

WEALTH DISTRIBUTION AS A CONTEXT FOR TEACHING MATHEMATICS FOR SOCIAL JUSTICE

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Defining TMfSJ: Cont. ...

In TMfSJ, students use mathematics as a tool to analyze injustices affecting marginalized peoples.

The injustices may come from students' communities, cultures and life experiences.

Theoretical and Pedagogical “roots” of TMfSJ: Brief overview of critical theory and critical pedagogy

The origin of critical theory is often associated with the Frankfurt School (circa 1920s), which holds a Marxist theoretical perspective: to critique and subvert domination in all its forms (Bottomore, 1991).

Although the Frankfurt School and the seminal works of Karl Marx (and Friedrich Engels) are foundational in its development, it is important to keep in mind that critical theory is not coextensive with either of these or with both of them together (Crotty 1998).

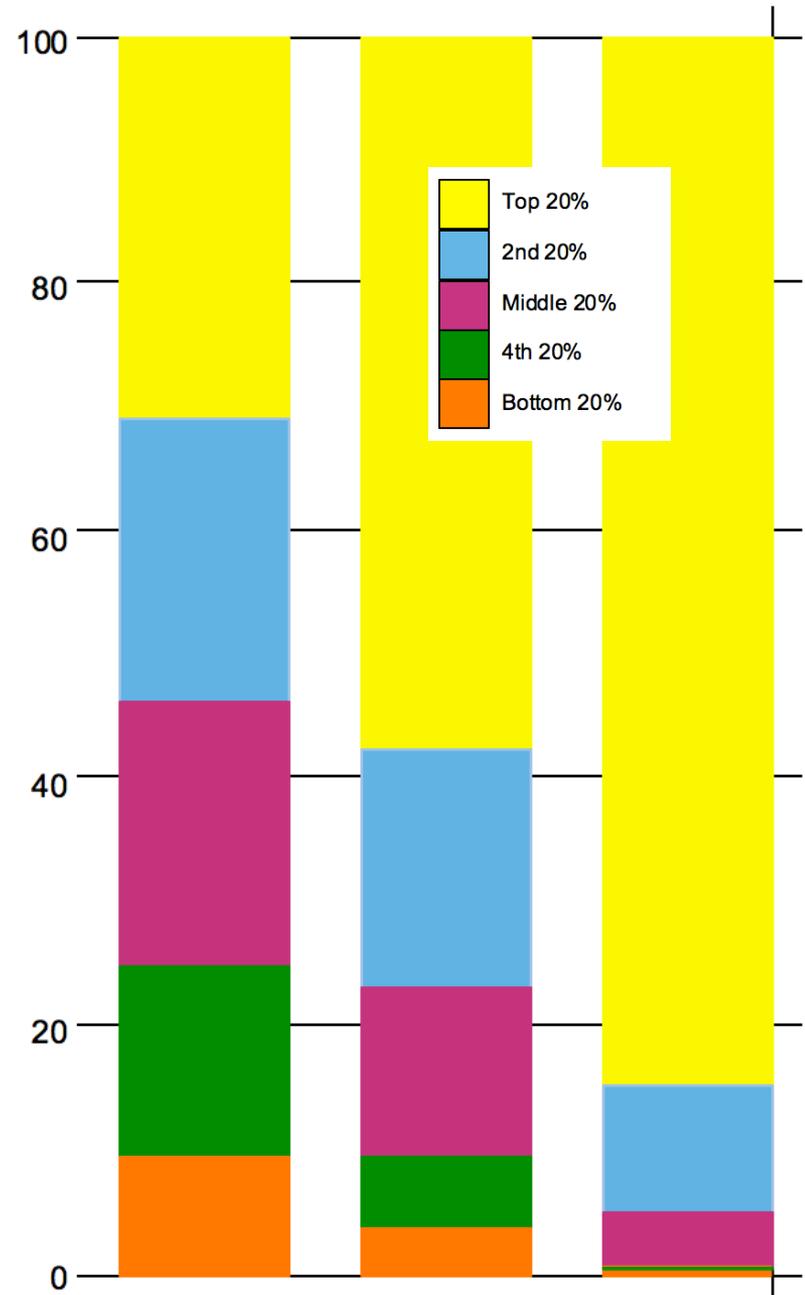
The Activities are based on a Wealth Distribution Article

□ Skewed Preferences

From left to right the wealth distribution that Norton's respondents said would be ideal; how they estimated wealth was currently distributed; and the actual distribution of wealth in the United States.

Gudrais, Elizabeth (November-December 2011). Loaded Perceptions: What We Know About Wealth 2013 Harvard Magazine Inc. Retrieved May 6, 2013 from

<http://harvardmagazine.com/2011/11/what-we-know-about-wealth>



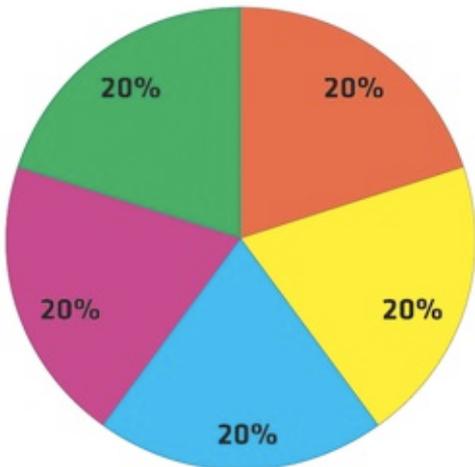
AND

NPR Wealth Quiz: How Does the U.S. Slice the Pie?

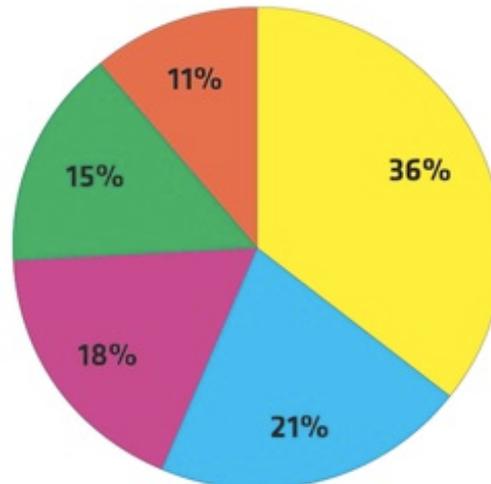


These pie charts represent the distribution of wealth in three different places. Each slice of the pie chart represents the proportion of wealth held by one fifth of the population in the country: the yellow slice, by the wealthiest fifth; the blue slice by the next wealthiest, down to the red slice, which represents the poorest fifth, in terms of wealth. Which nation do you think the pie charts for Country A, Country B, and Country C represent? Which place would you like to live in and why?

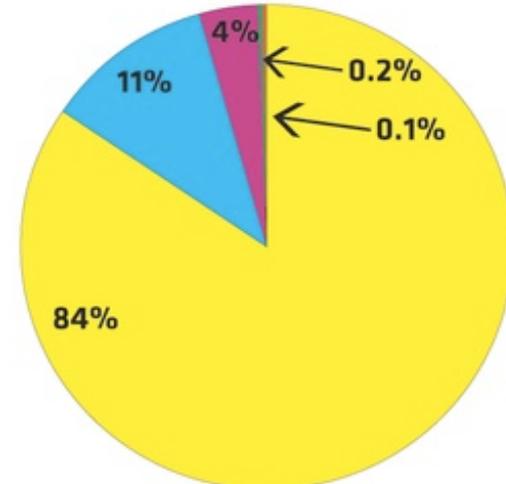
Country A



Country B



Country C



Social Justice Survey: Pretest/Posttest

- Twenty-two (22) Fifth-grade students were asked:
 1. What social issues are of interest to you? List the ones you want.
 2. Select one of the social justice issues you listed and explain why this is a social issue for you.
 3. What would you like to know about your selected social issue?
 4. Give an example of a nation. Why is this a nation?
 5. How would you define wealth?
 6. What do you know about wealth distribution in the United States of America?
 7. What do you know about wealth distribution in the world?
 8. What else would you like to know about wealth distribution?
 9. Share your ideas about social issues with others. What other issues did you learn about from other students? Write your answer in the space provided below:

Results for Question 1: What social issues are of interest to you? List the ones you want.

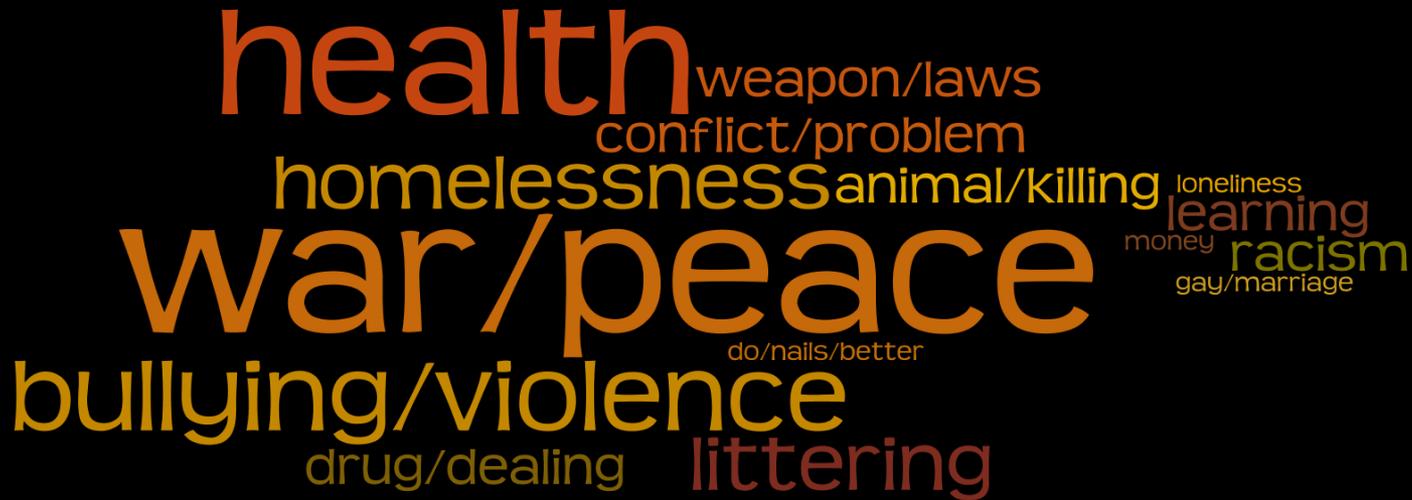
	Topics				
1	bullying	gangs	smoking	war	homeless
2	war	loneliness	racism	animal killing	
3	racism				
4	world peace	trash/liter			
5	war needs to be stopped	medicine for cancer			
6	world peace	homeless people			
7	read words I don't know				
8	other ways to solve problems instead of war				
9	no more gay marriage				
10	social illness				
11	weapon laws no one should be able to carry a gun or have one without being a cop or in the military				
12	drugs				
13	school violence				
14	bullying				
15	problem	conflict	illness	killing animals	
16	more money	A's on all test	do nails better		
17	illegal contact of weapons, knives and other things				
18	bullying				
19	world peace	drug dealers			
20	people need to not leave trash on the earth's nature				
21	illness				
22	unhealthy food	homeless people	littering		

Results for Question 1: What social issues are of interest to you? [Some could be Wealth Related*]

Topics	
war/world peace/other ways to solve problems instead of war	7
illness/medicine for cancer/smoking/social illness/unhealthy food: health *	6
bullying/school violence: bullying/violence	4
people need to not leave trash on the earth's nature/ littering /[trash/litter]	3
homeless*	3
racism	2
killing animals/animal killing	2
drugs/drug dealers	2
conflict/problem	2
read words I don't know/A's on all test: learning	2
weapon laws no one should be able to carry a gun or have one without being a cop or in the military/illegal contact of weapons, knives and other things	2
loneliness	1
no more gay marriage	1
more money*	1
do nails better	1

Wordle

war/peace war/peace war/peace war/peace war/peace war/peace war/peace health health health health health health
bullying/violence bullying/violence bullying/violence bullying/violence littering littering littering homelessness homelessness
homelessness racism racism animal/killing animal/killing drug/dealing drug/dealing conflict/problem conflict/problem learning
learning weapon/laws weapon/laws loneliness gay/marriage money do/nails/better



Student 1

1. Bullying, gangs, smoking, war, homeless
2. Poor and homeless people are social issue to me because they should be fed and be in a home.
3. I would like to know how many people are in this ordeal and how this happens.
4. USA, because there are a lot of jobs, money and food.
5. I would define it as cost and money.
6. I don't know.
7. I don't know.
8. I would like to know what wealth distribution is.

Student 2

1. war, loneliness, racism
2. Loneliness is a problem for me because I feel like an outcast and I feel like I'm different.
3. Why it happens.
4. USA, because it is a group of states that have banded together to a bigger "state".
5. Wealth is something that is good and over-plentiful, like tons of money.
6. The better job you have the more money you get.
7. Nothing.
8. How it gets distributed in the world?

Student 3

1. racism
2. It is a social issue for me because you've got to treat others the way you want to be treated.
3. I would like to know where in the world it's happening at.
4. I don't know.
5. I don't know.
6. I don't know.
7. I don't know.
8. I don't know.

Student 4

1. world peace, trash/litter, animal killing
2. Animal killing is very harmful because they are defenseless.
3. I would like to know more about world peace.
4. I don't know.
5. Wealth to me is how much potential you have or how much money you have.
6. I find some of it unfair because a cashier at a gas station gets paid less when a cashier at a school shop will get paid more.
7. I don't know.
8. How do they come up with pay income?

Student 5

1. war needs to be stopped, medicines for cancer
2. War needs to be stopped because it is killing many families.
3. I would like to know why people fight instead of signing peace treaties.
4. America is a nation because it has it's own rights and a head president to rule over.
5. You would define wealth as how much money a person has.
6. Wealth distribution in America is distributing money to people.
7. I don't know.
8. I would like to know if people like wealth distribution or not.

Student 6

1. world peace, homeless people
2. Homeless people because they do not have a place to stay.
3. How they stay alive and how people treat them.
4. Canada. [unclear]
5. A lot of something, mostly money.
6. Not many people have jobs.
7. [unclear]
8. Nothing.

Student 10

1. social illness
2. I don't want to get sick or die.
3. How to stop the illness and kill it before it spreads.
4. It is a nation because people don't want to spread.
5. United States
6. ?
7. ?
8. ?

Student 11

1. weapon laws no one should be able to carry a gun or have one without being a cop or in the military
2. So many people are getting hurt or killed from people carrying guns and using them irresponsibly.
3. Why is this a good idea?
4. America
5. Someone who has more money than most.
6. I don't know.
7. I don't know.
8. I don't know.

Student 12

1. drugs
2. It is because I don't want one of my friends or family to die from that.
3. Why did people even invent drugs.
4. It is a nation because so many people can stay somewhere.
5. Being rich.
6. Poor people.
7. I don't know.
8. I don't know.

Student 13

1. school violence
2. School violence is an issue because people come to school to learn not to be bullied.
3. How often does this happen?
4. USA
5. Someone who is very wealthy and rich.
6. I don't know.
7. I don't know.
8. I don't know.

Student 14

1. bullying
2. I get bullied and I don't know like bully's.
3. Nothing.
4. USA. It has governors and government.
5. rich, healthy
6. ? ? ? ? What do you mean!?
7. ? ? I don't know.
8. Everything.

Student 15

1. problem, conflict, illness, killing animals
2. Killing animals will make them extinct and let them live their full lives.
3. What animals are being killed?
4. Africa
5. Very very rich is an example but means a lot.
6. It is given to government and it is split to businesses.
7. It is very unfair.
8. African stuff.

Student 17

1. Illegal contact of weapons, knives and other things
2. it has a lot violence and a lot of people die and it is inappropriate
3. Why people do it?
4. USA and its freedom
5. Money being higher than some people
6. I don't know.
7. I don't know.
8. I don't know.

Student 21

1. illness
2. People don't like when someone is sick or ill.
3. How people keep on getting ill?
4. I don't know.
5. People not getting sick.
6. A lot of people are wealth.
7. A lot of the world are wealthy and a lot are ill.
8. How do people get wealthy they become sick?

Student 22

1. unhealthy food, homeless people & littering
2. Unhealthy food – I love food and using good food in an unhealthy way is sad.
3. How I can help make better food?
4. U.S. It's like a country.
5. Money \$
6. There's not a lot of it.
7. Some parts have better wealth than others.
8. It's when you get money.

Tentative Schedule of the Study

- **Administer Social Issues Survey: Pretest**
- **Vocabulary list:** nation, wealth, wealth distribution, percent, social issue, GDP (Gross Domestic Product), per capita, unemployment rate, recession, inflation
- **Day 1:**
 - **Activity 1: Lessons on Percent (two parts of a region or rectangle)**
 - **Activity 2: Lessons on Percent (three parts of a region or rectangle)**
- **Day 2:**
 - **Activity 3: Perceptions of Wealth Distribution in the United States**
- **Day 3:**
 - **Activity 4: Wealth Distribution Around the World**
 - **Table 3 requires the use of the Internet to access websites.**
- **Day 4:**
 - **Activity 5: Wealth Distribution Around the World Quiz**
 - **Activity 6: Correct Answer for Wealth Distribution Around the World Quiz**
- **Day 5:**
 - **Activity 7: Wealth Distribution in the United States**
 - **Administer Social Issues Survey: Posttest**
- **If possible**
 - **Focus group at the end with some students – video**

Vocabulary list presented to students

- **GDP (Gross Domestic Product):** It is how much a country produces in some amount of time (for example, in a year). To know the GDP of a country, you need to add up [consumer spending](#), [investment spending](#), [government spending](#) and the value of the [exports](#) and subtract the value of the [imports](#). This measure is often used to find out how healthy a country is, in an economic way. In other words, a country with a high value of GDP can be called a large economy. The higher the GDP the better for the country.
- **Inflation:** It is a general increase in prices and fall in the purchasing value of money. You can buy less with your money. For example, you can buy less food with the same amount of money you usually spent before.
- **Nation:** It is a large group of people united by common descent, history, culture, or language, inhabiting a particular country or territory; for example, the United States of America, Germany, Costa Rica, Peru, Canada, among others.
- **Per Capita: GDP per capita** is the total income of a [country](#), divided by the number of inhabitants. It shows how much money people make on [average](#) at work. The higher the per capita the better it is for the economy.
- **Percent:** It means for each 100. One hundred percent, or 100%, then, means 100 for each 100 (or), which is all; for example, 100% of 12 is 12. Fifty percent, or 50% is another way of saying half because 50% means 50 for each 100 (or), which is half (or).
- **Recession:** It is a period of temporary economic decline during which trade and industrial activity are reduced, generally identified by a fall in GDP in two successive quarters (three-month period). For example, there is less activity in the selling and buying of houses or food.
- **Social issue:** It refers to a concern, problem, conflict or illness that influences and is opposed by a considerable number of individuals within a society. It is often an undesirable condition that people believe should be corrected, and the consequence of factors extending beyond an individual's control and local geographical environment.
- **Unemployment rate:** It is a measure of the prevalence of **unemployment** and it is calculated as a percentage by dividing the number of **unemployed** individuals by all individuals currently in the labor force. During periods of recession, an economy usually experiences a relatively high **unemployment rate**. The lower it is the better it is for a country (more people have jobs), but this might depend on the type of jobs in terms of high paying or low paying jobs.
- **Wealth:** It is the abundance of valuable possessions or money. It is a measure of the value of all of the assets of worth owned by a person, community, company or country. Essentially, wealth is the accumulation of resources. People are said to be wealthy when they are able to accumulate many valuable resources or goods. Wealth is expressed in a variety of ways. For individuals, [net worth](#) is the most common expression of wealth, while countries measure by [gross domestic product \(GDP\)](#) or GDP per capita.
- **Wealth distribution:** the way in which the wealth and [income](#) of a nation are divided among its population, or the way in which the wealth and income of the world are divided among nations.

Percent in the CCSS



[Video](#) [Map](#) [Search](#)



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Grade 6 » Ratios & Proportional Relationships » Understand ratio concepts and use ratio reasoning to solve problems. » 3 » c

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Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.

Kindergarten-Grade 12

Standards for Mathematical Practice

Introduction

Kindergarten

Grade 1

Grade 2

Grade 3

Grade 4

Grade 5

Grade 6

Introduction

► **Ratios & Proportional Relationships**

The Number System

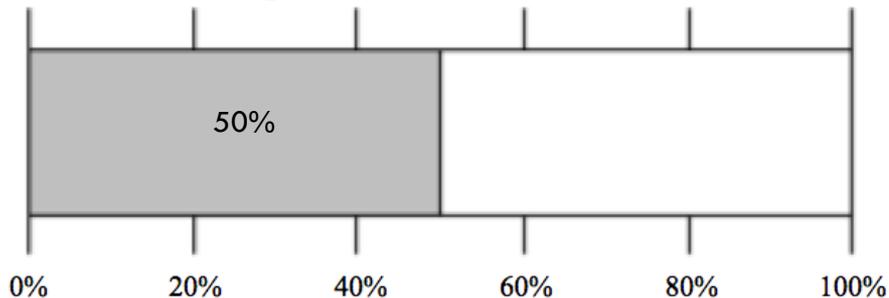
Expressions & Equations

Geometry

Statistics & Probability

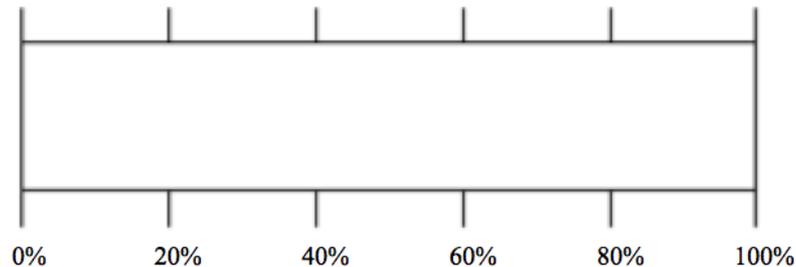
Activity 1: Lessons on Percent (two parts of a region or rectangle):

Percent: It means for each 100. Then, one hundred percent (or 100%) means 100 for each 100 (or $\frac{100}{100}$), which is all. For example, 100% of 12 is 12. Fifty percent (or 50%) is another way of saying half because 50% means 50 for each 100 (or $\frac{50}{100}$), which is half (or $\frac{1}{2}$). The example below shows that 50% ($\frac{1}{2}$) of the rectangle is shaded. Use the equivalency cubes to help you see this relationship. [Students used Fraction Tower Cubes]



Activity 1: Continued:

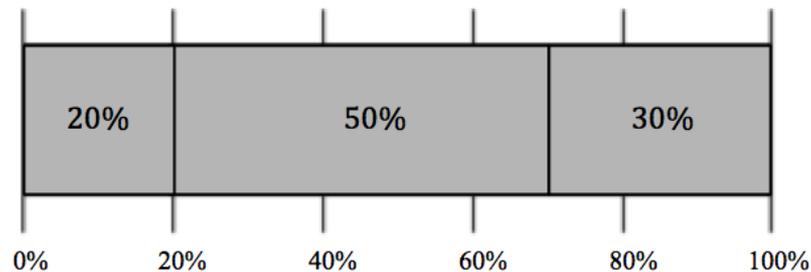
1. If the rectangle below represents 100% of a candy bar, and Pedro ate 25% ($\frac{1}{4}$) of the whole candy bar. Show how much of the candy bar he ate? Use the equivalency cubes to help you see this relationship. **Hint:** Shade $\frac{1}{4}$ of the rectangle below.



Activity 2: Lessons on Percent

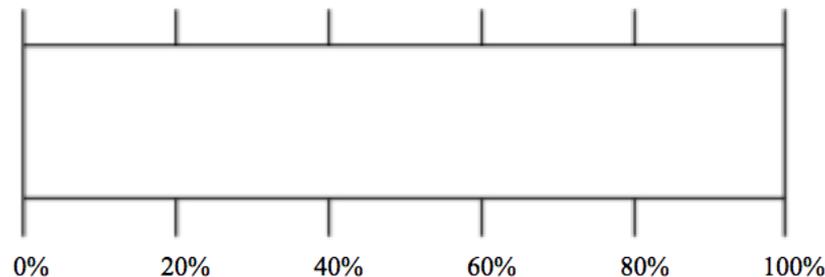
(three parts of a region or rectangle):

The rectangle below represents 100%. You can also divide the rectangle in three parts that add up to 100%. For example, you can have 20%, 50%, and 30%, which adds up to 100%. Use the equivalency cubes to help you see this relationship.



Activity 2: Continued:

1. If the rectangle below represents 100% of a candy bar, and Pedro has 25% of the whole candy bar, Carl has 40%, and Ralph has 35%. Show that they have 100% of candy bar together. Use the equivalency cubes to help you see this relationship.

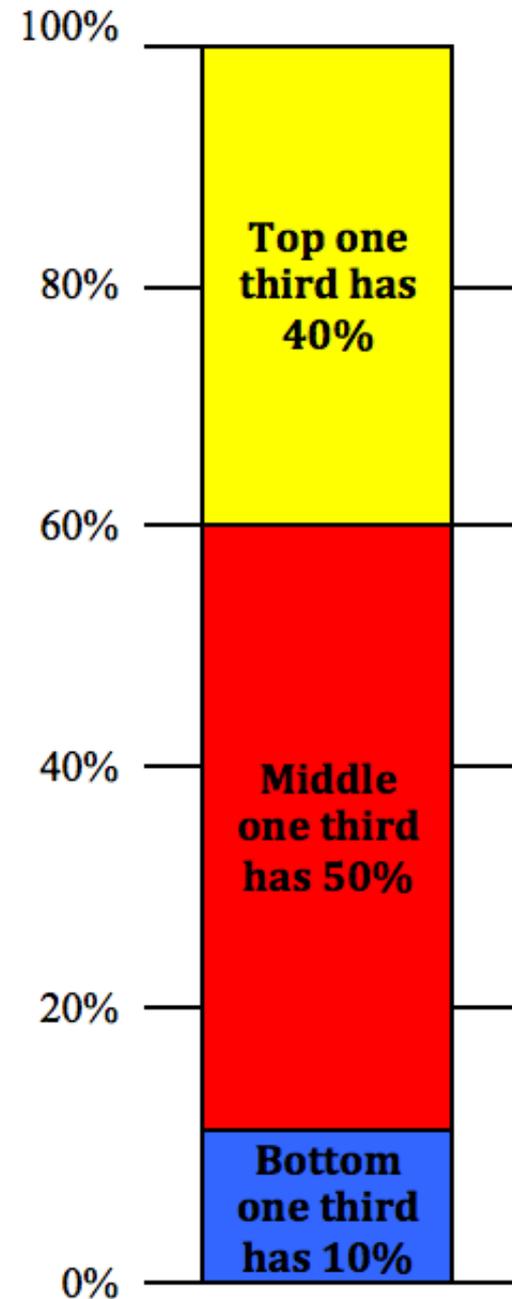


Activity 3: Continued:

Possible wealth distribution in the U.S. divided in three groups:

- from wealthiest third (**top one third**) has **40% of the wealth** (yellow),
- next wealthiest (**middle one third**) has **50%** (red), and
- down to the poorest third (**bottom one third**) has **10%** (blue), which totals 100% (40% + 50% + 10%).

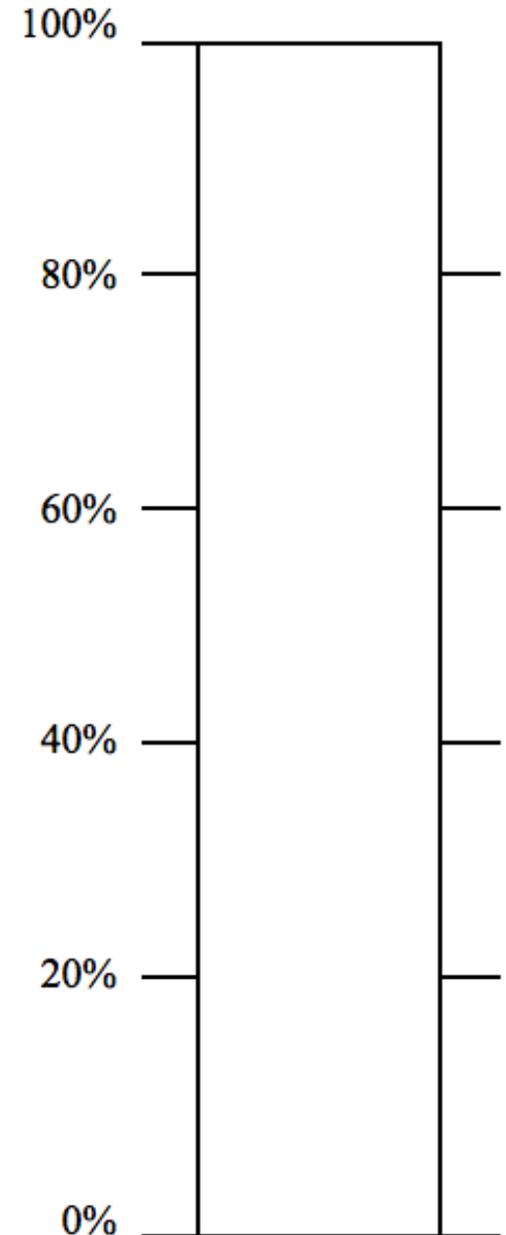
Example Stacked Chart:



Activity 3: Continued:

- Divide the first stacked chart (100% of the wealth in U.S.) into three groups representing the **current wealth distribution**:
 - from wealthiest third (**top one third**): **yellow**;
 - next wealthiest (**middle one third**): **red**;
 - down to poorest third (**bottom one third**): **blue**.
- This will be your estimate.

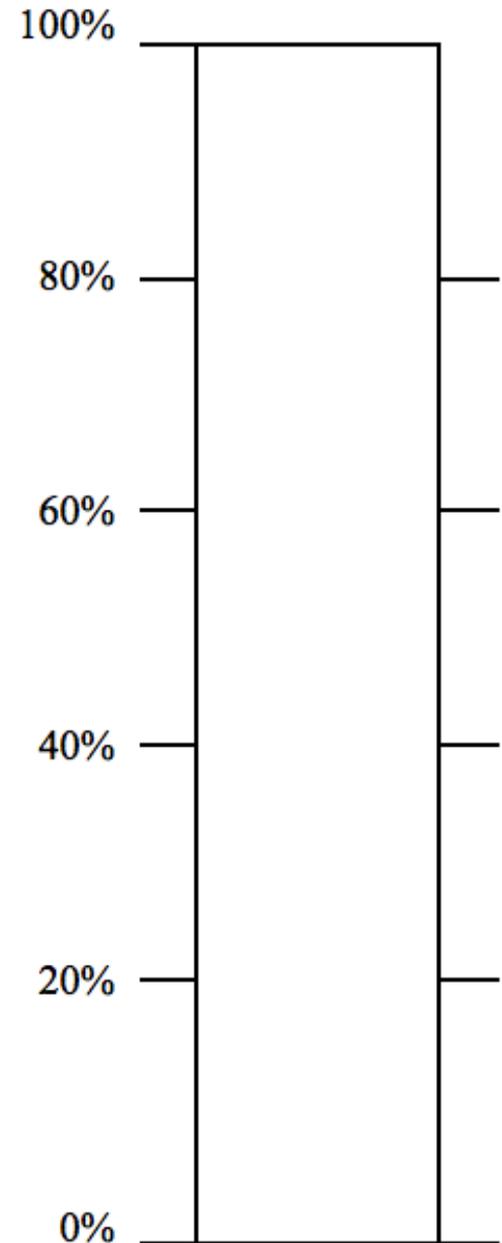
First Stacked Chart:



Activity 3: Continued:

- Similarly, in the second stacked chart, estimate what you think should be the **ideal wealth distribution in the U.S.**
 - from wealthiest third (**top one third**): **yellow**;
 - next wealthiest (**middle one third**): **red**;
 - down to poorest third (**bottom one third**): **blue**.
- This will be your estimate of the ideal wealth distribution.

Second Stacked Chart:



Activity 3: Continued:

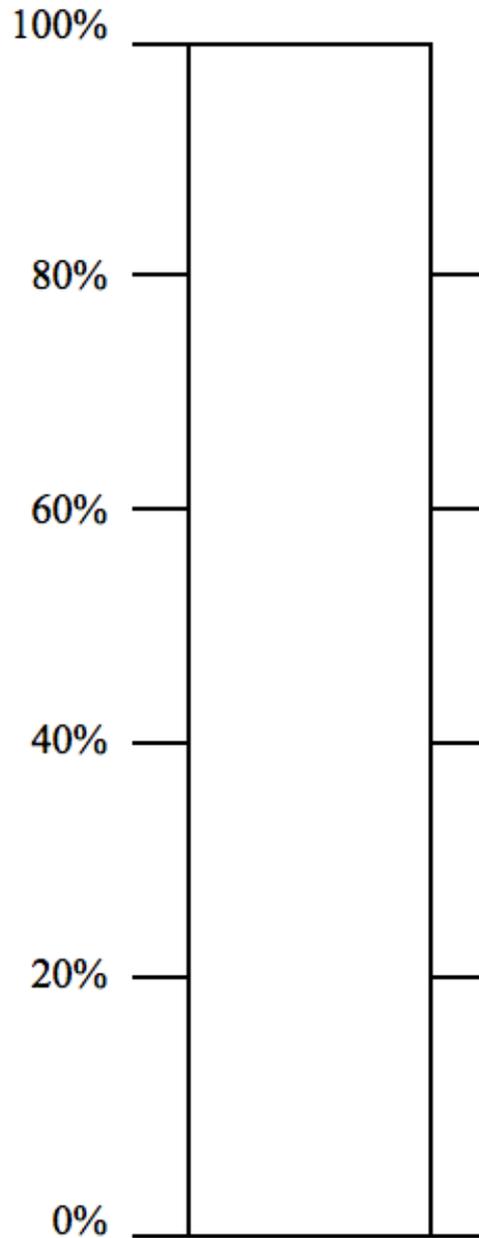


- How do the two charts you made compare?

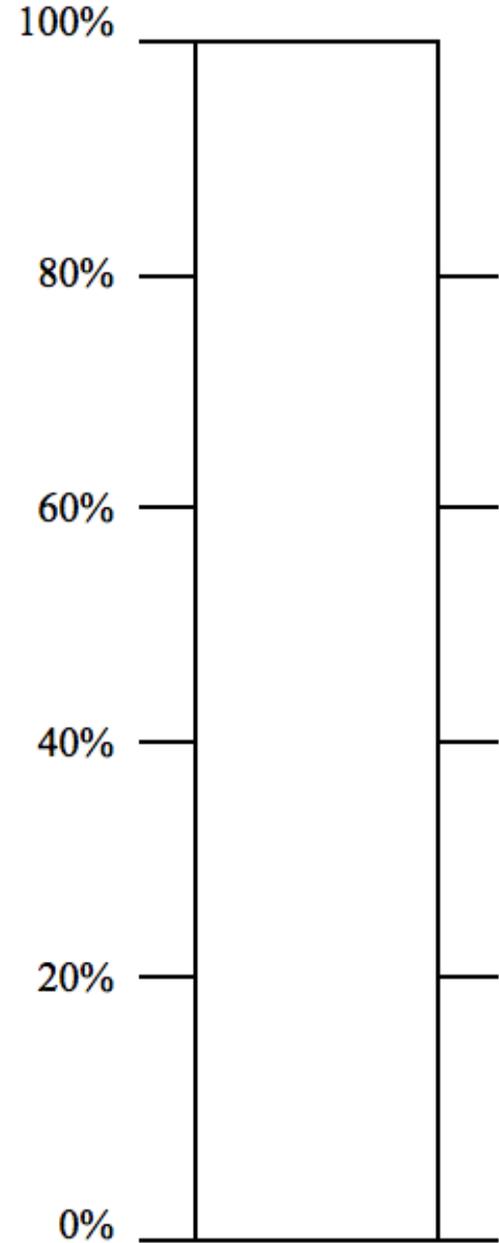
- Compare your charts with the charts of another person. How do they compare?

- Would you make any changes? Explain.

First Stacked Chart:



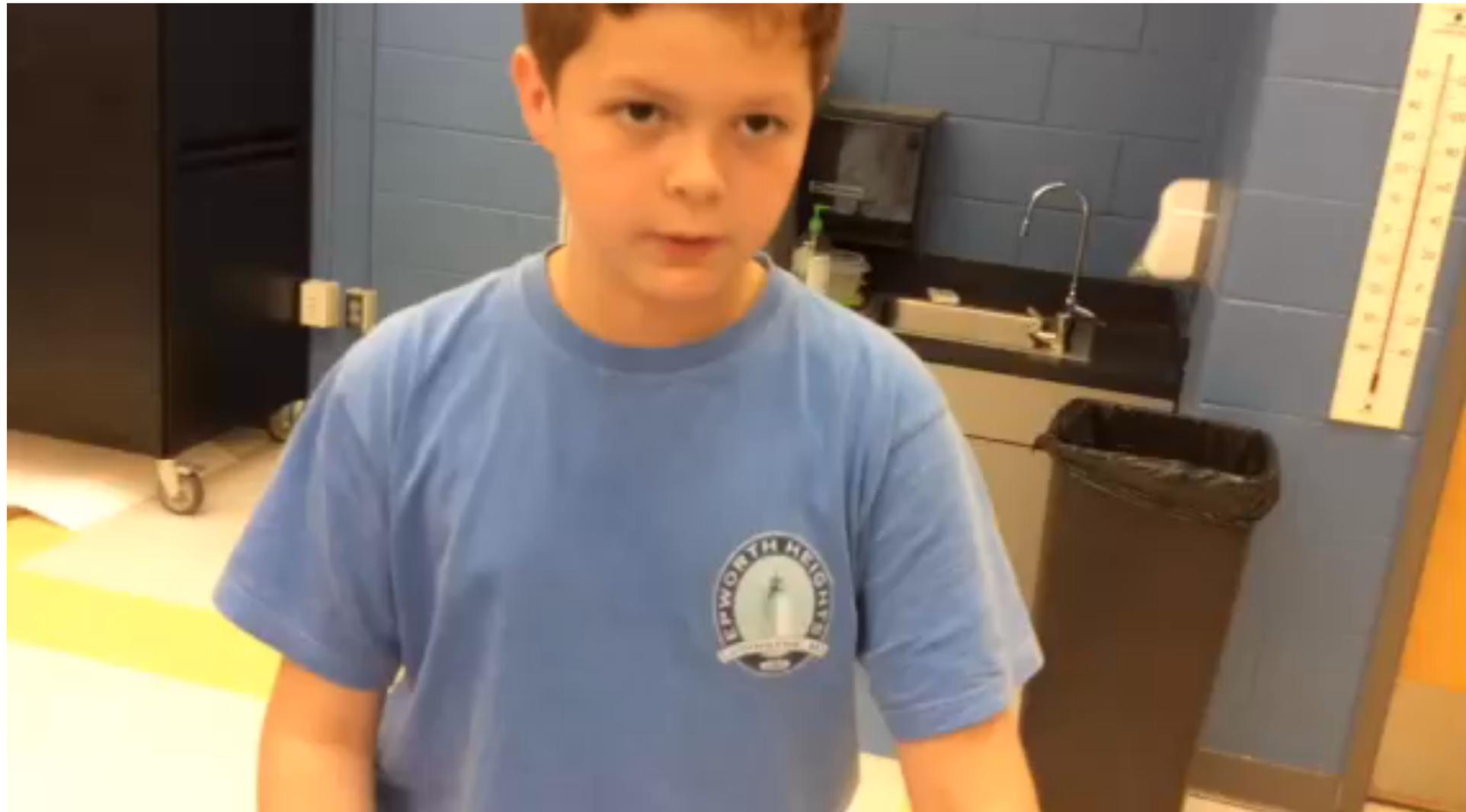
Second Stacked Chart:



Students' answers for Activity 3

What it is			Ideal		
Top	Middle	Bottom	Top	Middle	Bottom
20	40	40	40	10	50
20	30	50	10	70	20
20	50	30	33	34	33
20	50	30	50	30	20
20	60	20	30	50	20
30	60	10	Middle 100%		
30	60	10	Middle 100%		
30	50	20	20	60	20
30	70	0	40	40	40
35	53	12	Middle 100%		
40	40	20	40	30	30
40	20	40	20	30	50
45	50	5	40	58	2
50	30	20	33.33	33.33	33.33
50	30	30	30	40	30
50	40	10	40	30	30
50	25	25	35	33	32
55	35	10	30	40	30
60	20	20	70	20	20
60	28	12	55	25	20

Activity 3: Student 1



Activity 3: Student 2



Activity 4: Wealth Distribution Around the World

- In pairs, you need to work on 5 to 10 countries in terms of their economy and complete the information in Table 2. The following website has the necessary information for this purpose. You also need to prepare a short report for the whole class (see Table 3).
- You need to select a country, then select “**More Facts and Figures**” for that country. Of special importance is the “**Economy summary**” for that country.
 1. Fill in the table below with information for the selected countries?

Activity 4: Continued:

- Important definitions (The World Bank Group, (2015). GDP Per capita. Retrieved from <http://data.worldbank.org/indicator/NY.GDP.PCAP.CD>)
 - **GDP:** It is how much a country produces in some amount of time (for example, in a year). To know the GDP of a country, you need to add up [consumer spending](#), [investment spending](#), [government spending](#) and the value of the [exports](#) and subtract the value of the [imports](#). This measure is often used to find out how healthy a country is, in an economic way. In other words, a country with a high value of GDP can be called a large economy. The higher the GDP the better for the country.
 - **Per Capita: GDP per capita** is the total income of a [country](#), divided by the number of inhabitants. It shows how much money people make on [average](#) at work. The higher the per capita the better it is for the economy.
 - **Unemployment rate:** It is is a measure of the prevalence of **unemployment** and it is calculated as a percentage by dividing the number of **unemployed** individuals by all individuals currently in the labor force. During periods of recession, an economy usually experiences a relatively high **unemployment rate**. The lower it is the better it is for a country (more people have jobs), but this might depend on the type of jobs in terms of high paying or low paying jobs.
 - **Recession:** It is a period of temporary economic decline during which trade and industrial activity are reduced, generally identified by a fall in GDP in two successive quarters (three-month period). For example, there is less activity in the selling and buying of houses or food.
 - **Inflation:** It is a general increase in prices and fall in the purchasing value of money. You can buy less with your money. For example, you can buy less food with the same amount of money you usually spent before.

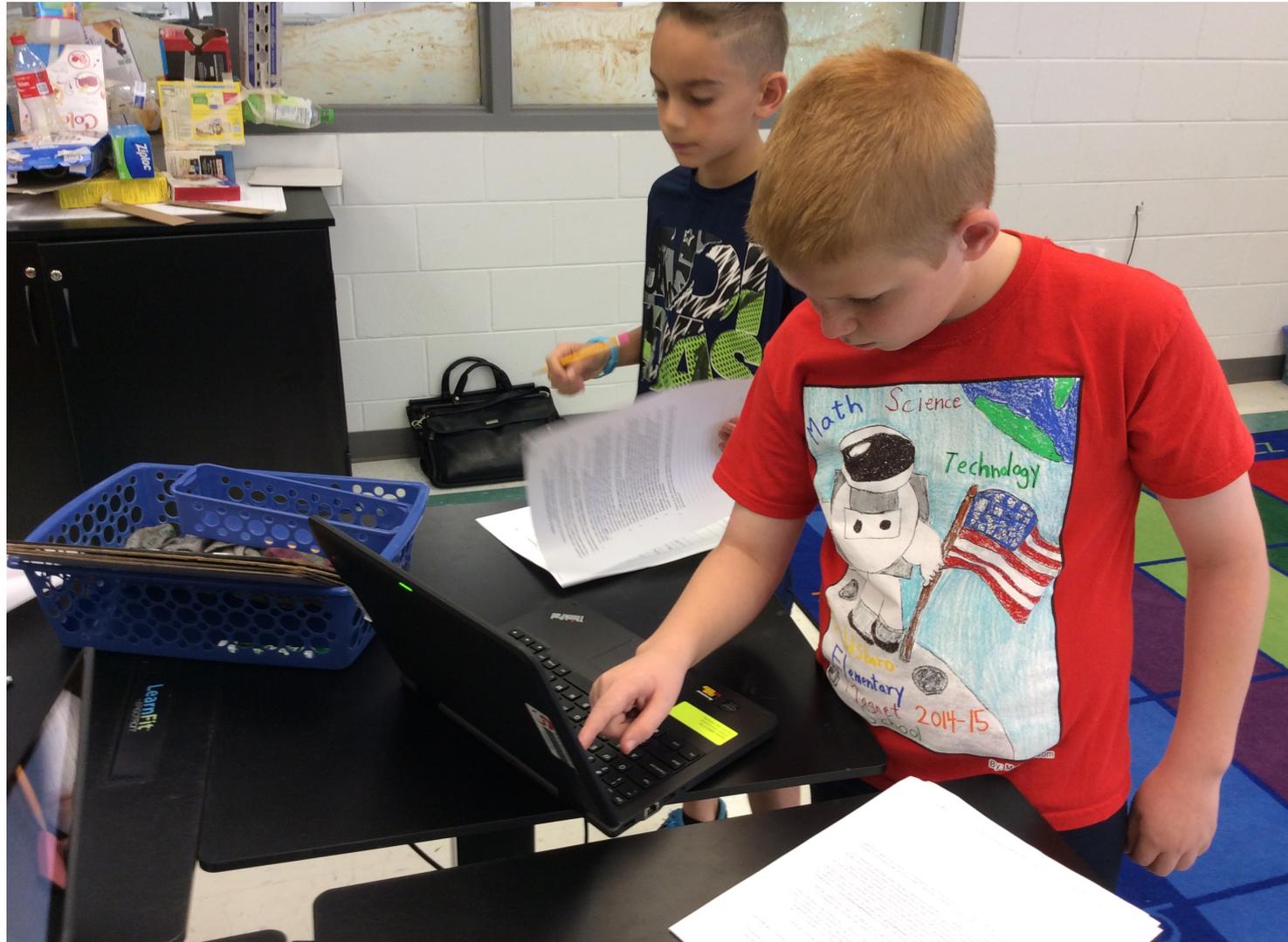
Activity 4: Continued:

Table 2. Economy Summary

Country	GDP	Per Capita	Unemployment	Other

2. Based on the information you collected in Economy Summary Table, how do the different countries you select compare with each other? Do you think there are differences in terms of wealth or wealth distribution?

Students used computers to find information in pairs



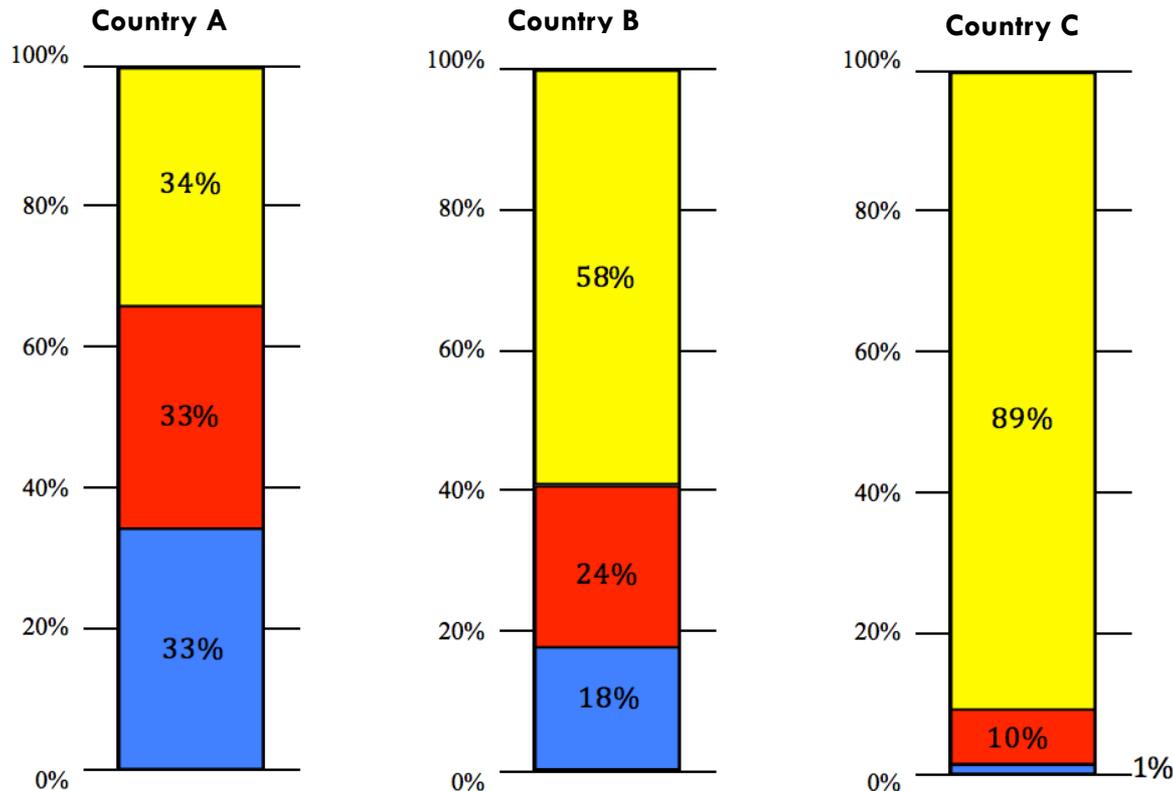
Activity 4: Continued:

Table 3. Countries of the World: Infoplease (2015) <http://www.infoplease.com/countries.html>

A	Afghanistan Albania Algeria Andorra Angola	Antigua & Barbuda Argentina Armenia	Australia Austria Azerbaijan
B	Bahamas Bahrain Bangladesh Barbados Belarus Belgium	Belize Benin Bhutan Bolivia Bosnia & Herzegovina Botswana	Brazil Brunei Darussalam Bulgaria Burkina Faso Burma (Myanmar) Burundi
C	Cambodia Cameroon Canada Cape Verde Central African Republic Chad	Chile China Colombia Comoros Congo Congo, Democratic Republic of the	Costa Rica Côte d'Ivoire Croatia Cuba Cyprus Czech Republic
D	Denmark Djibouti	Dominica	Dominican Republic
E	Ecuador East Timor Egypt	El Salvador England Equatorial Guinea	Eritrea Estonia Ethiopia

Activity 5: Wealth Distribution Around the World Quiz

These stacked charts represent the distribution of wealth in three different places (see Fig. 1 below, wealth distribution for three countries).



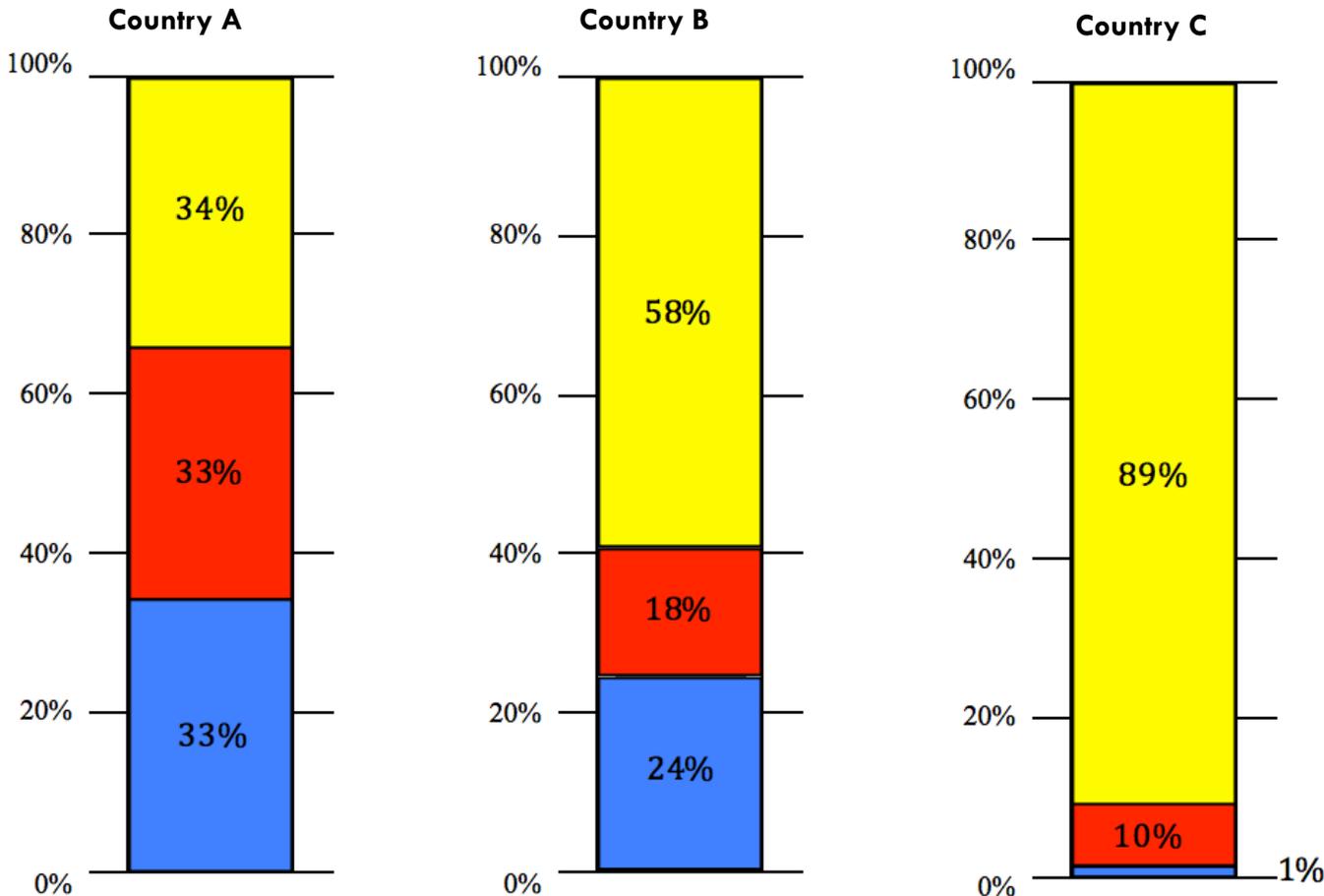
In terms of wealth, each section of the stacked chart represents the proportion of wealth held by one third (about 33.3 to 34%) of the population in the country:

- from wealthiest third (**top one third**): **yellow**;
- next wealthiest (**middle one third**): **red**;
- down to poorest third (**bottom one third**): **blue**.



Activity 5: Continued:

These stacked charts represent the distribution of wealth in three different places (see Fig. 1 below, wealth distribution for three countries).

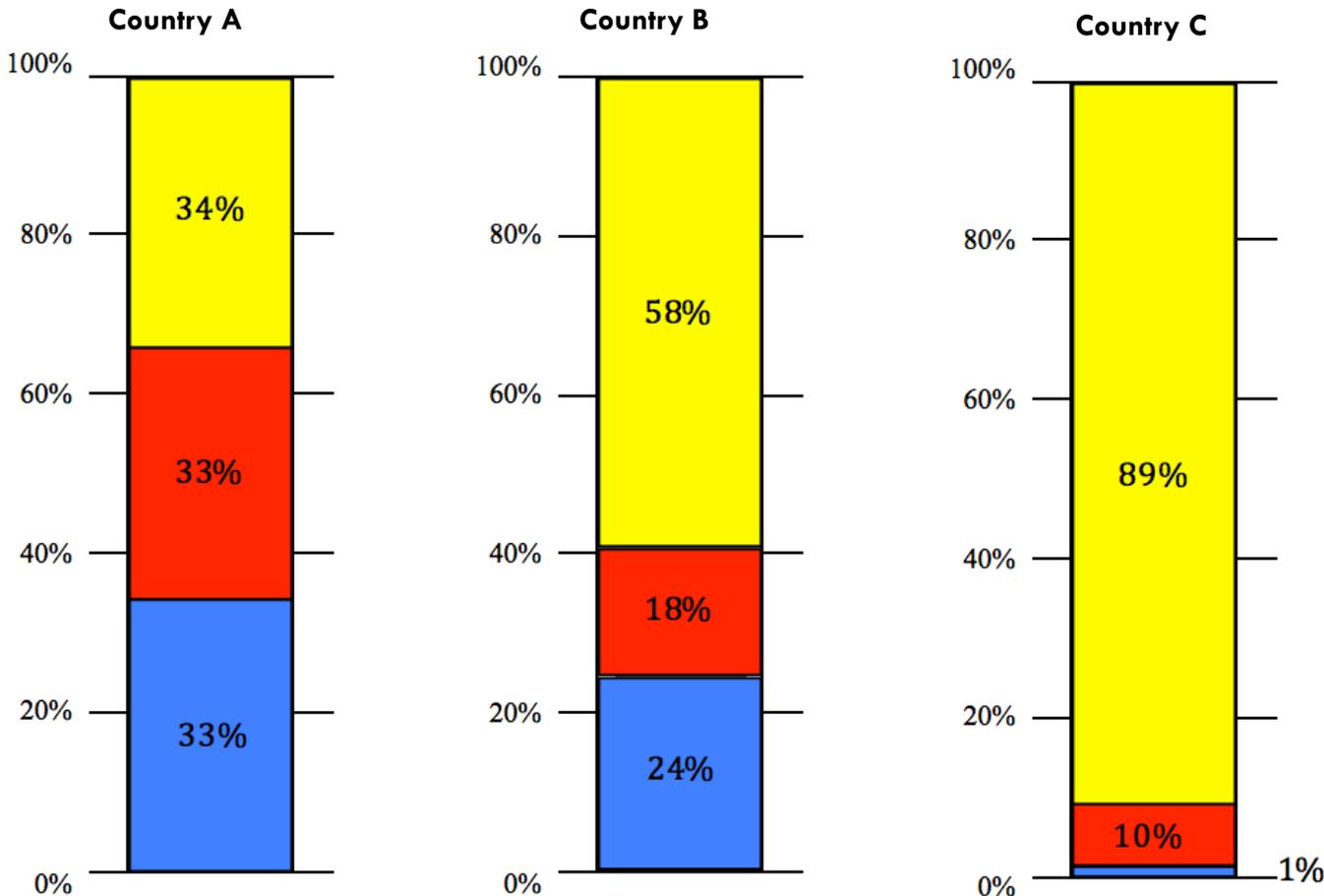


Which country do you think is represented by each section of the stacked chart? Write your answer in the space provided. **See Table 1 for possible countries.**

- Stacked chart for Country A represents _____
- Stacked chart for Country B represents _____
- Stacked chart for Country C represents _____

Activity 5: Continued:

These stacked charts represent the distribution of wealth in three different places (see Fig. 1 below, wealth distribution for three countries).



2. Based on your choices, which of these countries (Country A, Country B or Country C) would you like to live in and why? Select one of the following.

- Country A
- Country B
- Country C

3. Why would you like to live in this country?

4. Why would you like to live in this country?

Students' Answers to Activity 5:

Line in:	Why
A	I would like to live here because it is a good place to live here and it has 42,00 per capita and it has a great unemployment rate.
A	I would enjoy living in Cambodia because the social skills people would have would be amazing because their wouldn't be a lot of rich people there to brag to.
A	I would like to live in Kenya because there the wealthiest and the per capita is high also their unemployment rate is low.
A	I would like to live in Zimbabwe because I want to stay in a not to wealthy but it does not have very low wealthy state.
A	Because it is very fair and every one has about the same wealth.

Students' Answers to Activity 5: Cont.

Line in:	Why
B	I would like to live in this country because it has a per capita of 43,360, and GDP of 1,785,383,649,602.2.
B	I would like to live at this country because it isn't too rich or poor.

Students' Answers to Activity 5:

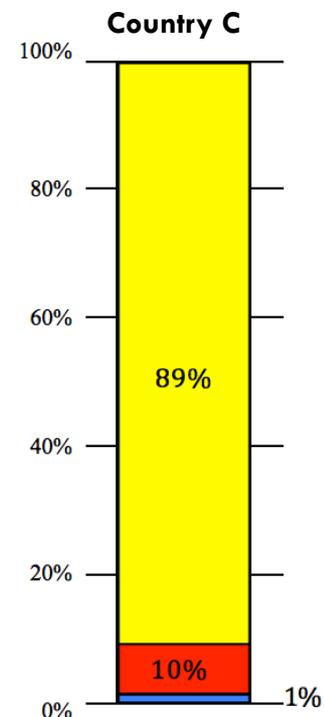
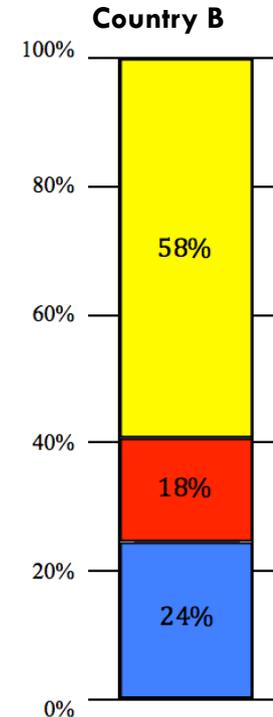
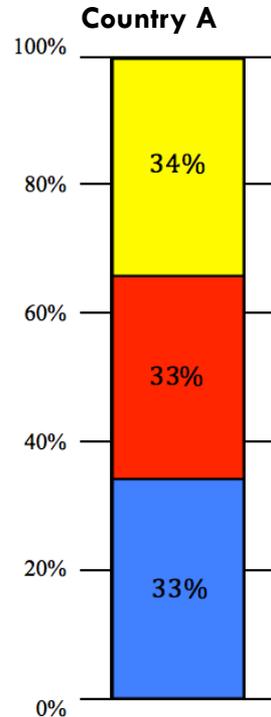
Line in:	Why
C	The economy is great, people get good pay.
C	I would like to live in Finland because it has the best quality which has 89% and it has 14.18 billion.
C	I would like to live in this country because 89% of the country receives more income than the other countries.
C	Because 89% of the wealth is given to the inhabitants while the other countries would get less spending money.
C	-
C	Because of the cold weather and the money.
C	This place has a lot of money coming in the top third while the bottom third is making very little money.
C	If I would live in country C there would be better of being wealthy since greater amount of people are wealthy.
C	I would live in this country because the country is wealthy and you get a lot of money.
C	I would like to live live in Kenya because it have a kind of high unemployment rate and have a higher per capita.
C	Country C because I would get more ... money and because it is wealthy.
C	Because Finland is the wealthiest and that means it has a better ...

Activity 6: Correct Answer for Wealth Distribution Around the World Quiz

Look at your answers in activities 4 and 5, and answer the following question.

1. The correct answer for each country was:

- Stacked chart for Country A represents 'Freedonia' (an equality utopia that does not exist)
- Stacked chart for Country B represents Sweden.
- Stacked chart Country C represents the United States.



a. Were you surprised by these answers? ___ Yes ___ No

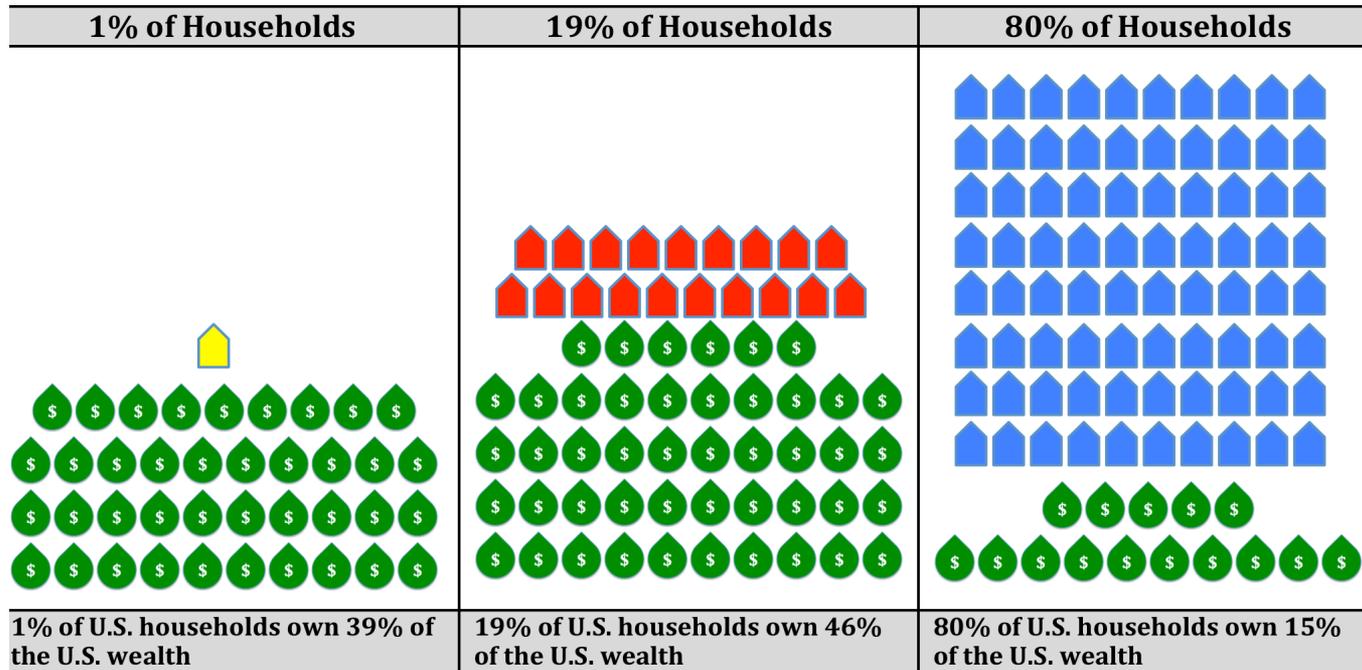
b. Why? _____

2. What countries did your class identify for each stacked chart? Indicate how many students selected each country. Country A: _____ Country B: _____ Country C: _____

Activity 6: Continued:

3. What percent of the students in your class indicated that they wanted to live in Country C (which happens to be United States)?
 - a. Number of students who selected County C: _____
 - b. What do you think about this finding? _____
 - c. What percent of your class did not what do live in Country C? Percent: _____
 - d. What do you think about their answer? _____
4. What are your general reactions to the findings in this activity? _____
5. Look at your second stacked chart for Activity 3: Perceptions of Wealth Distribution. How does it compare with the stacked chart for Country C, which is the one for United States?

Activity 7: Wealth Distribution in the United States



Note:

- Each  = 1% of the Wealth in U.S.
- **yellow** = wealthiest third (**top one third**)
- **red** = next wealthiest (**middle one third**)
- **blue** = poorest third (**bottom one third**)

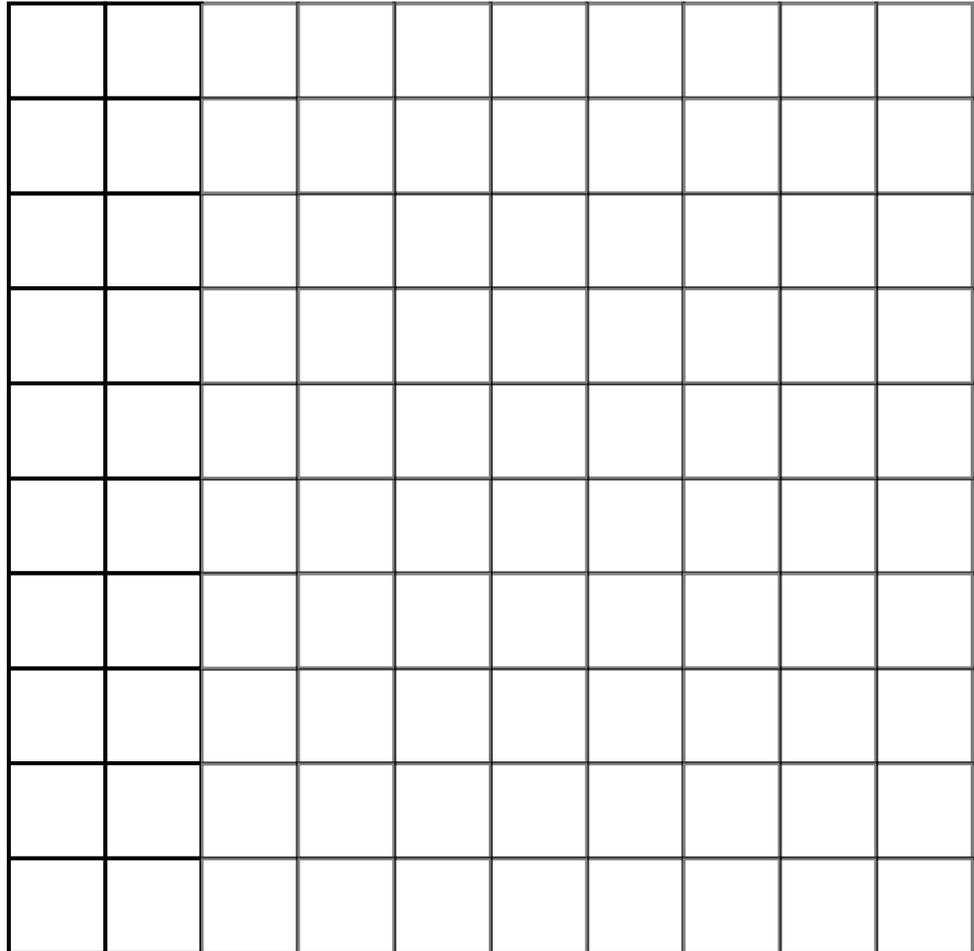
Adapted from Gutstein, E. (2006). Reading and writing the world with mathematics: Toward a pedagogy for social justice. NY: Routledge.

Activity 7: Continued:

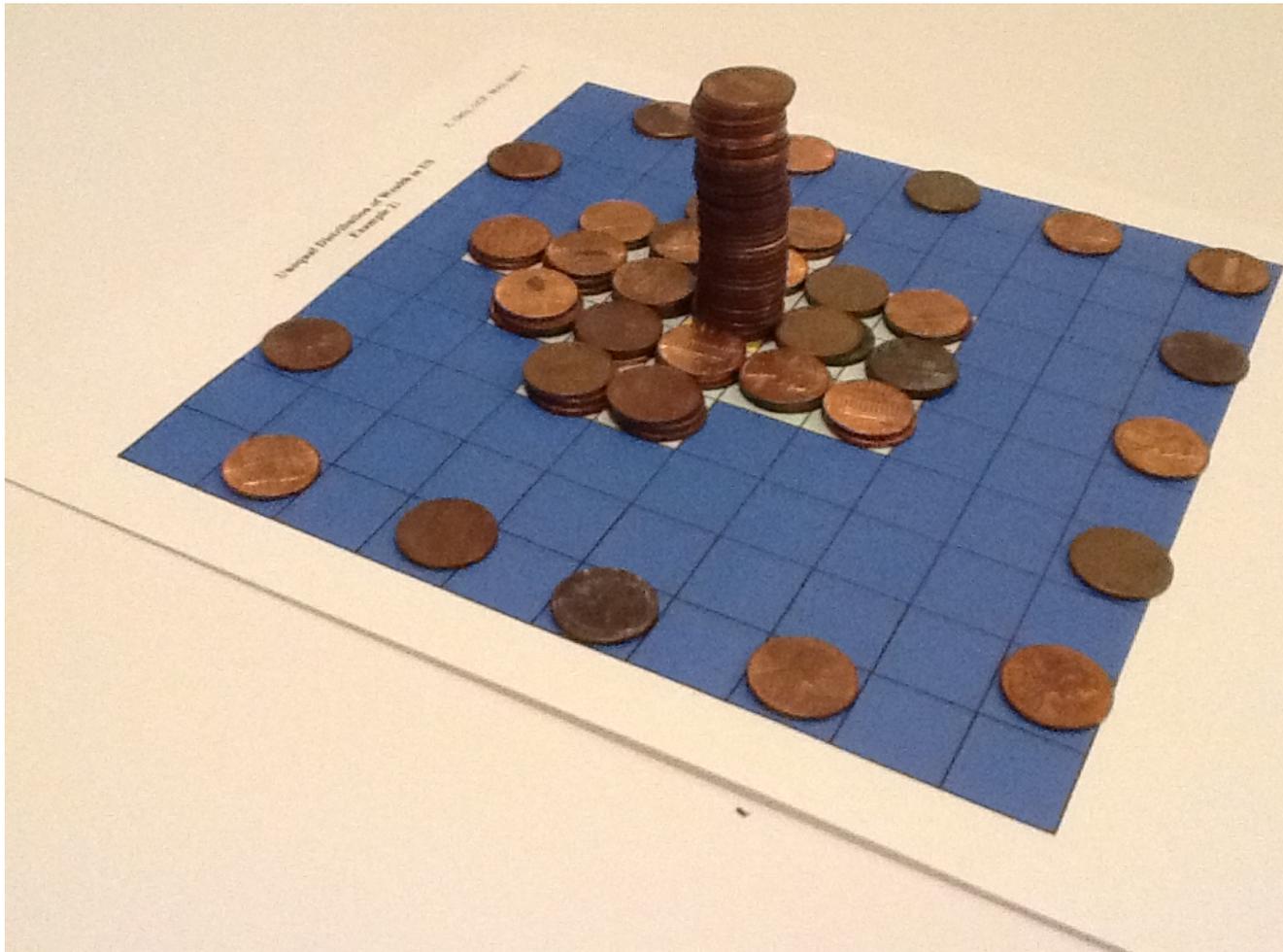
1. First divide the 10 x 10 grid in three regions by coloring each with different colors:

- 1 square = richest 1%
- 19 squares = the next richest 19%
- 80 square = the remaining 80% of families

2. Next divide the pennies into three piles: 39 for the richest region, 46 pennies for the next region, and 15 pennies for the third region. You may use your own selection of colors and arrangement of squares, as long as you keep the same amount for each group. See example.

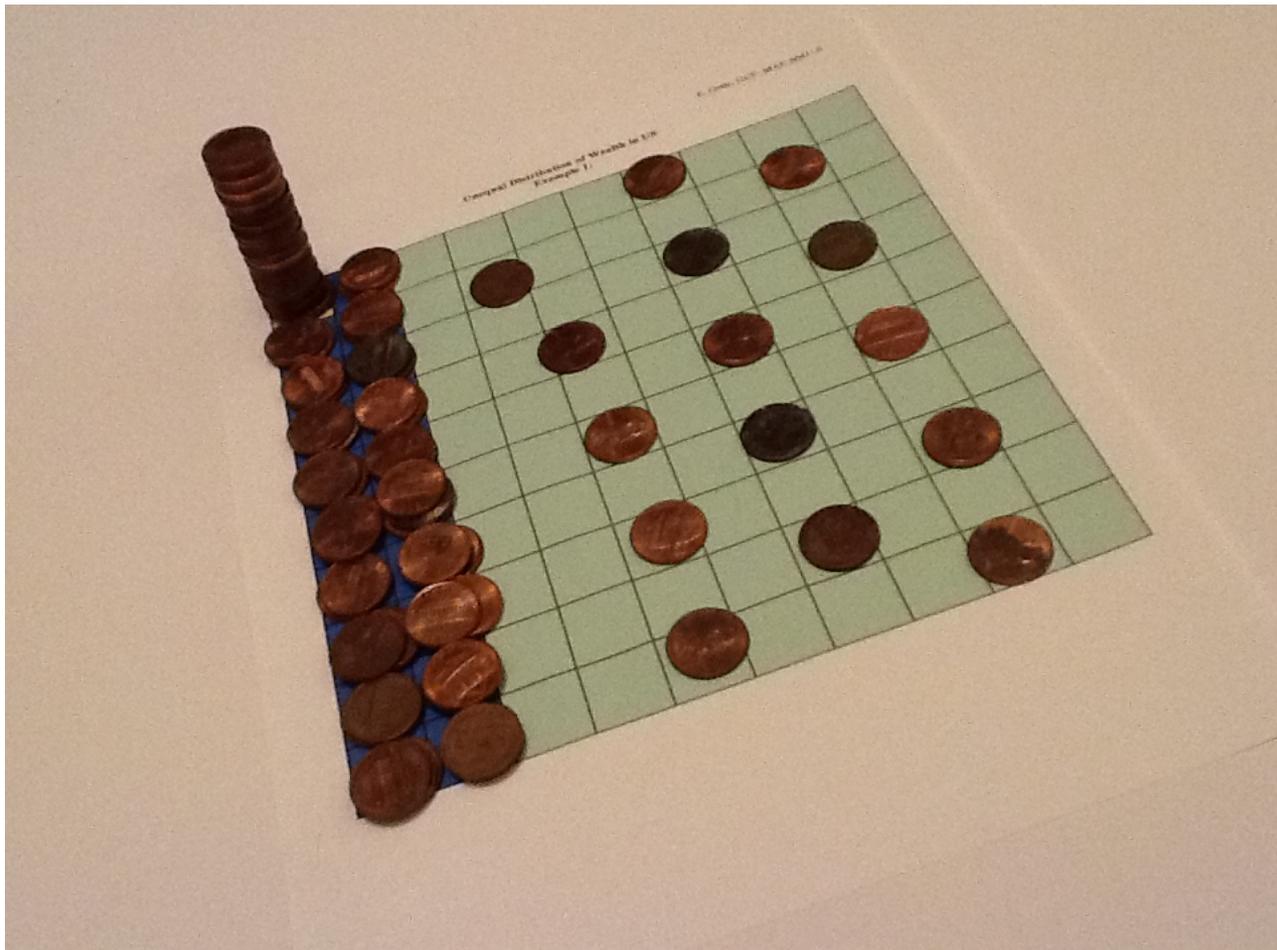


Activity 7: Continued: Example 1:



TMfSJ Activities: Continued: Example 2:

Unequal Distribution of Wealth in the United States



The Challenge

- So, the next time you pick up a textbook and consider giving your students a mathematics story problem, ask or keep asking yourself these question:
 - ▣ What issues are hidden in the context of the situation or problem?
 - ▣ Is this the context I want my students to explore, or is there a more meaningful way for me to address the mathematics while deepening students' understandings of both the world they live in and the role this subject plays in it?

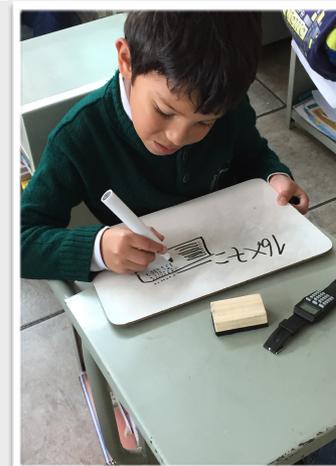
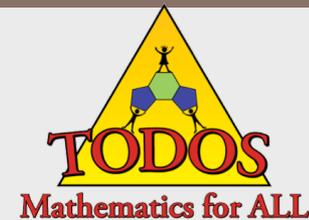
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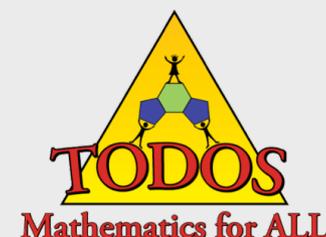
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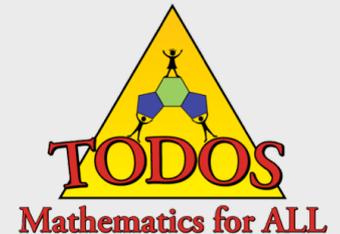


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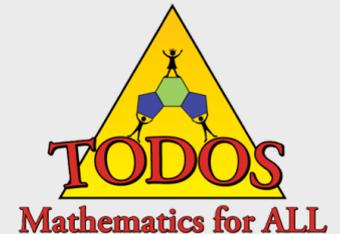
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