

# If Our Classroom Were the World

## Proportions and Percents



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Published by K20 Center

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<b>Grade Level</b>	6th – 7th Grade	<b>Time Frame</b>	200 minutes
<b>Subject</b>	Mathematics, Social Studies	<b>Duration</b>	4-5 class periods

### Essential Question

How can we use proportions to understand our world?

### Summary

In this lesson, students will use proportions and percentages to discover what classrooms around the world are like.

### Snapshot

#### Engage

Students complete sticky bar exercises to assess their knowledge of peoples of the world and watch a 12-minute video based on the book "If the World Were a Village" (or read the original book, if accessible).

#### Explore

Students work in small groups and use proportions to determine what the classroom would look like if it were representative of the whole world.

#### Explain

Students present their results.

#### Extend

Students create children's books that explore what classrooms may be like around the world.

#### Evaluate

Students partake in a Gallery Walk of peer-created children's books.

## Standards

Oklahoma Academic Standards for Mathematics (Grade 7)

**7.N.1.3:** Recognize and generate equivalent representations of rational numbers, including equivalent fractions.

**7.A.2:** Recognize proportional relationships in real-world and mathematical situations; represent these and other relationships with tables, verbal descriptions, symbols, and graphs; solve problems involving proportional relationships and interpret results in the original context.

**7.A.2.1:** Represent proportional relationships with tables, verbal descriptions, symbols, and graphs; translate from one representation to another. Determine and compare the unit rate (constant of proportionality, slope, or rate of change) given any of these representations.

**7.A.2.2:** Solve multi-step problems involving proportional relationships involving distance-time, percent increase or decrease, discounts, tips, unit pricing, similar figures, and other real-world and mathematical situations.

**7.A.2.3:** Use proportional reasoning to solve real-world and mathematical problems involving ratios.

**7.A.2.4:** Use proportional reasoning to assess the reasonableness of solutions.

## Attachments

- [Country-Information-Sheet-If-Our-Classroom-Were-the-World - Spanish.docx](#)
- [Country-Information-Sheet-If-Our-Classroom-Were-the-World - Spanish.pdf](#)
- [Country-Information-Sheet-If-Our-Classroom-Were-the-World.docx](#)
- [Country-Information-Sheet-If-Our-Classroom-Were-the-World.pdf](#)
- [Lesson-Slides-If-Our-Classroom-Were-the-World.pptx](#)
- [Numerical-Information-If-Our-Classroom-Were-the-World - Spanish.docx](#)
- [Numerical-Information-If-Our-Classroom-Were-the-World - Spanish.pdf](#)
- [Numerical-Information-If-Our-Classroom-Were-the-World.docx](#)
- [Numerical-Information-If-Our-Classroom-Were-the-World.pdf](#)
- [Web-Resources-If-Our-Classroom-Were-the-World - Spanish.docx](#)
- [Web-Resources-If-Our-Classroom-Were-the-World - Spanish.pdf](#)
- [Web-Resources-If-Our-Classroom-Were-the-World.docx](#)
- [Web-Resources-If-Our-Classroom-Were-the-World.pdf](#)

## Materials

- Lesson Slides (attached)
- Country Information Sheet (attached)
- Web Resources (attached)
- Numerical Information in *If the World Were a Village* (attached)
- *If the World Were a Village* by David J. Smith
- Sticky notes (three per student)
- Three posters/large chart papers or three blank areas of white boards
- Markers
- Colored pencils/crayons
- Blank, white paper (three sheets per student)

# Engage

## Teacher's Note: Activity Prep

Before class, section a whiteboard or chalkboard into three sections or hang three large posters. At the top of each section or poster, write the three questions below. At the bottom, draw a horizontal line with the corresponding answers to each question written below the line, as shown below.

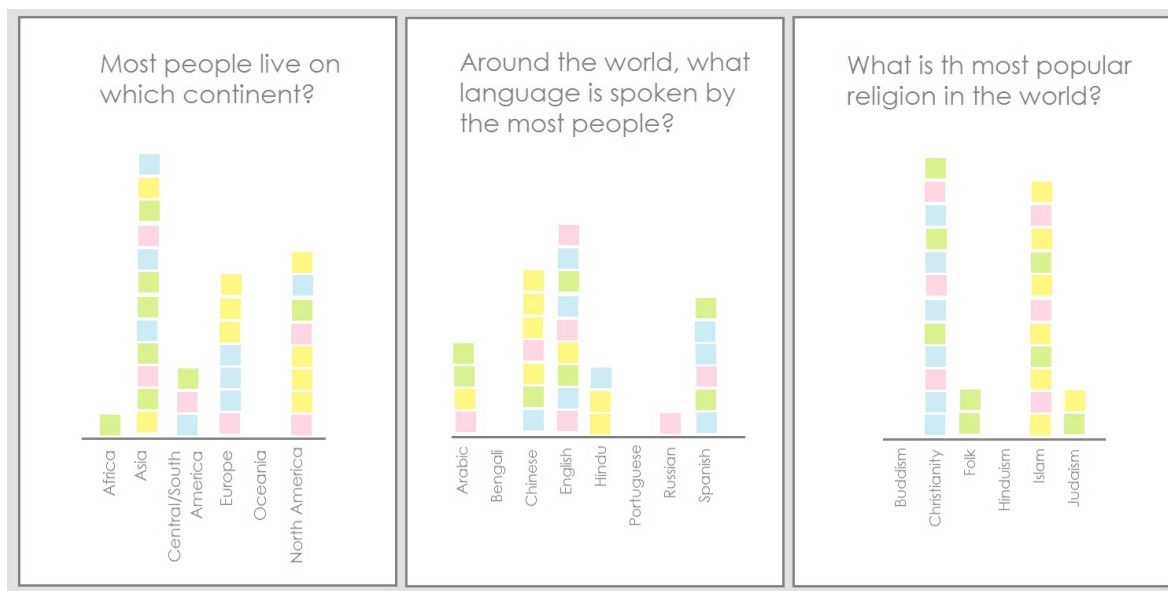
- Question 1: Most people live on which continent? (answers: Africa, Asia, Central and South America, Europe, Oceania, North America)
- Question 2: Around the world, what language is spoken by the most people? (answers: Arabic, Bengali, Chinese, English, Hindu, Portuguese, Russian, Spanish)
- Question 3: What is the most popular religion in the world? (answers: Buddhism, Christianity, Folk, Hinduism, Islam, Judaism)

<p>Most people live on which continent?</p> <hr/> <p>Africa Asia Central/South America Europe Oceania North America</p>	<p>Around the world, what language is spoken by the most people?</p> <hr/> <p>Arabic Bengali Chinese English Hindu Portuguese Russian Spanish</p>	<p>What is the most popular religion in the world?</p> <hr/> <p>Buddhism Christianity Folk Hinduism Islam Judaism</p>
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*Questions and Answers for Sticky Bars Engagement Activity*

Introduce the lesson using the attached Lesson Slides. Go to **slide 3** to display the lesson's essential question: How can we use proportions to understand our world? Go to **slide 4** to share the lesson's learning objective with students. Review this with your class to the extent you feel necessary.

Go to **slide 5**. Hand three sticky notes to each student. Introduce the class to the [Sticky Bars](#) strategy, and have the class create a Sticky Bar for each question. To do so, students should write how they know the answer to each question on a sticky note and post their note above what they believe the right answer is. When complete, your Sticky Bars may look something like this:



Completed Sticky Bar Activity

### Teacher's Note: Sticky Bars

The purpose of this activity is to get students to think about the statistics they know about the world's population. In addition, the Sticky Bar activity reinforces students' prior knowledge about bar graphs and displays their prior knowledge using a mathematical representation.

Go to **slide 6**. After the class has created the three Sticky Bars, tell students that you will be reading a book to them. Their job as they listen is to record as much mathematical information presented as they can.

Go to **slide 7**. Read the book aloud. For reference, the attached **Numerical Information handout** gives the numerical information presented in the book.

Go to **slide 8**. After reading the book, return students' attention to their sticky bar results. Ask students what information they recorded about the three questions (See the Numerical Information handout for the information they should have recorded). Record the information somewhere all students can see. Discuss with them whether most people in the class were correct, and what may influence our perceptions of the world.

### Possible Student Responses

Students may comment that they had incorrect perceptions about the world's population because the population of their local community (school, town, state) looks very different from the world population, or because the news that they watch, read, or listen to focuses mostly on North America.

Go to **slide 9**. Explain to students that understanding mathematical concepts, like fractions, percentages (with which they should be familiar) and proportions (which they are about to explore) can help them make sense of the people and events in different parts of the world even if they have no personal experiences.

## Explore

Go to **slide 10**. Complete a [Think-Pair-Share](#) exercise with your students using the prompt "What would our class look and sound like if it represented the whole world?"

### Possible Student Responses

Most students will think about how many students would speak a certain language, be from a certain continent, or practice a certain religion. As these thoughts are shared, it is important that the teacher question the students in order to guide them towards more mathematically precise answers. For example, if a student says "Many of us would be from Asia", ask them how many? Would more than half of us be from Asia? Also, press students to explain how they know. For example, if they say more than half would be from Asia, ask them to explain how they know; most students will respond by saying 61% (percent of people from Asia) is more than half, or something similar. The goal here is to get your students to start precisely comparing the numbers given in the video to the numbers of students in your class; this leads into the idea of proportions.

Some students might question what "represented" means in the context of the prompt. If so, take advantage of this line of questioning to explore the definition of a "proportion" (see below).

If no student brings up what "represented" means in this context, you will need to bring up this question yourself at the end of the discussion. Turn the question over to the class, asking them what they think it means to "represent" the world. Students will often begin by saying that you need the "right" or the "same" number of people from each continent, language, etc. Ask these students to define right or same.

Go to **slide 11**. Through discussion, establish the idea that the ratio (or fractions) of people with a given characteristic need to be equal for the world and for the class. Once it is established that fractions (or ratios) need to be equal, you can define "proportion" as an equation that sets two fractions (or ratios) equal to each other.

### Teacher's Note: Pacing

Most teachers find that this is an appropriate point at which to end day one of the lesson. If so, begin the next day by asking students to define what a proportion is in their own words.

Go to **slide 12**. Ask the class how a proportion could be used to help decide what the class might look or sound like if it represented the whole world. Guide students through a discussion until they write a proportion with an unknown value (represented by a blank, variable, or question mark.) The example below shows what this discussion might look like if the class were attempting to find out how many students out of a class of 28 would be from Asia, using the information that 61 out of 100 people are from Asia. You can choose to start with this information or any other information that your class finds interesting. You should, of course, use your actual class size, not 28.

### Possible Class Discussion

- Teacher: So we know we want to set two ratios equal to each other for our proportion. What ratios do we want to use?
- Student 1: Well, we want to use the 61 people from Asia
- Teacher: OK, is 61 a ratio?
- Student 2: No, but the village was 100 people, so we can use the ratio 61 out of 100.
- Teacher (turning to student 1): Do you agree with that?
- Student 1: Yes
- Teacher (writing on the Smart Board): Ok, so the first ratio is 61 out of 100. What could we use for a second ratio?
- Student 3: Twenty-eight. There's 28 people in this class.
- Student 2: But that's not a ratio either.
- Student 3: Well, it could be the top of the ration, like 61 was out of 100.
- Student 1: That doesn't make sense; it would be 28 out of what?
- Student 3: well, it's out of 28. 28 is the total.
- Student 1: Then it should be the bottom, not the top.
- Student 2: Yeah, that makes more sense.
- Teacher (turning to student 3): Does that make sense to you?
- Student 3 (long pause to think): Yeah, the bottom is the whole, the top is the part. Twenty-eight is the whole class, so it's on bottom.
- Teacher (writing 28 in the appropriate place): Ok, so then what goes on top?
- Student 1: We don't know, that is what we want to figure out.
- Student 2: Oh! Then let's write an x since we don't know.
- Teacher: So what does that variable represent?
- Student 2: It's the part.
- Teacher: The part of what?
- Student 2: The part of the class.
- Teacher: What part of the class?
- Student 2: Ummm... the part of the class from Asia?

Go to **slide 13**. Once you have written the first proportion with students, have them work in small groups of 2 to 4 students to create strategies for finding the number of students who would represent Asia if the class were representative of the whole world.

### Teacher's Note: Student Problem-Solving

Do not give them a process (that is, demonstrate how to solve a proportion) at this point. Allow students to create their own method. This allows students to see several different methods of solving a proportional problem in the explain section of this lesson. Some students may use additive reasoning while others begin to explore multiplicative reasoning.

## Explain

Go to **slide 14**. When most groups have found the value of  $x$ , or when groups are becoming too frustrated to be productive, bring the whole class together to discuss the strategies they formed. Some explanations for possible student strategies are shown below.

### Possible Student Strategies

1. "I made 61 out of 100 into a decimal; 0.61. This is more than half, so I know I needed more than half of 28, which is 14. Therefore, I started with 15 out of 28. When I made that a decimal, I got 0.53. That wasn't big enough, so I tried 16, and 17. Seventeen out of 28 is 0.607, so close. However, 18 out of 28 is 0.64. That's way too big, so I said 17 was the closest number."
2. "I thought about equivalent fractions. I know that to get equivalent fractions, I can just multiple the numerator and denominator by the same thing. Therefore, I started to think about what to multiply 28 by in order to get 100. Since 100 divide by 28 is about 3.57, I can multiple 28 by 3.57 to get 100. That means I would also have to multiply whatever is on top by 3.57 to get 61. Since 61 divided by 3.57 is just over 17, I said 17 would be from Asia, since you can't have part of a student."
3. "I made a row of 28 boxes, and then started to think about how many rows I would need to make 100. I started by making three rows of boxes, but that only made 84. I made another half row of boxes, and that added 14 more full boxes, so that there were 98 total. That was pretty close to 100. Then, I started shading boxes, going down the columns, until I shaded 61 full boxes. That took 17 full columns, plus another full and another half box. That was a little under seventeen and a half, so I rounded down to 17."

Note that the fact that students are not finding "exact" values at this point is fine; students should be more focused on building a conceptual understanding of how to solve proportions. They will begin to work with more precision as they become familiar with the strategies used to solve proportions and as the application of the proportions become more abstract.

Have students present their work and results. After each group presents, ask the rest of the class what they liked about the strategy and what they didn't like.

Go to **slide 15**. After all groups have presented, ask students to choose one method that would like to try to use to solve another proportion. Once students have had 2-3 minutes to choose a strategy they want to try, have students use the strategy to solve another proportion relating their class to the world population statistics in *If the World Were a Village*. For example, you could choose to have them write and solve a proportion determining how many class members would be from Africa if the class represented the whole world, or you can move to a different topic and ask them to find out how many people would speak Chinese. Continue discussing strategies and practicing solving proportions until most groups seem confident they have found a strategy that works for them.

### Optional: Modifying the Example

Feel free to add, delete, or modify the example given to best fit your students' needs. The end of the Explain portion of the lesson usually makes a good stopping point in the lesson (usually for day 2).

## Extend

Go to **slide 16**. Tell students they will be writing a children's book modeled on "If the World Were a Village" which they will title "If our classroom were in \_\_\_\_\_."

Go to **slide 17**. To fill in the blank, students in the class will be assigned different countries to research. Their book should tell readers how many people are typically in a class in their assigned countries. In addition, it should talk about the languages spoken, religious practices, available technology, water, clean air, food, and money of the people in their assigned countries.

This information can be found in the attached **Country Information Sheet**. You may decide to cut them in advance and randomly select the countries for students, or another method may work best for your class. Draw one card or assign each student to a country. Pass out two blank pages of paper to each student. Have students stack the two pages and fold them in half horizontally (hamburger fold) and staple the pages along the crease. Tell students that these pages will form the pages of their children's book. Aside from the front and back covers, each page should contain information about a different demographic for their countries' classrooms, including class size. All information should be written as whole numbers (since you cannot have just part of a person and since small children are not likely to understand ratios or percentages).

### Teacher's Note: Differentiation

Since students are required to find at least one proportion for each page of the book (sometimes as many as four or five), they will need to solve at least 6 proportions for the project, up to 30. You can accommodate struggling and advanced students by having them investigate characteristics that will require relatively few proportions (like how many people have access to clean water; there are only two possibilities) or relatively many proportions (like languages spoken). You can also increase or decrease the number of pages required for their book.

Pass out the attached **Web Resources** handout or share it digitally to help students gather data relevant to their countries. They may also research alternative or additional data on their own. They may complete this evaluation in class or at home. Generally, teachers allow one work period after assigning the countries. This is generally enough time for students to generate and check the numbers they will use in their book. Then, students can write and illustrate the book at home.

### Optional: Interactive Display

If you wish, you can attach a world map to a bulletin board and have student pin their completed books to the map to create an interactive classroom display; students can take down each other's books to read if they wish.



## Evaluate

Go to **slide 18**. Have students partake in a [Gallery Walk](#) to display their children's books. You could have students read their books to small groups at a time or just have the books displayed for students to look through at their own pace.

## Resources

- K20 Center. (n.d.). Gallery Walk / Carousel. Strategies. <https://learn.k20center.ou.edu/strategy/118>
- K20 Center. (n.d.). Sticky Bars. Strategies. <https://learn.k20center.ou.edu/strategy/129>
- K20 Center. (n.d.). Think-Pair-Share. Strategies. <https://learn.k20center.ou.edu/strategy/139>
- Smith, D. (2002, March 1). *If the World Were a Village*. Kids Can Press.