) job? This is the job with the highest number of people. - Arrange the jobs in ascending order of how many people have them (smallest to biggest). Optional challenge: Learners challenge themselves to represent some of the information from the survey in bar graphs. First, select one category you want to represent. Suggestions: age, number of females vs males, education levels etc. Example:

		Y-axis  → X-axis ↑ - Steps: ○ Draw a vertical line and 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. ○ The y-axis is like a vertical number line. You can write numbers in 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. as was done in the previous (yellow) graph above. In this (blue) graph, 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's questions. 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 the graph above, 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?
	30 minutes	Learners will create a brief report about the main things they observed to summarize the census study they conducted and include the graph they made. Suggestions for what to include in the report: - Total number of people in your survey - Number of males vs females - Number of school-age and school-going children - Number of people who can read and write

	10 minutes	- Number of unemployed adults - Most frequently mentioned occupation - Most frequently mentioned highest level of education Learners can quiz family members on some questions to test how well they know their family! Learners will then share the results with their family by reading their report out loud and/or showcasing the poster they designed.
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 and/or poster to address challenge faced by surveyed participants

Learning outcomes:	- Designing and using a survey tool to gather information - Multiplication by one-digit numbers - Four-digit subtraction - Data handling: analyzing survey - Data handling: analyzing and creating graphical representation of data - Literacy: summarizing
Required previous learning:	- Multiplication by one-digit numbers - Four-digit subtraction
Inspiration:	N/A
Additional enrichment activities:	- Learners can add more questions to the survey and come up with the appropriate response categories - After completing the census, learners can try to identify one issue facing the community. For example, do the results reveal that there are a lot of out-of-school children? Do you find that many adults do not have a job? Learners can then design a poster to help address these issues
Modifications for simplification	- Reduce the number of questions or categories for the learners - Learners can conduct the survey in their own homes with a smaller sample size of people - Learners can reduce the amount of analysis and questions they answer at the end

Ages 11-14 (Level 3)

Description:	Learners will design their own census survey and gather and analyze data
Leading question:	Can we conduct a census survey to find out information about our family and community?
Age group:	11-14+
Subjects:	Mathematics (data handling)
Total time required:	~4.6 hours over 4 days
Self-guided / Supervised activity:	Medium supervision
Resources required:	Pen, paper, ruler

Day	Time	Activity and Description
1	5 minutes	Introduction: ● 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. ● 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. 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 identified from the results of their survey
	20 minutes	First, Learners will create a census questionnaire with all the questions they want to ask participants. The learner will think about what they should ask and write the questions down. Suggested questions: ● 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 they currently in school, not in school or finished school? ● If they finished school, what is their highest level of education? ● Can you and everyone in your house read and write? Learners will create categories for each of the responses. Suggestions:

	30 minutes	• Number of people in the home:
		  ○ 1-4
		  ○ 5-10
		  ○ More than 10
		• Age categories:
		  ○ < 10
		  ○ 10-18
		  ○ 19-30
		  ○ 31-40
		  ○ 41-50
		  ○ Older than 50
		• Education:
		  ○ Not enrolled in school or college
		  ○ Enrolled in school or college
		  ○ Completed school
		• Gender categories:
		  ○ Male
		  ○ Female
		• *What categories can you add for occupation? Come up with a few options for occupation.*
		
		If you add more questions, make sure to create categories for them.
		
		The final questionnaire should look like the following:
		1. What is your name?
		2. How many people are in your home?
		  a. 1-4
		  b. 5-10
		  c. More than 10
		3. What is the age of each person in your home, including you?
		  a. < 10
		  b. 10-18
		  c. 19-30
		  d. 31-40
		  e. 41-50
		  f. Older than 50
		4. What is the gender of each person, including you?
		  a. Male
		  b. Female
		5. Is everyone in your house , including you, currently in school, not in school or finished school?
		  a. Yes
		  b. No
		6. If they finished school, what is their highest level of education?
		  a. Not enrolled in school or college

<table>
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b. Enrolled in school or college
c. Completed school
7. What is the occupation of each person?
a. <insert occupation categories>

Make copies of the questionnaire or write the questions on many pieces of paper..

Record the responses of the person you are interviewing and everyone in their house on separate copies of the questionnaire. 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.

Group the copies of the questionnaire that belong to members of the same household together as house 1, house 2 etc.
</td>
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<tr>
<td>2</td>
<td>1-2 hours</td>
<td>
Today, the learner will interview his or her family and go around their neighborhood interviewing immediate neighbors. Options for conducting the interviews:
● In person with social distancing
● Phone/video call
● Guessing

Relatives and neighbors 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.

When you are interviewing people, ask them the question, then check the option in the categories that reflects 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

Another option if you are unable to conduct the interviews in person or phone calls is to simply guess what the responses might be!
</td>
</tr>
<tr>
<td>3</td>
<td>20 minutes</td>
<td>
Learners will create a table like the following and enter the details of all participants. Add columns for all the categories in your questionnaire:

<table>
<tr><th>House</th><th>Name</th><th>Age</th><th>Gender</th><th>No. of people in house</th><th>Education</th></tr>
<tr><td>1</td><td>Sarah</td><td>30</td><td>Female</td><td>3</td><td>Completed college</td></tr>
<tr><td>1</td><td>Ahmed</td><td>11</td><td>Male</td><td></td><td>In school</td></tr>
</table>
</td>
</tr>
</table>

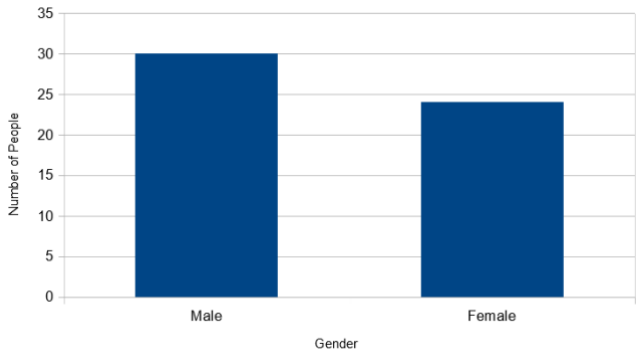
		1	Kareem	62	Male		Completed high school
		2	Sana	16	Female	5	In school

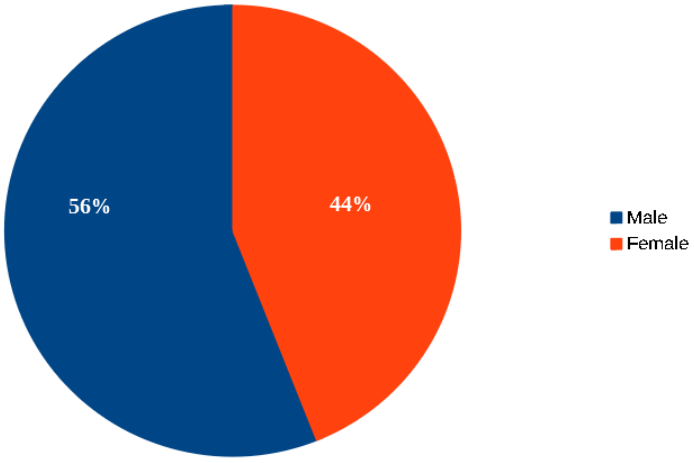
40-60 minutes

Analyze your results:

- 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)÷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)
    - 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. 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, the middle value is the sum of the tenth and eleventh numbers divided by 2. To illustrate:
        - 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 are 9 digits before 10 and 9 digits after 11
        - (10 + 11) ÷ 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
		  ○ e.g. 20/100 = 2/10 or 0.2. 0.2 x 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**?

4	30 minutes	Learners will 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. Example: Y-axis  → X-axis ↑ ● Draw a vertical line and 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. ● The y-axis is like a vertical number line. You can write numbers in 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

	30 minutes	• 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 numerical data (like age and no. of people using a pie chart such as the following:  • Find out the percentage of people in each category using the percentage formula • Draw a circle and divide it into different parts resembling pizza slices according to the percentages of each category. Bigger percentages should have a bigger part of the circle. In the chart above, 56% (males) is greater than 44% (females), so males get a bigger piece of the circle compared to females • Color or shade each part of the circle using a different color or shading pattern Learners will create a brief report about their experience and challenges facing the community by writing a few sentences about the following in their notebook or piece of paper to summarize the census study they conducted: • Total number of houses visited • Total number of people in your survey • Number or percentage of males vs females • Average age of participants • Mode of number of people living in the same household • Most frequently mentioned occupation • Most frequently mentioned highest level of education • Biggest challenge facing 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

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	10 minutes	Learners can quiz family members on some questions to test how well they know their community! Learners will then share the results with their family by reading the report out loud and/or showcasing the poster they designed.
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 consisting of a few sentences on key information gained from census survey

Learning outcomes:	- Designing and using a survey tool to gather information - Calculating percentages with two-digit numbers - Data handling: mean, median, mode, frequency - Data handling: graphical representation of data - Literacy: writing summary report and reading practice
Required previous learning:	Multiplication and division with two-digit numbers
Inspiration:	N/A
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