WonderHere

WORLD CHANGERS

Math Project

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become WORLD CHANGERS

It takes more math than you would think to understand the world and work to make it better each day. People who aim to be world changers don't shy away from problem solving through mathematics.

In this project, your child will get a good understanding of the world's demographics, explore three key global issues affecting equality for all, and make a plan to get involved in some way. Check out the learning benchmarks that correlate with this project:

Primary (generally K-1st grade) Benchmarks

Mathematics	Social Studies
Focus on asking and answering questions	Current events
Focus on solving everyday problems	How to be a good member of society
Follow simple step-by-step directions	Resolving conflicts
Sequence of numbers 0-100	Characteristics of responsible citizens
Basic addition and subtraction 0-20	Scarcity
Accurate use of mathematical tools	Community helpers
Comparing numbers	Needs and wants
Perform basic mathematic operations using natural numbers	
Practice mental arithmetic operations	
Learn the concept of a fraction.	
Systematically collecting data on topics of interest	
Record and present data using tables and diagrams.	

Post-Primary (generally 2nd-3rd grade) Benchmarks

Mathematics	Social Studies
The child improves their skills in performing basic mental arithmetic operations.	Valuing the diversity of nature and cultures and reinforcing global understanding.
Practice of sequencing and ordering numbers.	Values and basic principles of democratic action, including human rights, equity, and equality
Practice of comparing numbers.	Current events
All operations are practiced in versatile situations, utilizing the necessary tools.	
The child learns the concept of a fraction.	
The child gets to know the concept of the unknown.	
The child examines equations and solves them by reasoning and experimentation.	
Systematically collecting data on topics that are of interest to them.	
Data in the form of tables and diagrams.	

Comprehensive (generally 4th-6th) Benchmarks

Mathematics	Social Studies
Practice of basic arithmetic operations with decimal numbers	Valuing the diversity of nature and cultures and reinforcing global understanding
The child improves their skills in performing basic mental arithmetic operations	Values and basic principles of democratic action, including human rights, equity, and equality
Connections between fractions, decimal numbers, and percentages	Current events
The child learns division in cases of both quotation and partition	
The child rounds up figures and calculates with approximate values, through which they learn to estimate the order of magnitude of the result	
All operations are practiced in versatile situations, utilizing the necessary tools	
The child learns the concept of a fraction	
Multiplication and division are practiced with natural numbers	
The child gets to know the concept of the unknown	
The child examines equations and solves them by reasoning and experimentation	
Systematically collecting data on topics that are of interest to them	
Data in the form of tables and diagrams	

Primary & Post-Primary

GLOBAL demographics

Let's learn a little bit about the world around us! There are currently more than 7 BILLION people in the world. That's a really big number to wrap our minds around! So let's look at the world using a smaller number... 100. Here are some demographics:

POPULATION BY REGION	
Other Asia	23
China	19
India	18
Africa	16
Europe	10
Latin America	9
United States	5

RELIGIOUS BELIEFS	
Christian	33
Muslim	23
Hindu	14
Other	11
Non-Religious	10
Buddhist	7
Atheist	2

AGES	
Age 0-14	26
Age 15-24	17
Age 25-54	41
Age 55-64	8
Age 65+	8

LANGUAGES SPOKEN	
Mandarin	12
Spanish	5
English	5
Arabic	3
Hindi	3
Bengali	3
Portuguese	3
Russian	2
Japanese	2
German	1

OTHER DATA	
People working	47
People with clean water	89
People with toilets	63
People who can read	84
People with internet	30

Comprehensive

GLOBAL demographics

It's hard to truly care about the world if you don't know a lot about it. This first section will help you become more globally aware! The word *demographics* means "statistical data relating to the population and particular groups within it." In other words, demographics is information (in numbers) about all of the different groups of people in the world.

There are currently more than 7 BILLION people in the world. That's a really big number to wrap our minds around! So let's look at demographics based on a smaller number... 1,000. Here's the data:

POPULATION GENERAL	
Annual Births	18
Annual Deaths	8
Malnourished	140
Death by Communicable Diseases	3

POPULATION BY REGION	
Other Asia	230
China	190
India	180
Africa	160
Europe	100
Latin America	90
United States	50
Canada	5
Australia	3

RELIGIOUS BELIEFS	
Christian	334
Muslim	227
Hindu	138
Other	110
Non-Religious	97
Buddhist	68
Atheist	20
Sikh	4
Jewish	2

AGES	
Age 0-14	260
Age 15-24	168
Age 25-54	406
Age 55-64	84
Age 65+	82

LANGUAGES SPOKEN	
Mandarin	124
Spanish	49
English	48
Arabic	33
Hindi	27
Bengali	27
Portuguese	26
Russian	21
Japanese	18
German	13

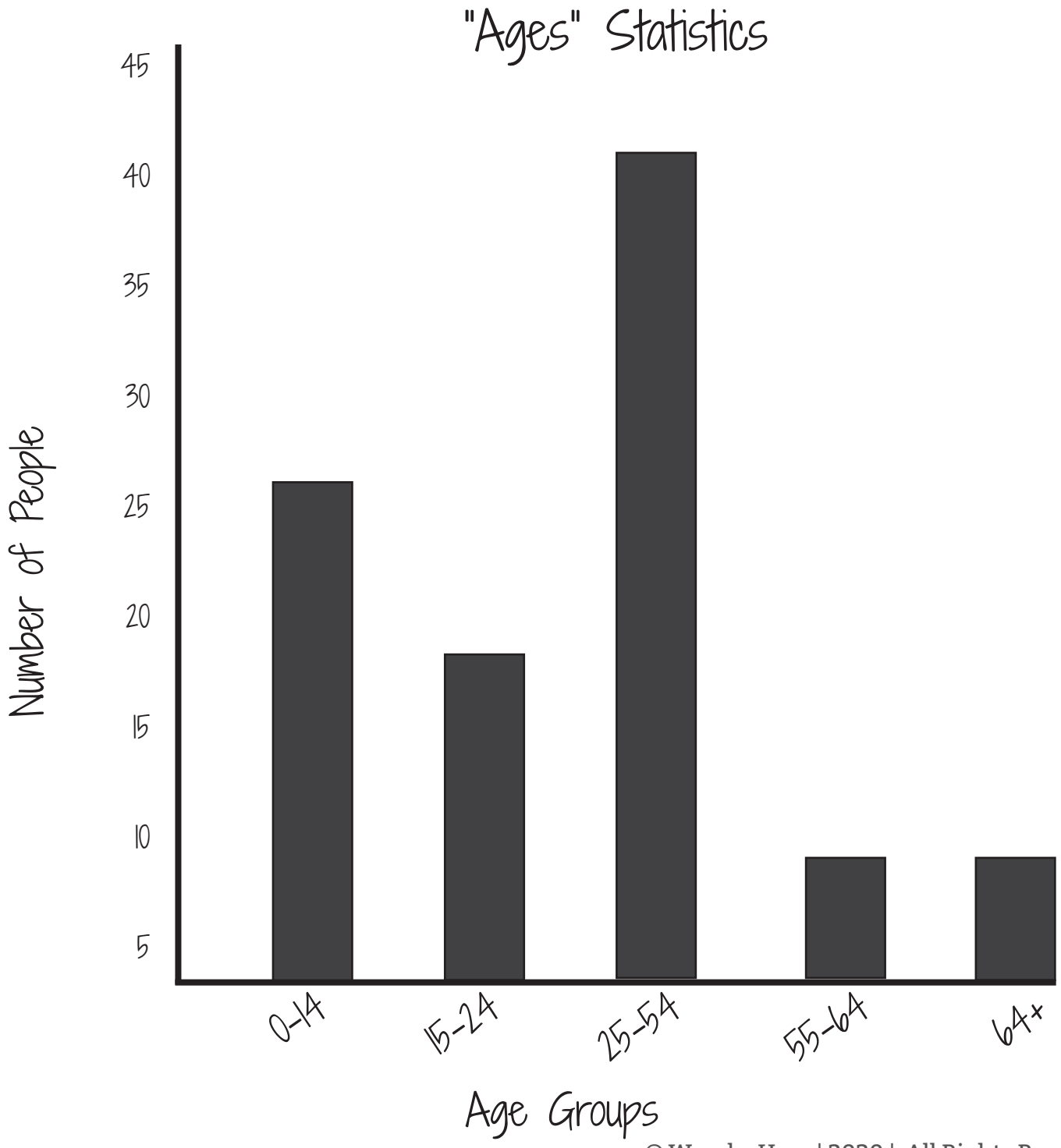
OTHER DATA	
Avg. yearly income per person	$10,240
People earning <$2 a day	480
People working	471
People with clean water	890
People with toilets	630
People who can read	841
People with internet access	300

People sharing one half of the world's wealth	10
People sharing the other half of the world's wealth	990

GLOBAL demographics

Bar Graphs

A bar graph is a chart that shows data using rectangular bars.
Example: "Ages" statistics as a bar graph:

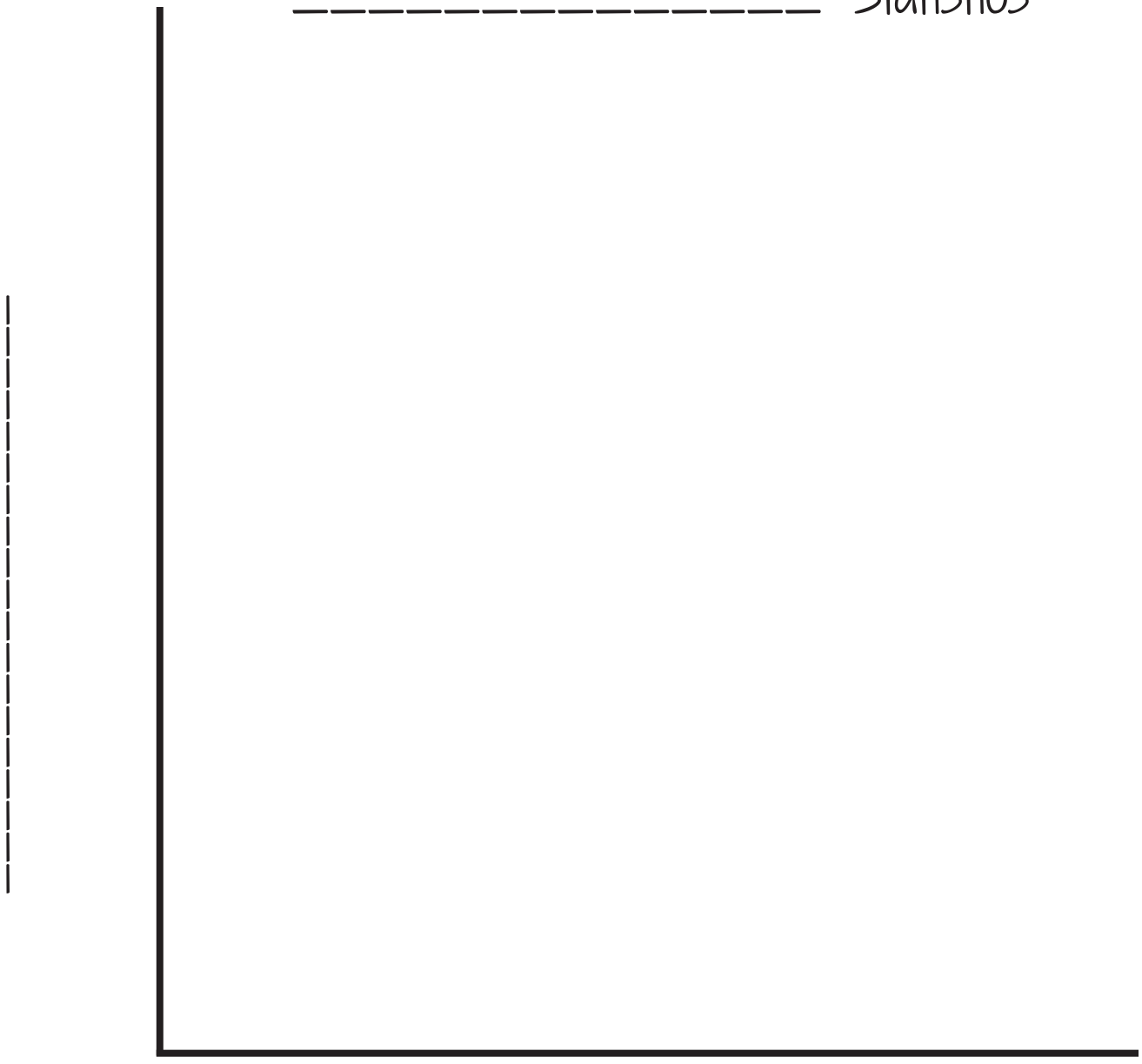


GLOBAL demographics

Your Turn!

Choose another demographic section from pages 6 or 7 (depending on your level) and display the data as a bar graph below:

_____ Statistics



_____

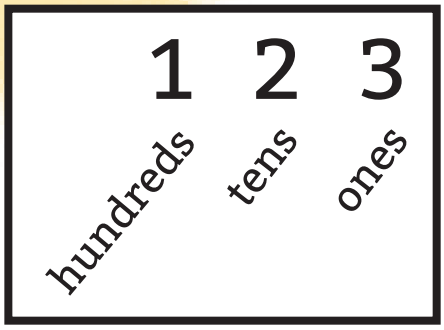
Sequencing Numbers

When we "sequence" numbers, that just means we put them in order! We can order them by...

smallest to largest or

largest to smallest

When we order numbers, we start with the largest place value. Let's review place value to the tens:



To order the numbers *58*, *23*, and *52* from smallest to largest, I look first at the tens place.

The number *23* has the smallest number in the tens place, so it goes first.

The numbers *58* and *52* both have a "5" in the tens place, so let's look at the ones place next. *52* has a "2" in the ones place, which is smaller than the "8" in *58* so it goes next.

58 goes last.

23, 52, 58

Sequencing Numbers

1. Choose a demographic category from page 6 and put the numbers in order from smallest to largest:

_____, _____, _____, _____, _____, _____, _____, _____, _____, _____

2. Choose another demographic category from page 6 and put the numbers in order from smallest to largest:

_____, _____, _____, _____, _____, _____, _____, _____, _____, _____

3. Choose another demographic category from page 6 and put the numbers in order from largest to smallest:

_____, _____, _____, _____, _____, _____, _____, _____, _____, _____

4. Choose another demographic category from page 6 and put the numbers in order from largest to smallest:

_____, _____, _____, _____, _____, _____, _____, _____, _____, _____

Comparing Numbers

When we "compare" two numbers, we tell which one is bigger and which one is smaller. Two numbers can also be the same, or "equal". We can compare numbers by looking at the largest place value first.

Let's look at the numbers

37 and *32*.

Both numbers have a "3" in the tens place, so let's look at the ones place next. *37* has a "7" in the ones place, which is larger than the "2" in *32*.

So, 37 is larger.

You can use a "greater than", "less than", or "equal to" symbol to compare numbers.

Greater than: >
Less than: <
Equal to: =

So, we can write it like this:

37 > 32

Comparing Numbers

Choose numbers from page 6 to compare. Use the symbols. The first one is an example!

Number 1	Symbol	Number 2
26	>	17

GLOBAL demographics

Fractions

A fraction represents an equal part of a whole. Fractions can also represent parts of a collection or a set.

For example: there are a total of 5 people.

3 out of 5 are men. So, the fraction of men is three-fifths, or...

$$\frac{3}{5}$$

2 out of 5 are women. So, the fraction of women is two-fifths, or..

$$\frac{2}{5}$$

Fractions have two parts. The number on the top, representing an equal part of a whole or a set) is called the numerator. The number on the bottom, representing the total number of parts or items in a set, is called the denominator.

GLOBAL demographics

Fractions

Using the simplified global population of 100, write a fraction to represent the following:

What fraction of the world population is from China? 19 / 100

What fraction of the world population practices the Hindu religion?

_____

What fraction of the world population is between the ages 25-54?

_____

What fraction of the world population speaks Portuguese? _____

What fraction of the world population has internet? _____

Using what you now know about fractions, which fraction from above do you think represents the largest number of people? Why?

_____

_____

Which fraction do you think represents the smallest number of people? Why?

_____

_____

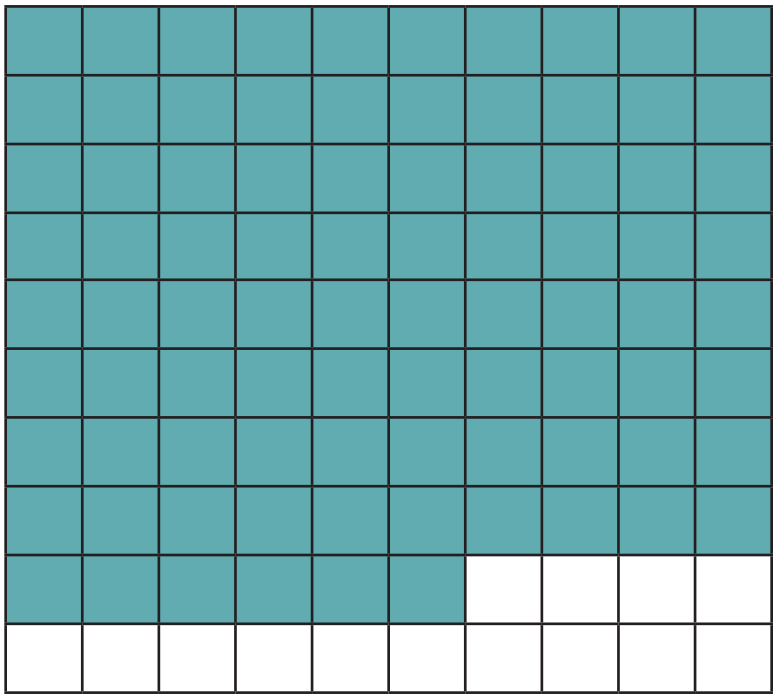
Percentages Overview

When talking about demographics, percentages are used quite often. *Percent* means "out of 100." The % symbol helps us to write a fraction with a denominator of 100. For example, instead of saying "86 out 100 children were boys," we can say "86% of the children were boys."

Percentages can be written as both fractions and decimals:

$$86\% = \frac{86}{100} = 0.86$$

This simply means that 86 out of 100 is represented:



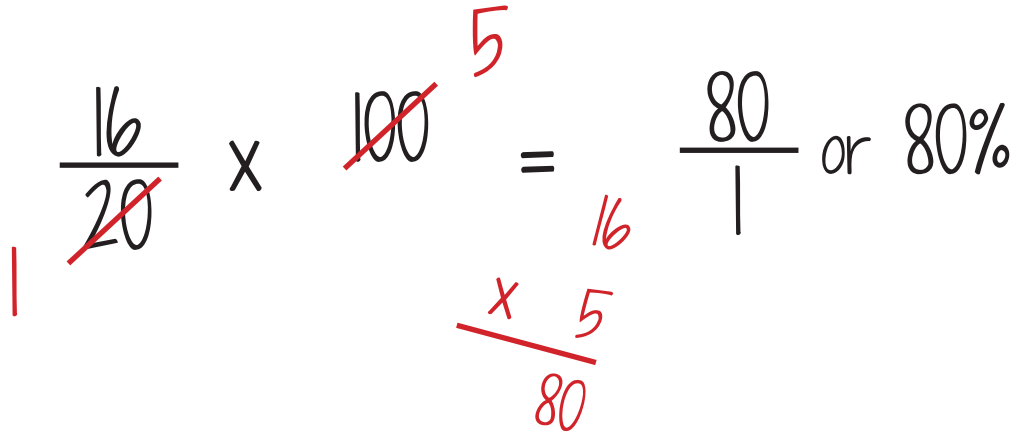
But what if there are more than 100 children? Or fewer than 100 children? Can you still calculate the percentage of children that are boys?
YES! Move on the next page to see how...

Converting Percentages

Even though percent means "out of 100", you can still calculate a percentage of a number that is more or less than 100.

For example, let's say there were only 20 children and 16 of them were boys. Here is how you would determine what percent were boys:

Take your fraction (in this case, 16/20), and multiply it by 100 (simplify before you multiply).



Your Turn!

9 out of 20 children are under the age of ten. What *percentage* of children are under the age of ten? Use the example above to guide you.

Demographic Percentages

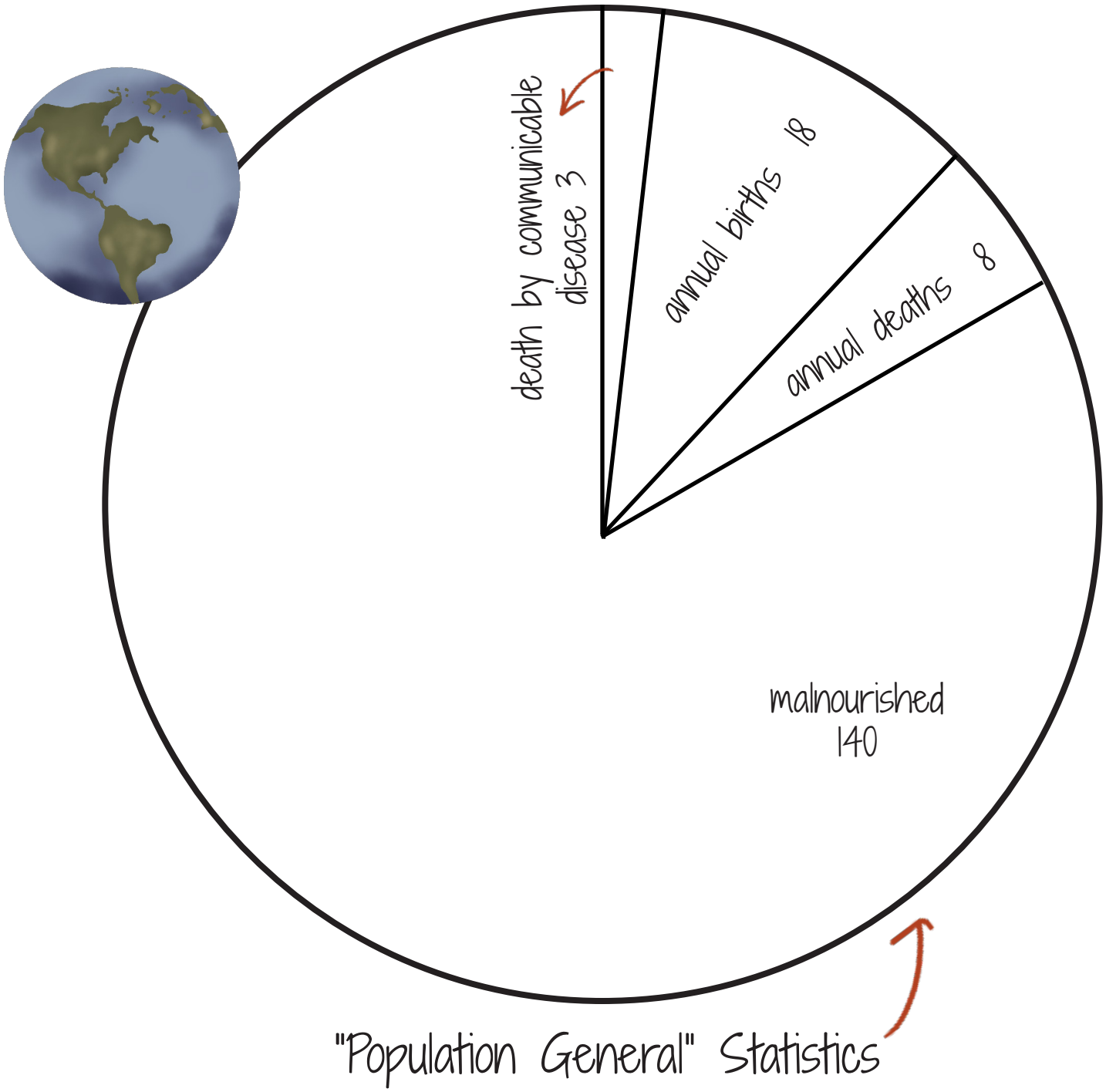
Now that we have a good understanding of percentages and have had the chance to practice, it's time to apply that knowledge to the demographics we studied on page 7. Use the table below to convert the demographics from fraction form to percentage form. Remember that these demographics are out of 1,000 people total. Two examples are shown for you, then choose seven more from page 5 to work through. Use the following page to work out your math. Use a calculator if necessary, and round percentages to the nearest whole number.

Demographic	Fraction	Percentage
People from Africa	160 / 1000	16%
Portuguese speakers	26 / 1000	3%

Math Workspace

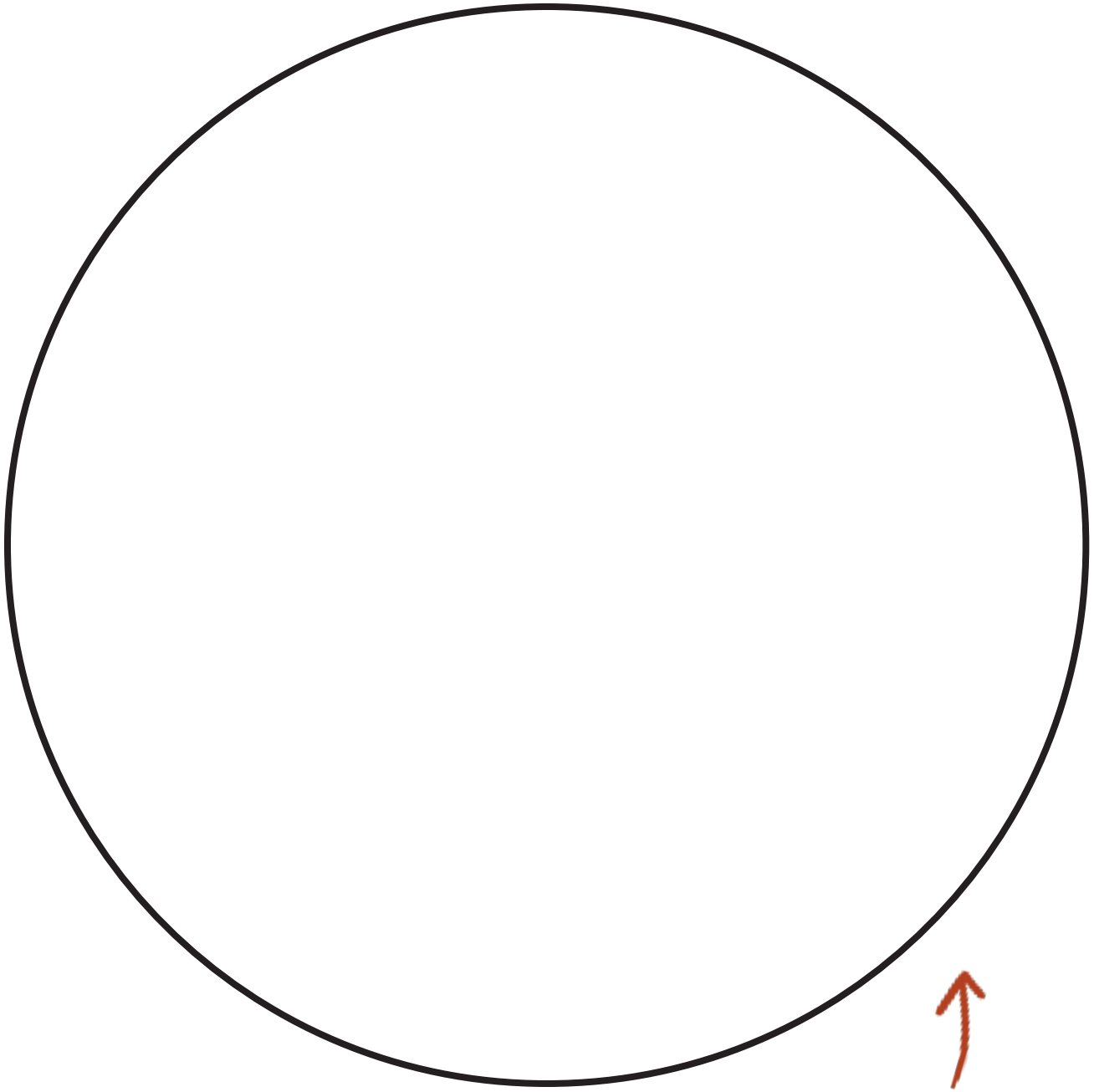
Pie Charts

A pie chart is a circular graph that is divided into parts. Each part represents a portion of the whole circle. Example: "Population General" statistics as a pie chart:



Your Turn!

Choose another demographic section from page 7 and display the data as a pie chart below:



Statistics

Primary & Post Primary

Issue #1: EDUCATION

Not all children get to have an awesome education like you! Here are some facts about kids and education from around the world:

Number of total people in the world: 7 billion

Number of children in the world: almost 2 billion

264 million children in the world do not attend school

What do you think about this?

Primary & Post Primary

issue #1: EDUCATION

Draw a picture of your thoughts and feelings about kids not getting an education.

Primary & Post Primary

Issue #1: EDUCATION

Look at the underlined numbers on page 22.

1. Sequence the underlined numbers from smallest to largest.

   _____, _____, _____,

2. Sequence the underlined numbers from largest to smallest.

   _____, _____, _____,

3. Choose two of the underlined numbers to compare.

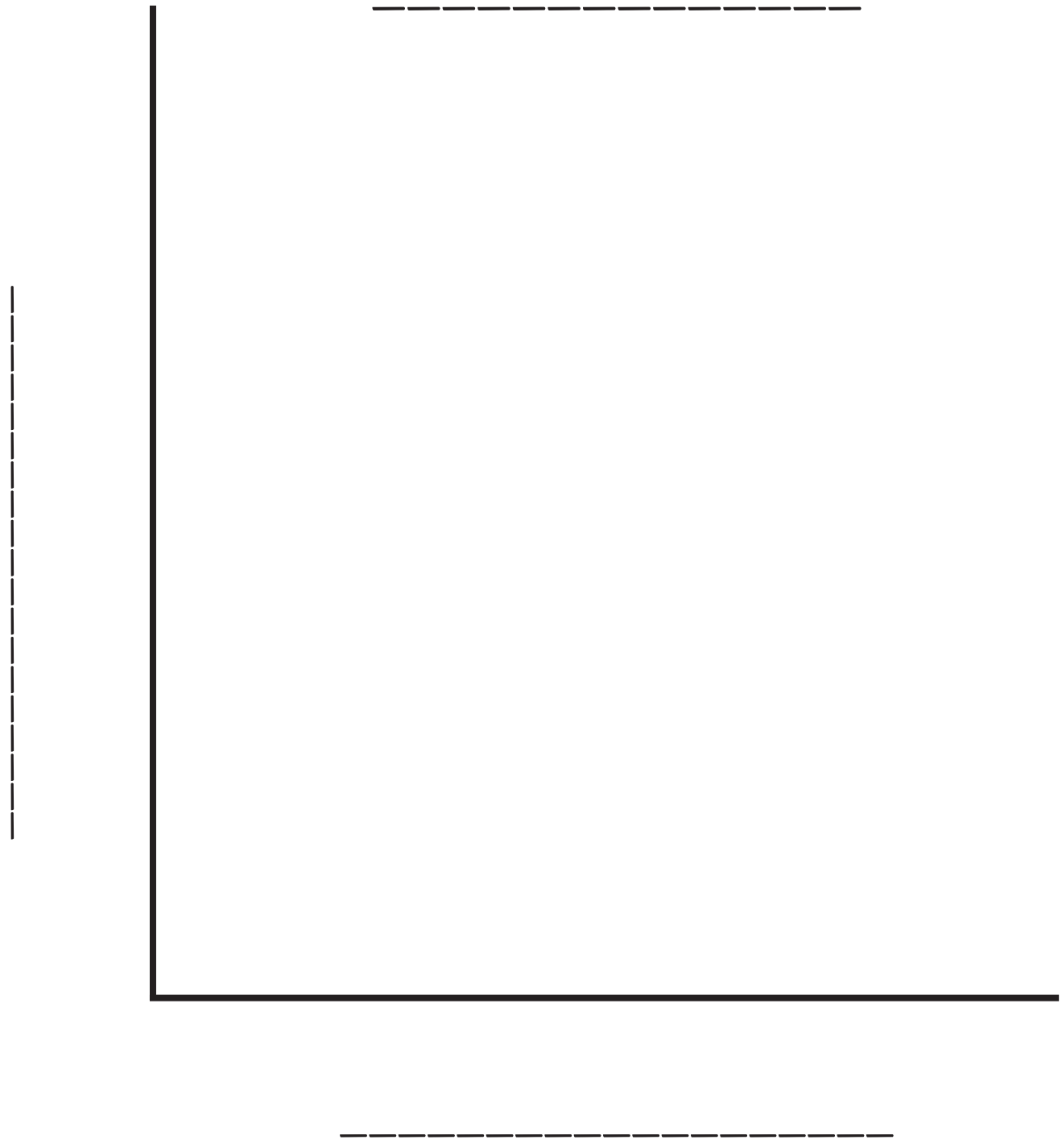
   _____ ___ _____

Math Workspace

Post Primary

issue #1: EDUCATION

Create a bar graph showing how many children go to school and how many children do not go to school.



Comprehensive

Issue #1: EDUCATION

As we spend this unit studying past and present injustices so we can learn from them and help overcome them, several important issues will arise. One of the biggest global issues is inequality in education for all kids. Here are the statistics:

Number of total people in the world: 7,530,000,000

Number of children in the world: 1,900,000,000

- 264,000,000 children in the world do not attend school
- 61% of children in low-income families have no books at home
- 1 in 3 women around the world cannot read or write
- More than 50% of Africans are illiterate

1. Write down any thoughts you have about this data. What do you notice?

Comprehensive

Issue #1: EDUCATION

Use the statistics on page 26 to answer the following questions. Use a calculator to help you.

1. What percentage of people in the world are children?

   _____ (HINT: 1,900,000,000/7,530,000,000 x 100)

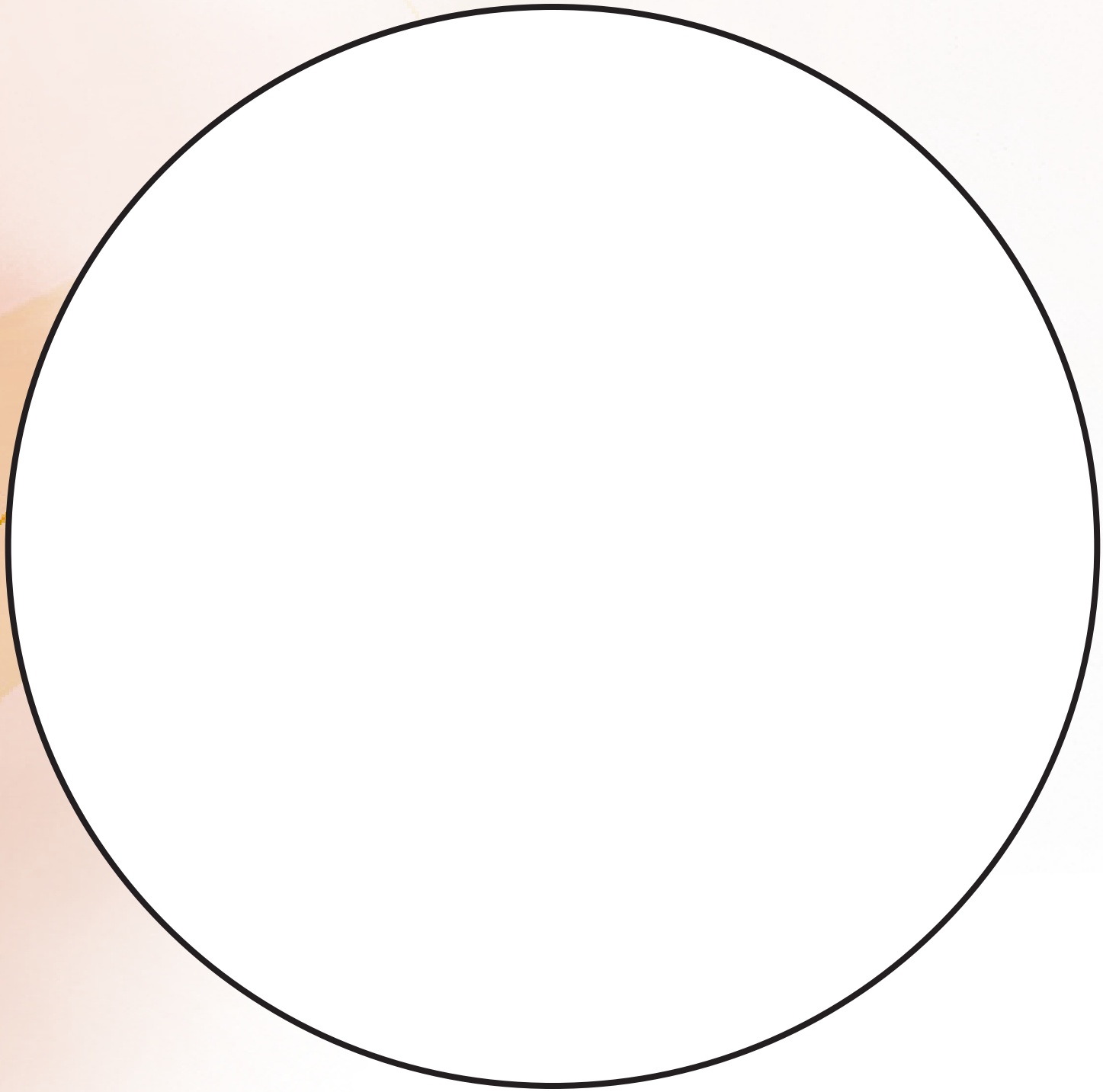
2. What percentage of children in the world do not attend school?

   _____ (HINT: 264,000,000/1,900,000,000 x 100)

Math Workspace

Issue #1: EDUCATION

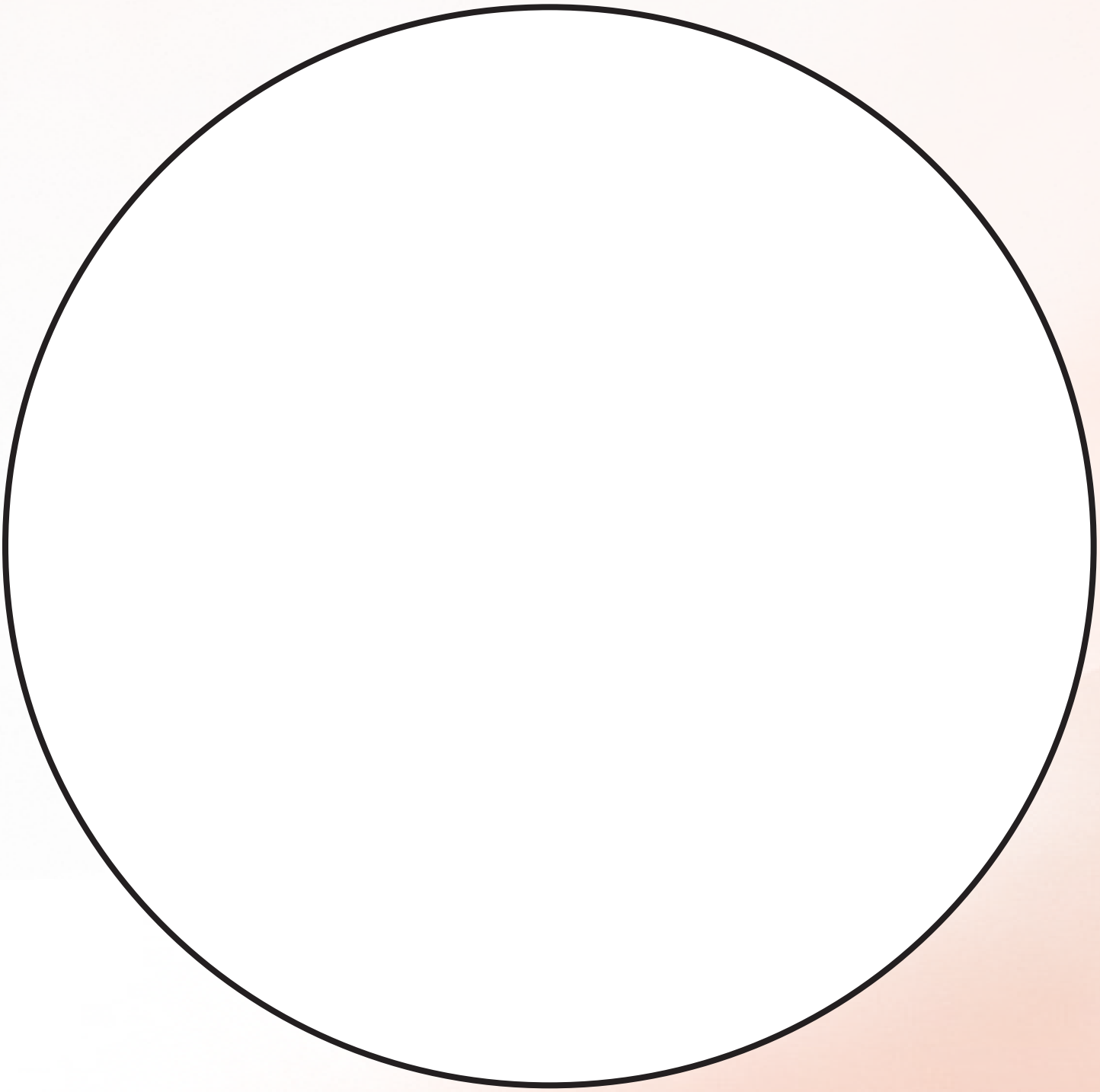
Create a pie chart showing the number of adults in the world versus the number of children in the world.



Comprehensive

Issue #1: EDUCATION

Create a pie chart showing the number of children in school versus the number of children out of school.



Primary & Post Primary

Issue #2: HUNGER

World hunger is a very big problem in the world. Not everyone has access to food and water like we do. Here are some facts:

Number of total people in the world: 7 billion.

- 822 million people are always hungry
- 1 in 5 people go to bed hungry each night
- Almost 500 million hungry people are women and girls.
- Almost 322 million hungry people are men and boys.

What do you think about this?

Primary & Post Primary

issue #2: HUNGER

Draw a picture of your thoughts and feelings about people in the world not having food and water.

Primary & Post Primary

Issue #2: HUNGER

Look at the underlined numbers on page 30.

1. Sequence the underlined numbers from smallest to largest.

   _____, _____, _____, _____, _____, _____

2. Sequence the underlined numbers from largest to smallest.

   _____, _____, _____, _____, _____, _____

3. Choose two of the underlined numbers to compare.

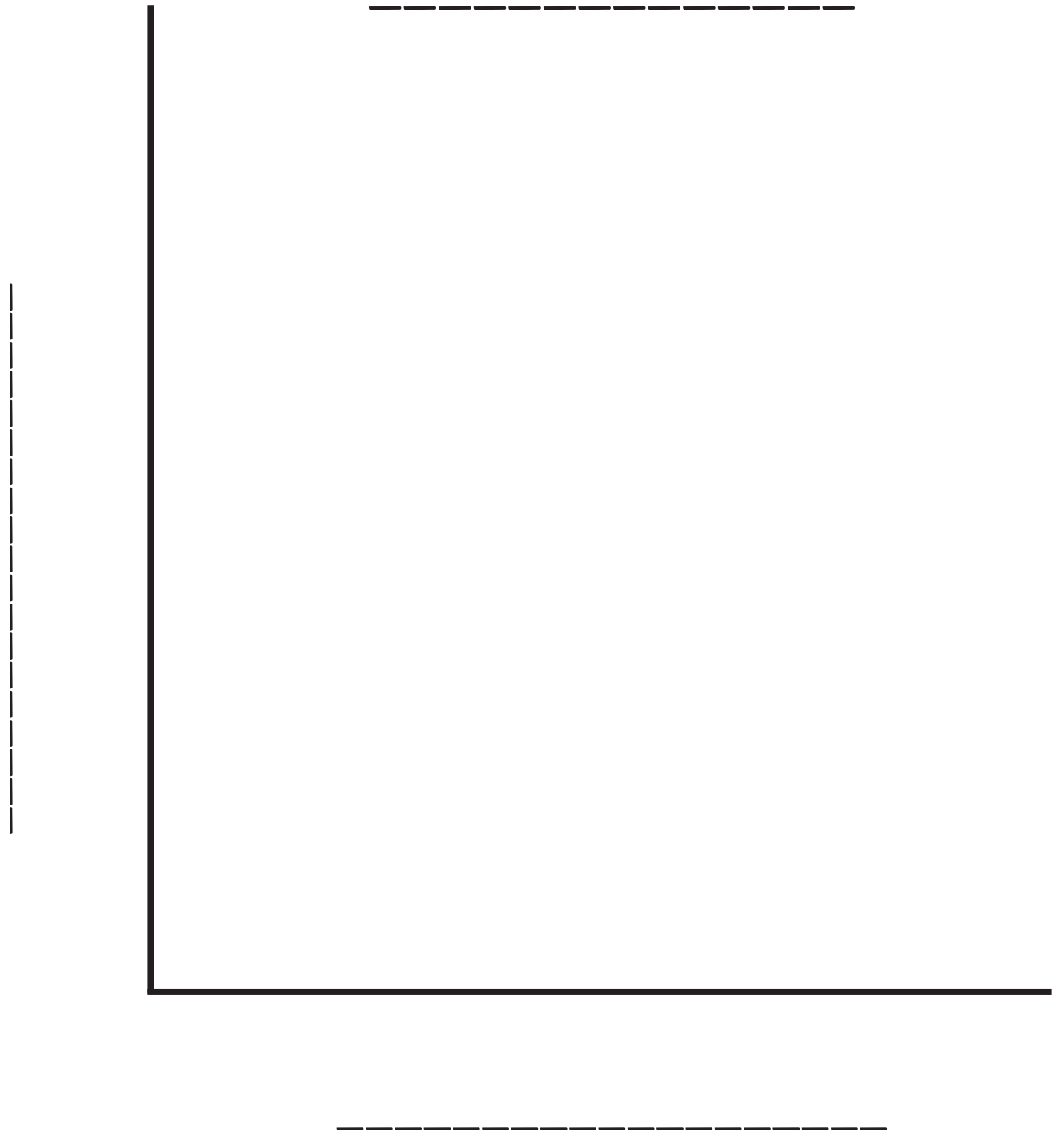
   _____ ___ _____

Math Workspace

Post Primary

issue #2: HUNGER

Create a bar graph showing how many hungry people are women/ girls and how many are men/boys.



Comprehensive

Issue #2: HUNGER

World hunger is one of the biggest issues that humans face. Here are the statistics:

Number of total people in the world: 7,530,000,000

- 821.6 million people are undernourished (meaning they are constantly hungry and do not have enough nutrition)
- 1 in 5 people worldwide go to bed hungry each night
- 60% of hungry people in the world are women and girls.
- More than 30% of children under 5 are Vitamin-A deficient
- Lack of nourishment is the leading cause of death for children under age 5
- There are more hungry people in the world than there are total people who live in the U.S., Canada, and Europe combined.

1. Write down any thoughts you have about this data. What do you notice?

Comprehensive

Issue #2: HUNGER

Use the statistics on page 34 to answer the following questions. Use a calculator to help you.

1. What percentage of people in the world are undernourished?

   _____

2. How many women and girls in the world are undernourished?

   _____

   (To answer question #2, multiply the number of total people in the world by 60% - or 0.60)

Math Workspace

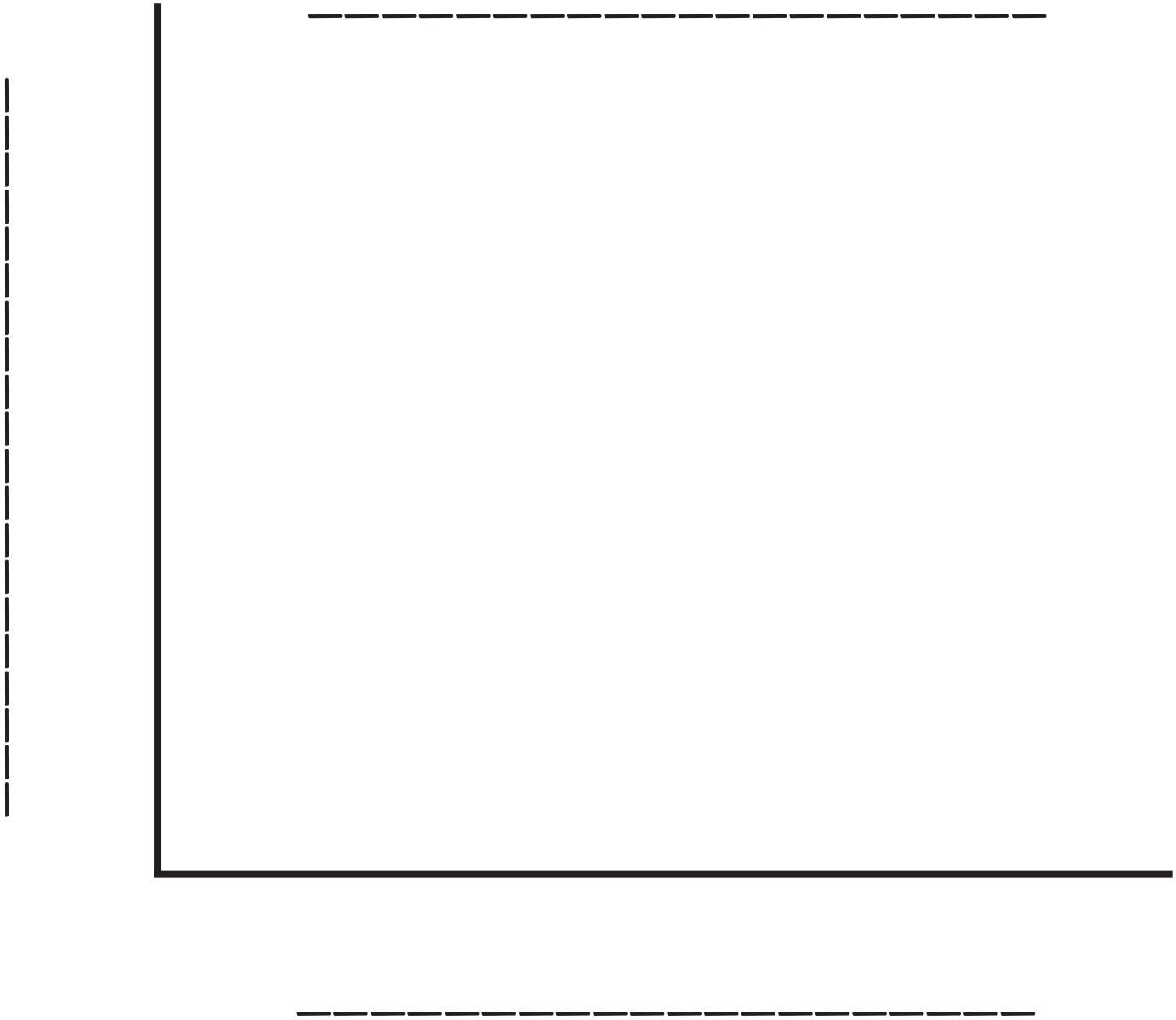
Comprehensive

Issue #2: HUNGER

99% of the world's undernourished people live in developing countries. Here is where in the world hunger is the worst:

- *Asia*: 513.9 million
- *Sub-Saharan Africa*: 239.1 million
- *Latin America*: 34.7 million

Create a bar graph displaying this data below:



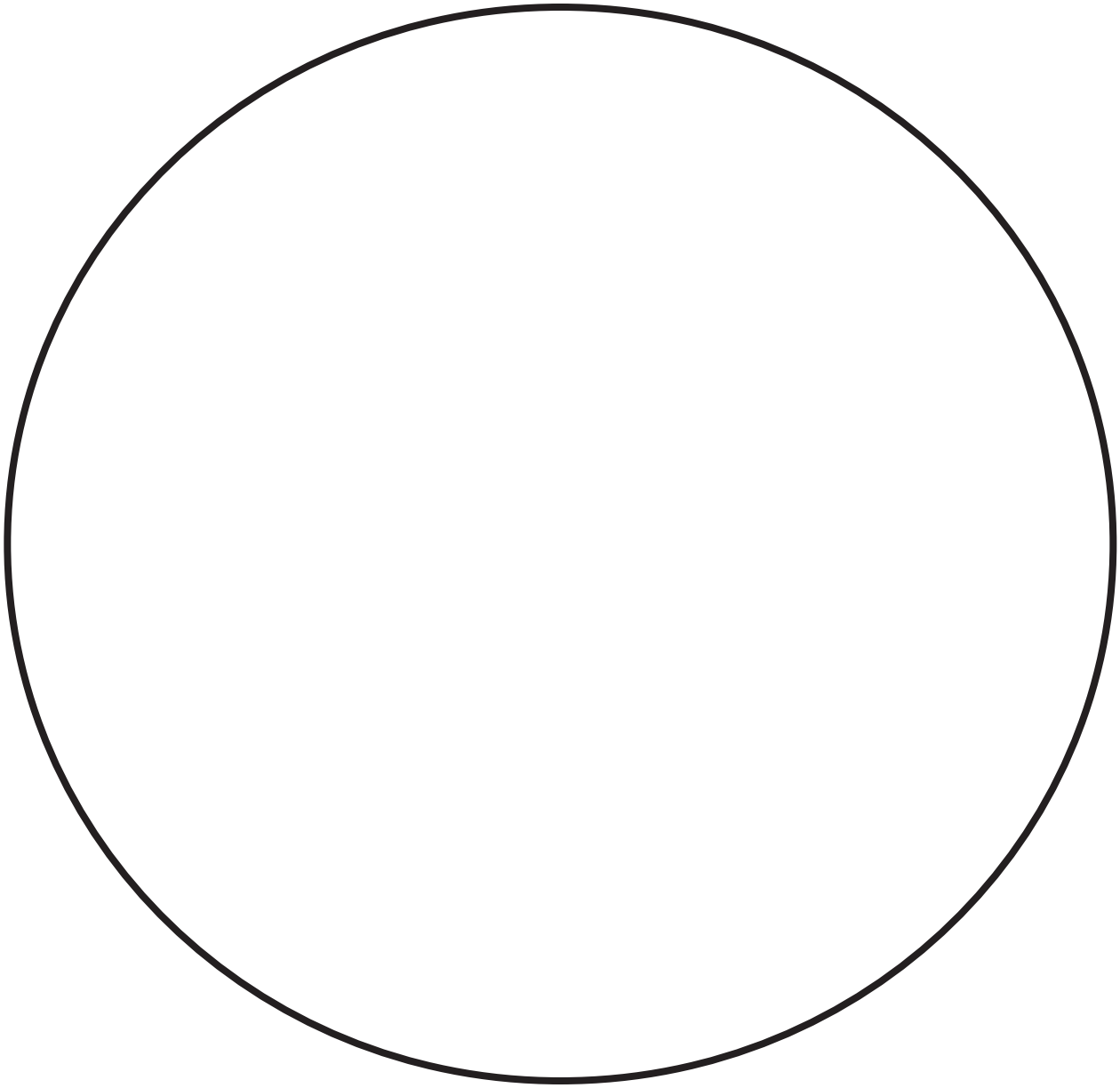
Comprehensive

Issue #2: HUNGER

99% of the world's undernourished people live in developing countries. Here is where in the world hunger is the worst:

- *Asia*: 513.9 million
- *Sub-Saharan Africa*: 239.1 million
- *Latin America*: 34.7 million

Create a pie chart displaying this data below:



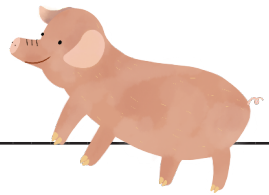
Primary & Post Primary

Issue #3: ANIMAL RIGHTS

Humans are not the only ones who experience unfairness... animals do, too. Here are the facts:

- Around 6 million animals live in animal shelters. 3 million are dogs and 3 million are cats.
- 3 million shelter animals are adopted each year.
- Almost all pigs are raised on factory farms and kept in cages.
- There are 5,000 tigers living in cages in China.
- 9 billion chickens are killed for their meat every year.
- 300 million chickens are used to make eggs.

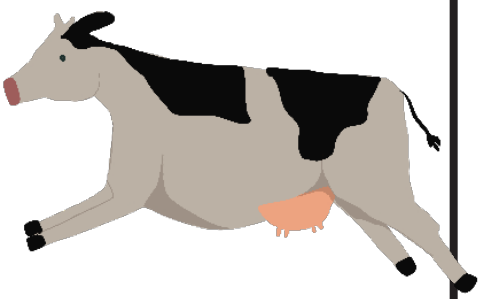
What do you think about this?

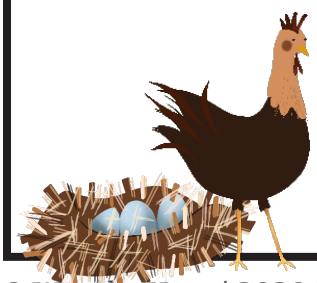


Primary & Post Primary

Issue #3: ANIMAL RIGHTS

Draw a picture of your thoughts and feelings about animals in the world being treated badly.





Primary & Post Primary

Issue #3: ANIMAL RIGHTS

Look at the underlined numbers on page 38.

1. Sequence the underlined numbers from smallest to largest.

_____, _____, _____, _____, _____, _____, _____

2. Sequence the underlined numbers from largest to smallest.

_____, _____, _____, _____, _____, _____, _____

3. Choose two of the underlined numbers to compare.

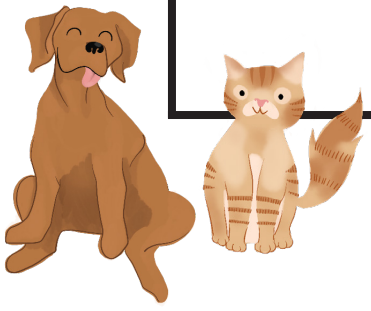
_____ ___ _____

Math Workspace

Post Primary

issue #3: ANIMAL RIGHTS

Create a bar graph showing how many animals that live in shelters are dogs and how many are cats.



Comprehensive Issue #3: ANIMAL RIGHTS

Humans are not the only ones who experience unfairness. Animal rights are a very big issue in our world today. Here are the statistics:

- 6.5 million animals enter U.S. animal shelters nationwide every year. Of those, 3.3 million are dogs and 3.2 million are cats.
- 3.2 million shelter animals are adopted each year. Of those, 1.6 million are dogs and 1.6 million are cats.
- 95% of pigs are raised on factory farms and kept in cages
- There are 5,000-6,000 tigers living in captivity in China
- 75% of "downed" animals (animals who cannot stand and walk on their own) are dairy cows.
- 9 billion chickens are killed for their meat every year, while another 300 million chickens are used to make eggs.

1. Write down any thoughts you have about this data. What do you notice?

Comprehensive Issue #3: ANIMAL RIGHTS

Use the statistics on page 42 to answer the following questions. Use a calculator to help you.

1. What percentage of animals in shelters are dogs?

   _____

2. What percentage of animals in shelters are cats?

   _____

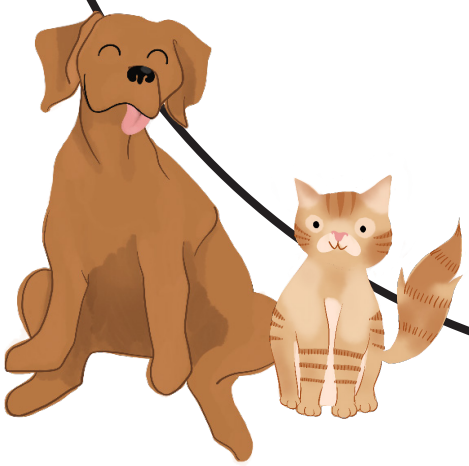
3. What percentage of adopted animals are dogs and cats?

   _____

Math Workspace

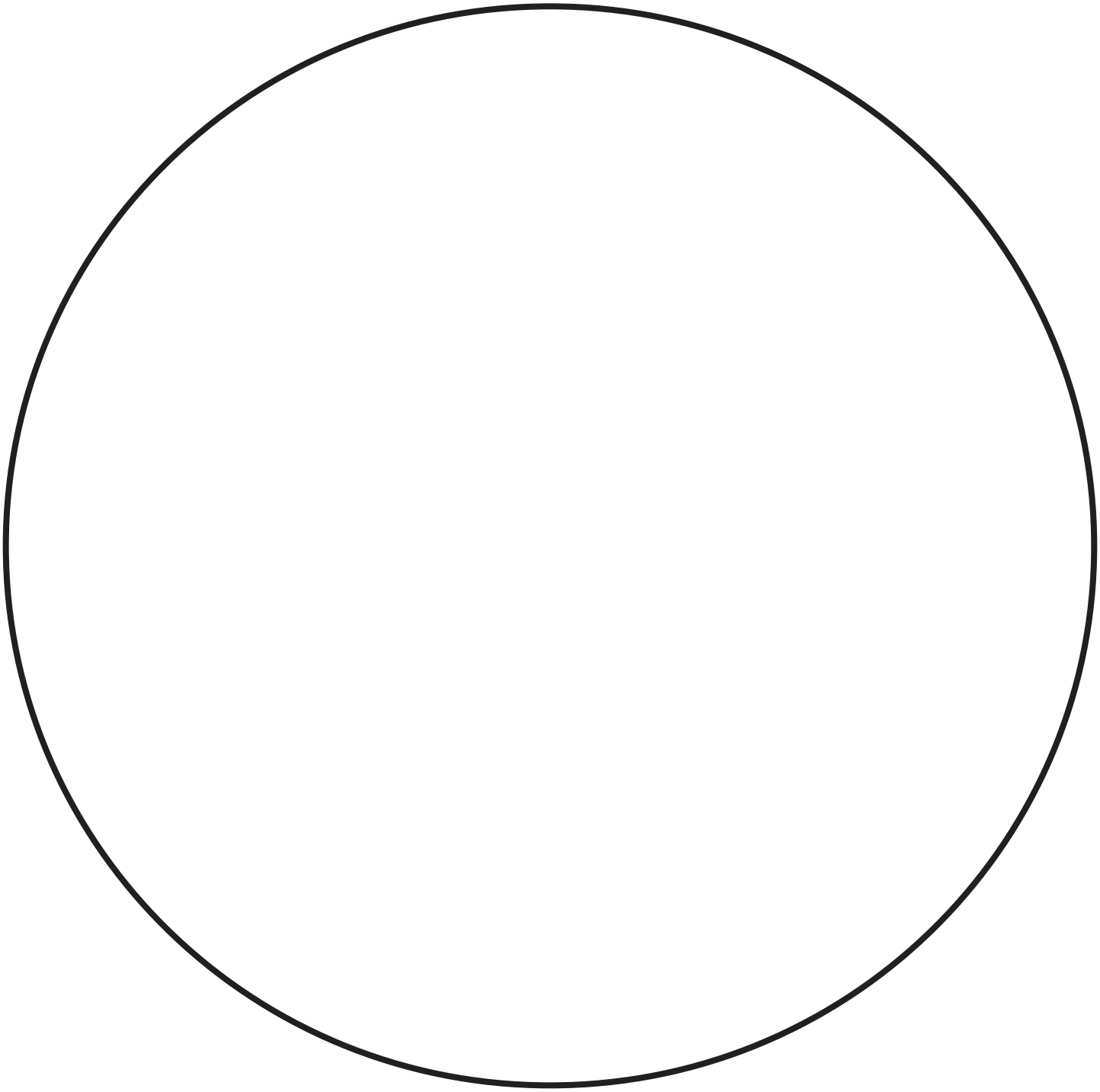
Comprehensive Issue #3: ANIMAL RIGHTS

Create a pie chart showing the number of dogs in shelters versus the number of cats in shelters.



Issue #3: ANIMAL RIGHTS

Create a pie chart showing the number of adopted dogs versus the number of adopted cats.



All Levels

Time to TAKE ACTION

Now we get to make a plan to help people and animals! No child is too young to make a difference!

Step 1: Take a Survey

Let's see which issue most people want to help with. Use the chart below and tally marks to help you keep track.

I surveyed _____ people.

"Take Action" Survey	
Issue	Number of People Who Showed Interest
Education	
Hunger	
Animal Rights	

1. How many* people voted for EDUCATION?
   _____ (_____%)
2. How many* people voted for HUNGER?
   _____ (_____%)
3. How many* people voted for ANIMAL RIGHTS?
   _____ (_____%)

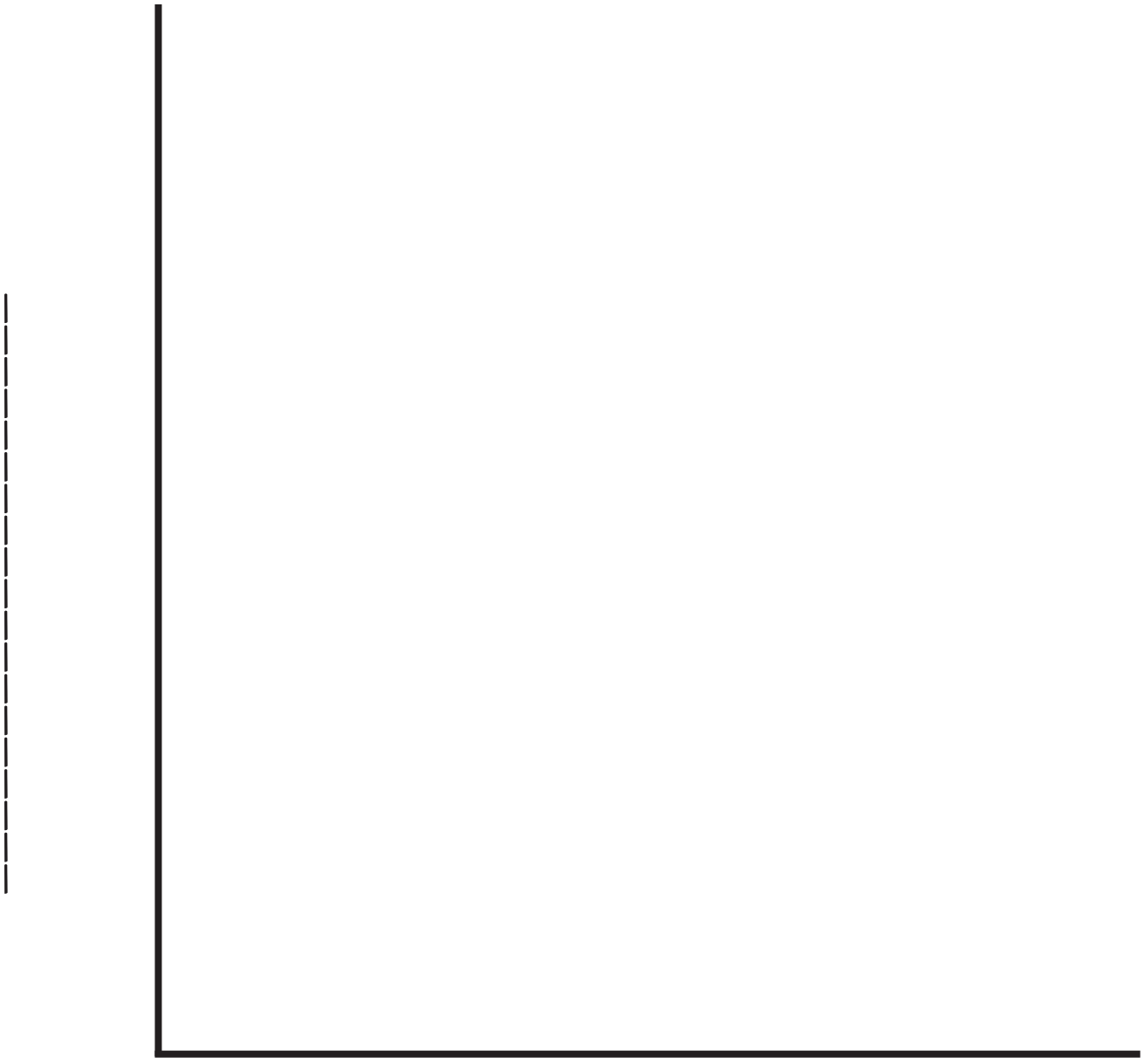
* Comprehensive - calculate the amount of people as a percentage

All Levels

Time to TAKE ACTION

Use the data you just collected from your survey and display it as a bar graph below.

"Take Action" Survey Results



Step 2: Make a Plan

Which issue do YOU want to take action on? It can be the issue that had the most votes, or not... It's up to you!

The issue I want to take action on is:

_____

Check out these cool charities and organizations that are already helping with this issue. We have some great ones listed here (run mostly by kids like YOU) for you to get a start with:

GENERAL

- www.kidsgoglobal.net/showcase/student-projects

EDUCATION

- www.roomtoread.org
- www.milkandbookies.org
- classroomofhope.org

HUNGER

- greenbronxmachine.org
- www.earthskids.com/hunger

ANIMAL RIGHTS

- www.friendsofanimals.org/just-for-kids
- www.humanedecisions.com/50-ways-kids-can-help-animals

All Levels

Time to TAKE ACTION

Now it's time to make a plan! Use this table to write or draw your thoughts:

Fact that bothered me the most	
My talents and abilities	
Who I can team up with	
My ideas for helping with this issue	

Time to TAKE ACTION

Step 3: Chart Your Progress

Now that you have a plan, think about how to chart your progress. Are you...

- Raising funds for a charity or cause? *Make a goal of how much money you want to raise and design a chart you can color in to keep track of what's been raised!*

- Volunteering your time? *Make a goal of how many hours you want to volunteer and graph your hours!*

- Creating something to help a cause (for example, creating motivational bookmarks for kids learning to read)? *Make a chart that shows the creations you have in mind, then take a photo of your actual work when it's done to keep track of your ideas and your final products!*

- Raising awareness about an issue? Brainstorm ideas and make a checklist of what you need to do to bring awareness to this issue. Check off items on your list as you accomplish them.

Tip #1: Team up with a friend or family member! Taking action is always better with other people by your side.

Tip #2: Goals work best when you have a deadline. Set a date you want to accomplish your goals and work hard towards it!

Use the next page to design a chart that will help you keep track of your progress!

Time to TAKE ACTION

Chart Your Progress Here!

Project Rubric

	Neatness	Creativity	Effort	Mathematical Understanding
Mastery	The project was completed very neatly with great attention to detail.	The child utilized their imagination and displayed out-of-the-box thinking when developing their project.	The child put a lot of time and effort into this project, taking great pride in their work. When met with challenges, they persevered.	The child showed *thorough* understanding of mathematical concepts throughout the project.
Progressing	The project was completed somewhat neatly. The child displayed some attention to detail.	The child showed some creativity when developing their project, and needed some extra guidance when thinking of ideas.	The child put some time and effort into this project, sometimes taking pride in their work depending on the task.	The child showed *some* understanding of mathematical concepts throughout the project, needing guidance along the way.
Developing	The project was incomplete or completed with little or no attention to detail.	The child showed little creativity and/or interest when developing their project, needing much prompting along the way.	The child showed disinterest and put little effort into the project. They needed much prompting along the way to finish.	The child showed *little to no* understanding of mathematical concepts throughout the project, and seemed lost in the math tasks.

Resources

- https://inequality.org/facts/global-inequality/
- https://www.dw.com/en/unesco-264-million-children-dont-go-to-school/a-41084932
- http://www.kidsgoglobal.net/the-issues/education
- https://www.statista.com/statistics/678737/total-number-of-children-worldwide/
- http://www.kidsgoglobal.net/the-issues/food/
- https://www.thp.org/knowledge-center/know-your-world-facts-about-hunger-poverty/
- https://www.worldanimalprotection.us/blog/7-animal-cruelty-facts
- https://www.aspca.org/animal-homelessness/shelter-intake-and-surrender/pet-statistics
- https://www.aspca.org/animal-cruelty/farm-animal-welfare/animals-factory-farms
- http://www.kidsgoglobal.net/the-issues/animal-rights/