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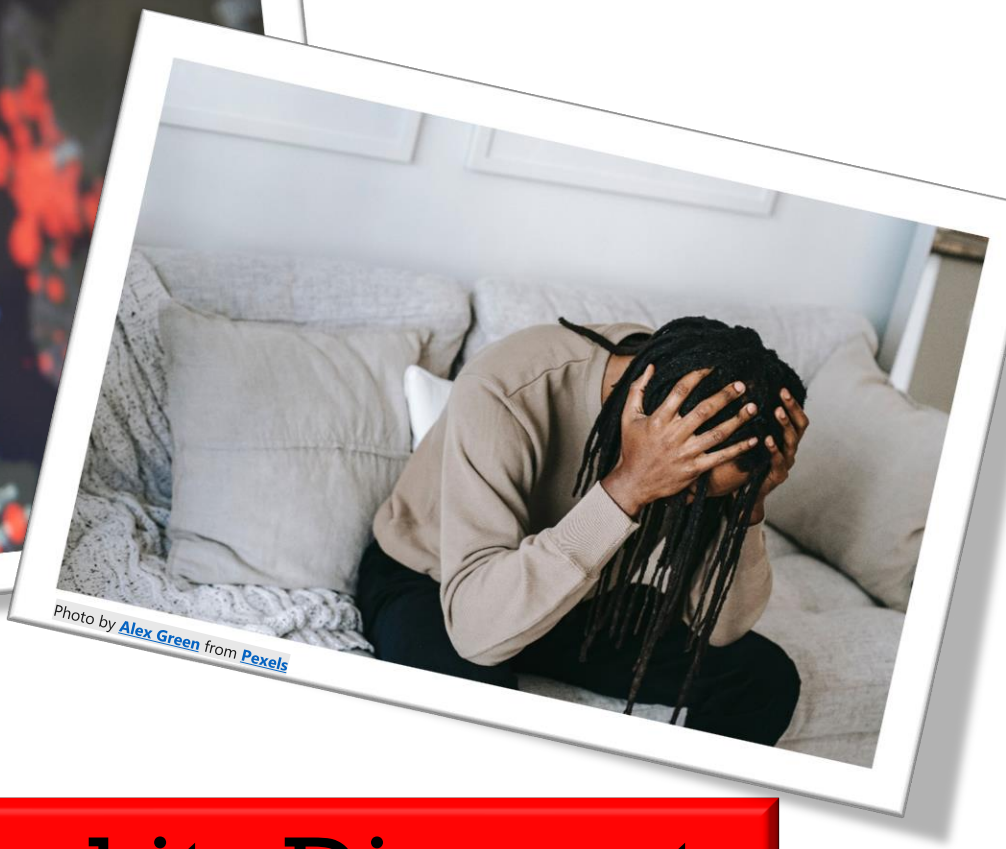
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COVID-19 and its Disparate Impact on Black Families

In the year 2020, we have seen COVID-19 bring the entire world to a halt, upending stability in families, communities, and economies all over the globe. If we take a closer look, though the impacts have been global in scale, data suggests that the virus has disproportionately affected people belonging to racial or ethnic minority groups (Price-Haywood et al.,2020; Stokes et al., 2020). In the United States, though African Americans comprise only 13% of the country's population, as of June 2020 about 30% of the COVID-19 cases in the US were African Americans, whereas their White counterparts accounted for only 9% of the total number of cases, as reported by the Centers of Disease Control and Prevention (Poteat et al., 2020).

Furthermore, there exists a stark difference between the mortality rate of the African American community and the White community. According to the APM Research Lab (2020), as of July 22, 2020, for every 100,000 Americans, about 74 back people died due to COVID-19 compared to 32 Whites, thus indicating that the mortality rate of the African Americans significantly stands taller than the mortality rate of White Americans.

COVID-19 has widely exposed economic and social disparities that have dug their trenches in our society long ago. It often takes adversity to bear the absolute truth and in 2020, COVID-19 is that stark adversity that did so.

In the US, most of the low-income jobs are held by people of color. Usually, these low paying jobs, which include jobs in retail, hospitality, and childcare, have limited opportunity to work remotely (Brown, 2020). According to the Bureau of Labor Statistics, before COVID 19 only 19.7% of the jobs held by African Americans were fit for remote operation, compared to 30% of the jobs held by White people (Gould & Shierholz, 2020). Furthermore, people of color working in low-income jobs have limited access to health insurance, due to which they are at higher risk in matters of health (getting timely as well as quality healthcare), and are thus more vulnerable to the virus causing COVID-19 due to the necessity for in-person attendance at their essential jobs.

Another factor leading to a disproportionate number of African American people being affected by COVID-19 is the stark wealth disparity between the White and the Black families. According to the US Census Bureau report, in 2018 where only 8% of White people lived under the poverty line, the percentage of African American people living under the poverty line was 21% (Semega et al., 2019). According to the Racial Wealth Divide Report (Collins et al., 2018)., the median White household has 41 times more

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Lesson: Racial Earning Inequality

This lesson is designed to engage students in a discussion around the disproportionate impact of COVID-19 on the African American community. Students will apply their prior knowledge of plotting ordered pairs and percentages to explore and compare the real median earnings of White males, White females, Black males, and Black females from 2007 to 2017. Hopefully, the lesson will enable students to reflect on how earning inequality across the different ethnic/racial groups left one more vulnerable to the pandemic over the others. Further, students will use their critical thinking skills and problem-solving strategies as they apply and attain mathematical content knowledge. Teachers are invited to modify the lesson based on the anticipation of their students' prior knowledge and experience.

Resources and Materials (In order of their appearance during the lesson)

- Video: COVID-19 Pandemic: Why are African Americans more affected by the virus? https://www.youtube.com/watch?v=dhP1fdrBjrQ
- Grouping Guidelines
- Worksheet 1, Real median earnings of full-time, full-year White male workers, 2007–2017 (For students belonging to group 1)
- Worksheet 2, Real median earnings of full-time, full-year Black male workers, 2007–2017 (For students belonging to group 2)
- Worksheet 3, Real median earnings of full-time, full-year White female workers, 2007–2017 (For students belonging to group 3)
- Worksheet 4, Real median earnings of full-time, full-year Black female workers, 2007–2017 (For students belonging to group 4)
- Graph paper (1 piece per student)
- Stationary: Pencils, rulers, colored pens, erasers.
- A-4 size papers for creating flyers.

as the sum of assets held by a family minus total household debt) than the median Black family, thus keeping the latter less prepared for unprecedented situations such as COVID-19. A sudden stoppage in income can have more drastic impacts on the ones below the poverty line as compared to the ones who benefit from higher levels of income. People working in lower-paying and less stable jobs have limited options to take time off of their work and are at a higher risk of exposure to the virus causing COVID-19. It certainly raises the ugly questions on survival versus making oneself available for the jobs, and no option to stay away from exposing themselves to the virus. The Benjamin Banneker Association, Inc. (BBA) defined social justice curriculum as lessons that would "facilitate students' critical examination of the world and critical consumption of information and engage the larger community beyond the classroom walls" (2017, p. 2). They further added, "When students are taught mathematics through the thoughtful implementation of a social justice curriculum, they have learned not only mathematics concepts and skills, but more importantly they… are empowered to apply this knowledge and other skills to examine additional cultural and societal phenomena" (BBA, 2017, p. 5). Consistent with BBA's position statement, the lesson we share here, targeted at upper elementary or lower middle grades, was developed to examine the issue of income inequality across the different ethnic/ racial groups, especially African Americans and the Whites, that left one group more vulnerable to the pandemic over the others.

The lesson will focus on the real median earnings of White males, White females, Black males, and Black females fromsis),

Launch (20 minutes)

1. Show students the video COVID-19 Pandemic: Why are African Americans more affected by the virus? The video shows how COVID-19 has disproportionately affected the African American community.
2. Ask students to note down what they notice and wonder while watching the video.
3. Facilitate a whole-class discussion asking students to share what they noticed in the video. Teachers might like to ask the following questions to guide the discussion:
    a. *What is the video all about?*
    b. *What did you find most compelling about the video?*
    c. *What are some of the reasons because of which African American people are disproportionately affected by COVID 19?*

Explore (90 minutes)

Part 1. Divide the students into four groups: Group 1, Group 2, Group 3, Group 4.

1. Give each student a worksheet and a graph paper.
    a. *Give worksheet 1 to Group 1: real median earnings of full-time, full-year White male workers, 2007–2017*
    b. *Give worksheet 2 to group 2: real median earnings of full-time, full-year Black male workers, 2007–2017*
    c. *Give worksheet 3 to group 3: real median earnings of full-time, full-year White female workers, 2007–2017*
    d. *Give worksheet 4 to group 4: real median earnings of full-time, full-year Black female workers, 2007–2017*

(2) at any given point of time, how the real median earnings of one group, say White males, has different from the real median earnings of the other group, say Black females (vertical analysis). The lesson would demand students to analyze the patterns in a given set of data and mathematical graphs, examine the connections between them and reflect on how people belonging to certain racial/ ethnic groups are victims of deep-rooted systemic inequities and unfair practices, over the others (Frankenstein, 1999; Gutstein, 2005). We hope that as students would engage deeply in this research, they would identify themselves in the data, see a neighbor, an acquaintance, or two in it, and would initiate an interesting and provocative conversation around income inequality and its longstanding impact on people's health and social lives. Although we have not yet had the opportunity to implement this lesson, we are hopeful that it will help students to develop a shared understanding of the disparate impact of COVID-19 on the African American community and the causes behind it. The introductory video will straightaway introduce students to the topic and provide them an opportunity to reflect on the different factors that might make African American people working in low-income jobs more vulnerable to the virus compared to the others. To develop a data-driven argument on the topic, students will apply their mathematical reasoning of graphs and percentages and compare the real median earnings of White and Black males and females over the past ten years. We hope that the mathematical activity would provide students a platform to identify the long-lasting social issue of earning inequality and recognize its connection to the present unprecedented situation.

2. Ask students belonging to each group to check the real median earnings of their corresponding population, from 2007 to 2017, and plot the year-real median earning ordered pairs on the graph paper.
3. Next, ask students to focus on the graphs and analyze how the real median earnings of their corresponding population have changed from 2007 to 2017.
4. As each group analyzes the graph, ask them to consider the following guiding questions:
    a. *How the earnings of your population changed from 2007 to 2017?*
    b. *Look at the graph and identify the time (in years) when the change in real median earnings of your population is maximum.*
    c. *Calculate the (maximum) percentage of change in real median earnings of your population.*
    d. *What is the percentage of change in real median earnings from 2007 to 2017?*

Part 2. After the first part of the exploration is complete, regroup the students in the following manner:

Group A: Put students from group 1 and group 2 together. If the group size is too big, split Group A into two subgroups. Make sure that students from group 1 and group 2 are evenly represented. Students belonging to both the subgroups would do the same work.

Group B: Put students from group 3 and group 4 together. If the group size is too big, split Group B into two subgroups. Make sure that students from group 3 and group 4 are evenly represented. Students belonging to both the subgroups would do the same work.

Ask the students belonging to Group A to keep the graphs side by side (real median earnings of a full-time, full-year White male; real median earnings of a full-time, full-year Black male) and compare them. If students want, they can re-plot the income of both the groups one below the other using different colors.

Ask the students belonging to Group B to keep the graphs side by side (real median earnings of a full-time, full-year White female; real median earnings of a full-time, full-year Black female) and compare them. If students want, they can re-plot the income of both the groups one below the other using different colors.

As the groups analyze the graphs, ask them to consider the following guiding questions, and talk about their opinion with each other:

1. What do you observe?
2. <u>To Group A:</u>
    a. Examine the graphs and compare (in terms of percentage) the change in median earnings of White males and Black males from 2009 to 2010? (Justice 12, 13)
    b. In 2017, by what percentage the real median earnings of White males exceeded the real median earnings of Black males? (Justice 12, 13)
3. <u>To Group B:</u>
    a. Examine the graphs and compare (in terms of percentage) the change in median earnings of White females and Black females from 2009 to 2010? (Justice 12, 13)
    b. In 2017, by what percentage the real median earnings of White females exceeded the real median earnings of Black females? (Justice 12, 13)

Part 3. After the second part of the exploration is complete, regroup the students again in the following manner: each group will contain one student from group 1, group 2, group 3, and group 4. If any student is extra, the teacher can assign the student with another group as per their discretion.

Ask the students belonging to each group to keep all the four graphs side by side and compare them. If students want, they can re-plot the incomes of all the groups one below the other using different colors.

As each group analyzes the graphs, ask them to consider the following guiding questions:

1. What did you observe?
2. Looking at the shapes of the graphs, how would you interpret the change of median earnings for White males, Black males, White females, and Black females from 2007 to 2017? Explain your answer.
3. How are the earnings of Black males different from the income of White females? (Justice 12, 13)
4. How are the earnings of White males different from the income of Black females? (Justice 12, 13)
5. Compare the percentage of change of real median earnings of White males with the percentage of change of real median earnings of Black females. (Justice 12, 13)
6. Did any of the findings surprise you?

Summary and Taking Action (20 Minutes)

1. Facilitate a whole-class discussion prompting students to reflect on long-lasting systemic health and social inequalities, and the impact of the lesson on their understanding of systemic racial discrimination. Teachers might consider the following questions to guide the discussion:
    a. Based on your exploration of the real median earnings of people of different colors and genders, how would you relate income inequality to different people's vulnerability to COVID 19 or similar pandemic situations? (Justice 12 and 13)
    b. How does this lesson impact your understanding of systemic racial discrimination? (Action 17)
2. Ask the students to create a small poster/ flyer, containing information about the potential factors that might put African American people at an increased risk of contracting COVID (Action 17). Teachers might consider the following lines as part of the instruction:
3. Create a flyer that you might like to distribute amongst your friends and family members to make them aware of the disparate influence of COVID 19 on African American people. Include all the factors that might have contributed to such an unjust condition. Be creative, make the flyer brief yet informational.

Worksheet 1

Real median earnings of full-time, full-year White male workers, 2007–2017

Plot the real median earnings of the White male workers from 2007 to 2017 and discuss in your group the following questions:

1. *How the earnings of White male workers changed from 2007 to 2017?*
2. *Look at the graph and identify the time (in years) when the change in real median earnings of White male workers is maximum.*
3. *Calculate the (maximum) percentage of change in real median earnings of the White male workers.*
4. *What is the percentage of change in real median earnings from 2007 to 2017?*

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Real median Earning	59,649	58,469	58,874	58,544	57,146	56,193	57,250	57,493	59,188	59,171	60,388

Source: https://www.epi.org/blog/black-workers-have-made-no-progress-in-closing-earnings-gaps-with-white-men-since-2000/

Worksheet 2

Real median earnings of full-time, full-year Black male workers, 2007–2017

Plot the real median earnings of the Black male workers from 2007 to 2017 and discuss in your group the following questions:

1. *How the earnings of Black male workers changed from 2007 to 2017?*
2. *Look at the graph and identify the time (in years) when the change in real median earnings of Black male workers is maximum.*
3. *Calculate the (maximum) percentage of change in real median earnings of the Black male workers.*
4. *What is the percentage of change in real median earnings from 2007 to 2017?*

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Real median Earning	42,746	42,583	42,944	41,513	43,127	41,197	42,160	42,204	42,530	42,181	42,076

Source: https://www.epi.org/blog/black-workers-have-made-no-progress-in-closing-earnings-gaps-with-white-men-since-2000/

Worksheet 3

Real median earnings of full-time, full-year White female workers, 2007–2017

Plot the real median earnings of the White female workers from 2007 to 2017 and discuss in your group the following questions:

1. *How the earnings of White female workers changed from 2007 to 2017?*
2. *Look at the graph and identify the time (in years) when the change in real median earnings of White female workers is maximum.*
3. *Calculate the (maximum) percentage of change in real median earnings of the White female workers.*
4. *What is the percentage of change in real median earnings from 2007 to 2017?*

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Real median Earning	43,549	42,673	44,132	45,392	44,057	43,761	43,549	43,347	44,556	46,725	46,513

Source: https://www.epi.org/blog/black-workers-have-made-no-progress-in-closing-earnings-gaps-with-white-men-since-2000/

Worksheet 4

Real median earnings of full-time, full-year Black female workers, 2007–2017

Plot the real median earnings of the Black female workers from 2007 to 2017 and discuss in your group the following questions:

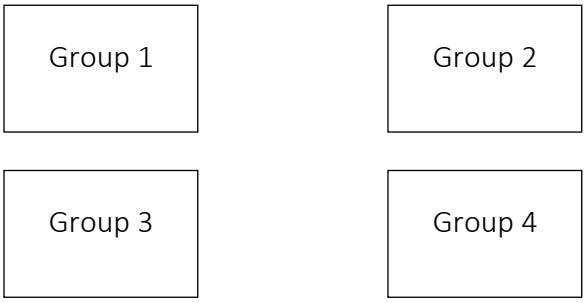
1. *How the earnings of Black female workers changed from 2007 to 2017?*
2. *Look at the graph and identify the time (in years) when the change in real median earnings of Black female workers is maximum.*
3. *Calculate the (maximum) percentage of change in real median earnings of the Black female workers.*
4. *What is the percentage of change in real median earnings from 2007 to 2017?*

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Real median Earning	36,751	35,939	36,448	36,396	36,593	36,244	35,069	34,756	37,459	37,006	36,735

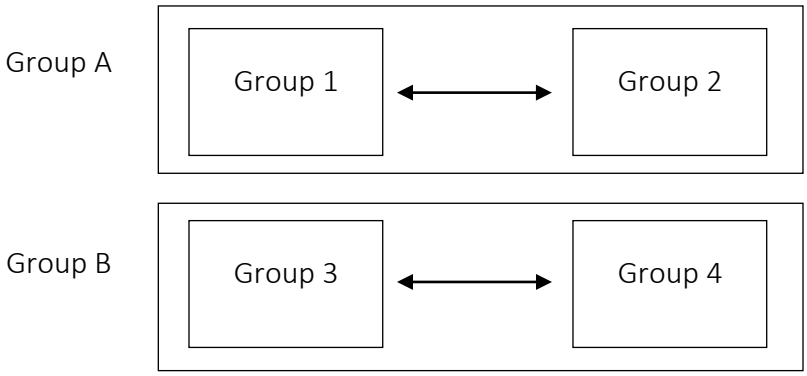
Source: https://www.epi.org/blog/black-workers-have-made-no-progress-in-closing-earnings-gaps-with-white-men-since-2000/

Grouping Guidelines

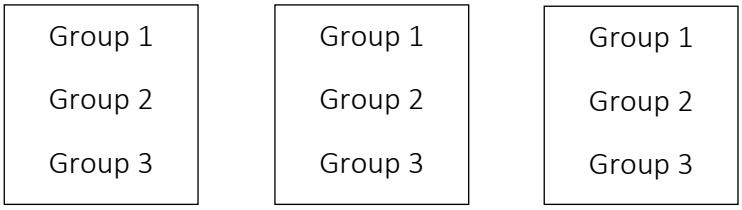
Part 1



Part 2



Part 3



Standards

Social Justice Anchor Standards and Outcomes (Teaching Tolerance, 2016)

- ***Justice 12.*** *Students will recognize unfairness on the individual level (e.g., biased speech) and injustice at the institutional or systemic level (e.g., discrimination).* The activity will allow students to recognize how African American people, especially women, have been systematically deprived of equal pay, thus leaving them more economically insecure and less prepared for any unprecedented situations such as COVID.
- ***Justice 13.*** *Students will analyze the harmful impact of bias and injustice on the world, historically and today*. The lesson will not only help students identify the disproportionate impact of COVID-19 on the African American community over the others but will generate within them a wider consciousness about the long-standing inequalities in areas such as the economy and healthcare. Students will recognize, the pandemic has not initiated the social disparity, but has just emphasized the disparities that already existed in every strata of society for a long time.
- ***Action 17.*** *Students will recognize their own responsibility to stand up to exclusion, prejudice, and injustice.* As the closing part of the lesson, students will engage in conversation around the possible agency they can take to address the issue. Students might spark a conversation with their family and friends and build a data-driven argument to make them aware of the reality of the pandemic. They might also interview African American COVID-19 survivors, learning about their personal experiences, and create some social media posts or podcasts to share their knowledge with the community.

Mathematical Content Standards

- ***CCSS.MATH.CONTENT.5.G.A.1.*** Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., *x*-axis and *x*-coordinate, *y*-axis and *y*-coordinate).
- ***CCSS.MATH.CONTENT.5.G.A.2.*** Represent real-world and mathematical problems by graphing points in the first quadrant of the coordinate plane and interpret coordinate values of points in the context of the situation.
- ***CCSS.MATH.CONTENT.6.RP.A.3.C.*** 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.

Mathematical Practice Standards

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.

Supplementary Resources

Some supplementary resources on COVID 19 and income inequality are included below. Teachers might like to read or watch some of them to learn more about the issue and redesign part of the lesson.

1. Health Equity Considerations and Racial and Ethnic Minority Groups:
2. African Americans Disproportionately Affected by COVID-19: How Healthcare Professionals Can Help Black Patients Protect Themselves
3. Racial Economic Inequality
4. CDC COVID-19 Response Promising Practices in Health Equality II

Debasmita Basu is an Assistant Professor of Mathematics and Quantitative Reasoning at Eugene Lang College of Liberal Arts, The New School, New York City. Before pursuing her doctoral studies in the United States, Debasmita was a high school mathematics teacher in India for four years. As a teacher, she realized that students often consider mathematics as a set of rules and formulae, with little to no connection with their lives. Hence, with the greater goal to bring a change in school mathematics education, she aims to design mathematical activities that cultivate students' critical consciousness towards various social and environmental justice issues and help them realize the power and value of mathematics.

Hong was born and raised in Vietnam. She received her BS in Psychology from Manhattan College and is currently a master's student at The New School for Social Research (NSSR). Her interest in the role that culture plays in our emotional lives stems from her living experience in different cultural contexts (she grew up in Communist Vietnam but has lived in the United States for the past five years). Her current research address how failure influences one's motivation to achieve in a cross-cultural context. Hong is interested in social justice topics such as street harassment and stereotypical threats and believes in the power of mathematics and statistics to understand and raise awareness about these issues.

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