Master's Thesis: Fix The Funds Curriculum Teaching Math Through a World-Framing Pedagogy to Confront Inequitable Funding Allocation

Fix The Funds Curriculum
Teaching Math Through a World-Framing Pedagogy to Confront Inequitable Funding Allocation

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Committee Approval

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Confront Inequitable Funding Allocation

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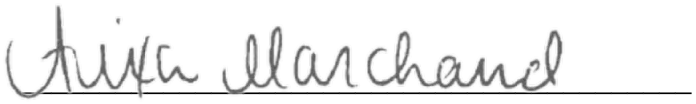

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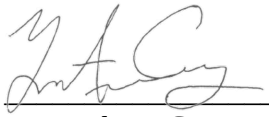

Dr. Zachary Casey

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Abstract

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Why is math important? When I was a student, teachers used to say that math is important because if you don't learn math, people will steal your money. What does this answer to that layered question look like on a macro-level? Might one perhaps look at local and federal budgets and say that their tax money has been stolen from them? Black communities perhaps might look at a history of enslavement and apartheid and say that money, resources, and dignity were stolen from them. What does it look like for educators to teach math rooted in this larger conversation to make math important skill for students to learn? What is, then, required of teachers that teach mathematics? How does one use academic content and Common Core mathematical standards to provide students with the tools they need to make a difference and disrupt the inequities that plague their communities and their world? How does one use math as a vehicle to teach and learn about issues of racial and social (in)justice? The objective of this curriculum is to provide teachers with the resources, literature, and inspiration to teach mathematics in a way that creates space for students to take what they learn from math and do something more meaningful with it. *Fix The Funds* ultimately pushes educators and students to open the doors for radical possibilities, transformation, and *World-Framing* inside the classroom and beyond.

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Acknowledgements

I would like to acknowledge my mother who showed me what it looked like to navigate the field of education, my grandmother who helped me develop a critical understanding of my place in this world, my grandfather whose work in rural NC schools continues to inspire me, and my aunt Dr. Mary McLeod-Bethune, whose charge I do my best to live up to.

I would also like to acknowledge teachers in my life and all over the world for supporting students through the work of *World-Framing*. It is this work that will forge the way to a better future despite what goes on in the present. Lastly, I would like to acknowledge my professors at Rhodes College for providing students with the space to explore all that is possible regarding the redefinition, reimagination, and transformation of what we know as Urban Education.

Introduction

My grandmother, Rev. Dr. Mazie Ferguson (1996), wrote in a news article, "White racists do not wear white sheets, they write on them. From policies to editorials, they write on them. 'White only' signs have become 'white only' interpretations of racial realities" (Ferguson, 1996). A commitment I have currently in education is to (as much as possible) hold honest conversations about Black education and the Black experience in the context of US white supremacy that extends beyond the framework of the white gaze. Urban Education, as studied in the Academy, is generally used as a euphemism to describe education within or adjacent to the context of the impoverished Black experience. Terms such as "achievement gap" and "food deserts" are two examples of language used in conversations about predominantly Black areas to avoid addressing systemic and contextual factors that impact schools, students, and communities.

In conversations that attempt to explain why predominately Black urban communities have higher rates of poverty and crime than predominately non-Black suburban communities, many studies point to symptoms of disparity thus missing opportunities to accurately diagnose illnesses. Paulo Freire (1970) said, "Scientific revolutionary humanism cannot, in the name of revolution, treat the oppressed as objects to be analyzed and (based on that analysis) presented with prescriptions for behavior" (Freire, 1970, pg. 131). It is dishonest for researchers and scholars to present solutions for predominately Black and Brown schools and neighborhoods without holistically and critically facing the problem(s). None of these issues are by accident. They are the results of decisions that were made intentionally. In the Summer 2017 edition of the Harvard Educational Review, Brian Lozenski (2017), shares that "crisis narratives are an inherently temporal concept which does not allow for the historical depth and complexity necessary to understand the systemic denial of quality and liberatory educational spaces

to the descendants of enslaved Africans" (Lozenski, 2017). This curriculum rejects the notion that acknowledging problems without presenting crisis-oriented solutions is useless. Ella Baker once shared that oppressed people "must learn to think in radical terms". The term radical being used in its original meaning---getting down to and understanding the root cause. The echoes of slavery, Jim Crow, and historical oppression continue to haunt Black neighborhoods and Black people in the present day without any sign of relief. In educating Black students, and quite frankly, all students, how does one make learning content and skills relevant to their sociopolitical context and what can be done with it? Bob Moses (2001), a Civil Rights Activist, wrote in his book Radical Equations, that "..the most urgent social issue affecting poor people and people of color is economic access... [and that] depends crucially on math and science literacy." This statement at a macro-level speaks toward laws and budgets passed with the use of mathematics. Policy makers are using math to make decisions that impact poor people and people of color the most. This notion has "allowed the nation to stay blind to the historical accumulation of the education debt and the reparational approaches needed to address it" (Lozenski, 2017). This curriculum does not seek to provide learners a crisis-oriented, temporary solution to the problem more than it seeks to reveal more layers to the ongoing problem of inequity in education and in the world. The objective is to provide learners with the language, capacity, and data to ask more critical questions and generate more sustainable solutions.

Purpose

According to the Oxford Research Encyclopedia (2017), "divestment is a socially responsible investing tactic to remove assets from a sector or industry based on moral objections to its business practices. It has historical antecedents in the anti-apartheid movement in South Africa" (Oxford Research Encyclopedia, 2017). Over time, this concept has served as a driving force for racial and class movements around the world. In

the context of Black communities in the United States, divestment has shown itself through police abolition movements. In the wake of the murder of George Floyd there was a shift in how organizers responded in their political talking points.

At one point, the nationwide Black Lives Matter movement called for transformational police reform. After countless Black lives were taken at the hands of police brutality and organizers noticed there was no significant impact from incremental reforms, the Movement for Black Lives brought forth a new call (M4BL, 2021). The demand was to invest in community by way of divesting from police. The argument was rooted in a reimagination of public safety. In that crime decreases as resources for communities increase. The argument also noted that the decreasing of crime would be directly linked to the decreasing of poverty. Essentially, what organizers were calling on policy makers to do, with budgets, was add and subtract. Through the use of phrases such as “Defund the Police”, the conversation grew from individual interpretations of isolated police brutality occurrences to a broader and more macro conversation about what it is that policy makers and tax payers value. This conversation moved away from a reactionary place and into one that holds space for nuance and critical understanding. In this conversation, addition and subtraction becomes more than the manipulation of arbitrary numbers. It ultimately becomes a basis to which one can express what and who they value. This is important for students especially in predominantly Urban schools because historically addition and subtraction has been the used to exploit and oppress communities of color. How does one use addition, subtraction, and place value skills and apply them toward meaningful change in their lives and their community?

Theoretical Framework

The theoretical framework for this curriculum pulls on many theories and ties them together to meet the overall objective. This objective is for students to take their mathematical skills and be able to articulate the ways math impacts them and their

communities. In order for teachers to present this curriculum with clarity, it is important to understand the theories that shape it. Critical pedagogy, problem posing education, radical possibilities and anti-capitalist theories are used to shape the over-arching idea of this curriculum. That over-arching idea is something that is called *World-Framing Pedagogy.*

In anti-capitalist theory, theorists such as Jean Anyon (1980) and Karl Marx (1867), present many critiques and analyses about class in the context of capitalism. On another hand, Black Scholars such as Cedric J. Robinson (1983), might argue that a class analysis absent of a racial analysis fails to account for the complete nature of capitalism. He asserts that "capitalism and racism, produce a modern world system of 'racial capitalism' dependent on slavery, violence, imperialism and genocide" (Robinson, 1983, pg. xiii). It is with this understanding that Robinson introduces readers to what he calls the Black Radical Tradition. Robinson uses this term as a way of "specifying the source of opposition to slavery, Jim Crow, and various other modes of oppression born of racial capitalism, colonialism, and imperialism" (p. 24). The reason behind using anti-capitalist theory with racial analysis as a piece of the theoretical framework for this curriculum is to expand students' schema beyond what the world currently is. In doing so, learning and creating does not have to be bound by the barriers of structures that already exist. In *World-Framing pedagogy*, such student-centered work is informed by a simultaneous engagement in the ways that capitalism and white supremacy function together, intersectionally, to limit the life chances for people of color.

In Jean Anyon's work, she shares the argument that the quality and rigor of education changes as one observes schools serving different social classes. Anyon's theoretical framework reveals how she defines a social class. Anyon studied schools across four social classes are defined as such: Working Class (blue-collar), Middle Class (managerial), Affluent Professional (Lawyers, engineers, etc.), Executive Elite Class (top 1%, the wealthy). Before unpacking the research results, Anyon asserts that one's social

class is not based solely on one's physical capital but also takes into consideration one's relationship to social, cultural, and political capital and how, if used correctly; it may yield social and cultural power. Anyon additionally names that in the capitalist class one must be an "owner of production" while on the contrary, in the working class, a person does not own physical capital and uses their labor to make it possible for others to profit (Anyon, 1980). Anyon's class analysis is important to the framework of this curriculum because it is intentionally ambiguous. This means that what is written in *Fix the Funds*, the name of the curriculum at the center of this project, is meant to be delivered by any teacher, in any school, and in any context. That said, in *World-Framing pedagogy*, teachers must have a keen understanding of the immediate social and political contexts in which they work and in which their students live. To support students in (re)framing their/our worlds, it is essential that teachers focus on the multiple ways that class and racialized oppressions work in tandem and must be challenged together. In understanding class and race, teachers can take a more targeted approach to delivering this curriculum by keeping in mind the context and community in which they serve students. To this point, Anyon (2005) is worth citing at length as she argues,

> I believe it is important for educators, public policy analysts, and practitioners to take hold of the fact that economic policies yield widespread low-wage work even among an increasingly educated workforce… Unless we make some changes in the way the macro-economy works, economic policy will trump not only urban school reform, but individual educational achievement of urban students as well. (p. 29)

This is the task of *World-Framing pedagogy*: to engage students in reimagining economic policies that can function on the side of human flourishing rather than in their continued dispossession.

In addition to Anyon, this curriculum is constructed with the theories of Paulo Freire's (2000) "Problem Posing Education" concept in mind. In *Pedagogy of the*

Oppressed, Freire unpacks two competing notions of education. One of the concepts Freire unpacks is called Banking Education. This is Narrative Based instruction which is aimed to make students receive information from an authority figure and regurgitate what is given. In this form of education, the student has no room to conceptualize, interrogate, or explore. Freire asserts that this type of education works in the interests of oppressors "who care neither to have the world revealed nor see it transformed" (Freire, 2000, p. 73). The fruits of education through "banking" are noticed throughout the world by the ways historically exploited communities are encouraged and expected to fully engage and subscribe to respectability politics, assimilation, and compliance. In *World-Framing pedagogy*, students interrogate the ways they have been coerced into performing according to the oppressors' logics and desires. The goal of banking pedagogies is for the oppressed to internalize oppressor consciousness. The goal of *World-Framing pedagogies* is to critically interrogate oppressor consciousness and articulate radical alternatives.

Another concept Freire mentions is how banking education can produce necrophilia, the love of death. While reading Freire's description of who a necrophilous person is, one might wonder how this shows up in society at large and education in particular. These are the instructors who cling to banking models, who believe they are filling their students minds as an act of depositing. Contrary to the banking concept of education, Freire offers a completely different kind of pedagogy that he coins as Problem Posing Education. In many academic settings, a question that is usually presented when systemic problems and issues are being named is, "Well then what is your solution? You can't present a problem without presenting a solution." Freire offers educators and revolutionaries an opportunity to examine the world and oneself as not divorced from each other. That is, as conscious beings in the world, we have the capacity to act in order to transform and transgress our contemporary oppressive social order. The work of Freire supports this larger idea of *World-Framing* in that students are not using mathematical

skills in search of a “correct answer”, rather, students will be seeking out to determine what their values are, what ways the government is in (or out of) alignment with those values, and how they can express those values as they manipulate numbers and percentages.

Additionally, this curriculum draws from the educational theory of Gloria Ladson-Billings, who defines culturally relevant pedagogy as one that “supports students’ critical consciousness or their ability to recognize and critique societal inequalities” (Ladson-Billings, 1995 pg. 20). Ladson-Billings (1995) developed Culturally Relevant Pedagogy after conducting a reflective and empirical examination of strong teachers with African American students. Her definition of the theory includes the findings of this investigation. It's a pedagogy that "rests on three criteria or propositions: (a) Students must achieve academic achievement; (b) Students must build and/or sustain cultural competency; and (c) Students must develop a critical consciousness through which they challenge the current social order's status quo” (p. 477). Ladson-Billings third criteria points directly to the central premises of *World-Framing pedagogy*. If students develop a critical consciousness through which they challenge the current social order’s status quo, addition and subtraction become more than an important math skill for one individual. Students can name the ways addition and subtraction happen in federal and local budgets, which impact communities everywhere, and disproportionately impact working class communities of color. Dr. Martin Luther King Jr. (1966) once said that "A nation that continues year after year to spend more money on military-defense than on programs of social uplift is approaching spiritual death” (King, 1966, pg. 7, para. 48). It is not uncommon for community organizers at protests and rallies, to hold up signs that say, “A budget is a moral document.”

The aforementioned statements are in alignment with the idea that addition and subtraction taught through a critical means, through *World-Framing pedagogy*, gives students room to hold deep reflection and critical thought on what they value and how

they can use math to impact their world and community in ways they will ultimately be proud of. Students should also conceptualize mathematical skills as moral practices that can impact their lives, families, and environments. Where this curriculum goes further is in how students are not only being tasked with having a critical understanding of their place in the world, but they are also being tasked with using that understanding and their mathematical skills to dream and frame a world that is more just and more human than this one.

Tasking students to frame a new world ties into theories such as the Black feminist praxis of bell hooks (1994), whose work centered "education as a practice of freedom" (hooks, 1994 p. 59). She gives great insight on what becomes possible when education is molded into a practice of freedom that is not restricted to its former and lesser developed state. In her book, *Teaching to Transgress* hooks unpacks what it means for lived experiences to be translated into theory and practice. She describes how theory is really nothing more than "to make sense of what happens in our lived experiences" (p. 61). This is something that can happen when one begins to dream of worlds that do not exist yet after critically examining the world one currently lives in. hooks makes it a strong point that so-called "good" theory is defined by its amount of academic jargon and inaccessible language. It can be, however, merged with practice when "our lived experience of theorizing is fundamentally linked to processes of healing and collective liberation" (p. 61). Regarding teaching math, what does it look like to apply the principles of "education as a practice of freedom" (hooks, 1994 p. 59) when teaching standards? This question is at the center of *World-Framing pedagogies*.

I have worked to sketch out many theories here to provide a theoretical framework that lays the foundation for *World-Framing pedagogies* and the curriculum at the center of this project. The over-arching idea is that if teachers make space for students in the teaching of academic standards, critical problem-posing pedagogy, and cultural relevancy, students will have the capacity to frame and be a productive part of a future

that they can collectively construct on the side of human flourishing. However, there is currently no curriculum that explicitly takes these specific pieces and synchronizes them toward the goal of empowering students to transform the conditions of their communities and their world through a *World-Framing pedagogy*. It is for this reason that I am launching the *Fix the Funds* curriculum.

Overview of Existing Curriculum

The closest already existing curriculum to *Fix the Funds* is a resource curated by Jonathan Osler called Radical Math. Radical Math is a website and resource that currently includes "A Guide for Integrating Issues of Social and Economic Justice into Mathematics Curriculum" (Munk, 2012). Osler, through the website shares a guide for how one might construct a lesson plan and integrate justice issues into their math instruction. Osler's guide is an inspiration for how this curriculum is constructed.

Additionally, in *Rethinking Elementary Education*, Allison Milewski (2018), created a curriculum that is like this curriculum in that it asks students to analyze budgets and make decisions on what they believe the budgets should look like. The name of this lesson is called "Student Engagement Through Participatory Budgeting". Essentially, what is required of students is for them to analyze community needs, understand how participatory budgeting operates at a micro and macro level, and ultimately design a Participatory Budget Plan of Action that address a need at the school. This curriculum is very similar to the one I am seeking to create. Students being given the opportunity to modify government budgets through collaboration with their peers and an understanding of community need is in alignment with Divesting/Investing. In participatory budgeting, "community members are given a role in monitoring the process of following the allocation of funds" (Local Government Association, 2021). While this practice is meaningful in fostering a spirit of advocacy and collaboration, this does fall short in truly addressing the fullness of community needs. In my curriculum, I will be asking students

to go further by allocating the funds themselves. Ultimately, students are being asked not just to figure out how to use funds that may exist after allocation of funds have been approved, but rather, transform the way those funds are being used and allocated to align with how what they collectively determine best fits their values.

William F. Tate (1995) wrote about having a Culturally Relevant Approach to Mathematics. This approach in a way combined the theories of Ladson-Billings, Freire, and others to present a framework to support teaching mathematics to Black students. In Tate's writing, he mentions Sandra Mason. Sandra Mason was a teacher who used culturally relevant mathematics to teach Black students math. Tate describes this by sharing, "her students were prepared to engage in economic and social debates on issues relevant to African American students" (Tate 1995, p. 169). It is the goal of this curriculum to take those approaches and tie it back toward *World-Framing*.

Related Research

In Chapter 4 of *Rethinking Elementary Education* (2012), the authors speak about linking math to history, people and politics. In Memphis-Shelby County Schools, teachers are required to have students make real-life connections to the content being taught. The real-life examples that were generally expected from teachers, were examples of students at a store or at home. For the most part teachers were expected to support students toward drawing connections between the math they were doing in class to math they would do in "the real world". The current curriculum used in Memphis-Shelby County Schools does a great job with providing real life examples to students to manipulate numbers and practice skills. However, the current curriculum does not allow students to make connections between the skills they are learning, their sociopolitical context and what they can do with it. In other words, in having students draw connections between the math they are doing and "real-world" examples, there is no critical examination of "the real world." If there is no critical conversation with students about

"the real world", why is math important? Conversations around wealth, politics and federal/state budgets are all tethered to an understanding of numbers, place value, percentages, fractions and decimals. Essentially, it is understanding these things to have parts and a whole. It is also understanding that numbers and percentages regarding the dollar amount under a capitalist economic system is an expression of what an individual or collective of people value. This is tied to the theoretical framework section where Tate and Ladson-Billings outline the shortcomings of traditional methods of teaching math. These shortcomings become especially larger in the context of teaching Black students, students of color, and working-class students. How might connecting numbers and percentages to living conditions help students further conceptualize the mathematical concepts being taught in the classroom.

Fix The Funds: Overview

To be clear, the purpose of *Fix the Funds* is not to decide for students what they should and should not value. The purpose of this curriculum is to provide space for students to wrestle with and determine what it is they value individually and collectively and express that using numbers and percentages. In a budget, there is a set amount of money available. When one wants to make changes to a budget, one must reallocate funds. Those funds would come from an item already in the budget. It is important that this is understood by the teacher delivering the curriculum because it is intentionally ambiguous. Having a racial and a class analysis will help with modifying the curriculum toward different populations and demographics of students. Students may reject what the teacher is naming as a problem. In that event, point back toward the *World-Framing pedagogy.* The idea is for students to do what they determine collectively as better and fairer after looking at the data.

Delivering this curriculum will require the teacher to do some building their background knowledge of the current state of budgets at the federal and local level. One

resource that could help teachers to gather background information, is nationalpriorities.org which shows the costs of United States wars since September 11th, 2001. The War Resisters League also has a resource that would help teachers to gather the information needed to teach the unit. Another resource that is helpful is available through the Vera Institute of Justice which breaks down the costs of spending on police by city and the implications of it. This is done through using the city budgets of an area which can be searched through their site. It would be beneficial to cross reference their site with present day information about the city's budget. For example, in Memphis, TN, their site shared that $273M was spent on police. However, the city's budgetary graphic provides a lot more insight on how much is being spent on policing compared to other public service items (housing, neighborhoods, and community development). There are three different approaches that are offered as examples to deliver this curriculum. These examples are not limited to what is written here and they are able to be modified to fit the nature of one's classroom and community. One approach is to have students critically examine and revise federal and local spending on the military. Another approach could be to have students critically examine and revise local city budget allocations. The last approach is to have students tackle both the federal and local budgets. The outcomes would ultimately be for students to take what they notice, provide their own critical assessment/evaluation of the budgets, and propose revisions to the budget based on their collective moral compass and judgement.

Mathematical Concepts and Standard Alignment

The mathematical concepts and operations practiced in this unit are students' deepened understanding of fractions, percentages, addition, and subtraction. This unit can be adjusted and taught to grades 2-12. The skills associated with the unit range from students being able to use addition and subtraction within 100 (2.MD.B.5) to using probability to evaluate outcomes of decisions (HSS.MD.B.5). Depending on the age

group and background knowledge the teacher may consider using the operations of multiplication and division as well. However teachers choose to differentiate to fit the needs of their age group is up to them. This curriculum serves as more of a kick-starter and reference guide for teachers to deliver their own mathematical unit on critically analyzing budgets and imagining with students the infinite possibilities of changing them based on what is valued by the individual/collective.

Fix The Funds: Unit Plan

Once again, *Fix the Funds* is intentionally ambiguous. This means that the delivery of the curriculum will vary. The timeline of this curriculum could cover a week or several weeks depending on one's instructional schedule for teaching math. Ideally, the unit would be taught within 5-7 school days using this structure:

- Day 1: Teacher a Class discussion
- Day 2: Students Explore the Problem
- Day 3: Students Explain and Elaborate on the Implications
- Day 4: Begin Group Work on Proposal
- Day 5: Group Proposal Presentations & Class Reflection Share-Out

When teaching Science, teachers usually generate lessons using the framework of the 5E model. The 5E Model consists of these components: engagement, exploration, explanation, elaboration, and evaluation. Each phase has a specific function and contributes to the teacher's coherent instruction and to the learners' formulation of a better understanding of scientific and technological knowledge, attitudes, and skills. The instructional model is research-based and although it is commonly used for science, it is still fundamentally transferrable to support learning various academic content.

Because this unit is using math skills in a way that looks more like project-based learning, it makes sense to use the 5E model to teach it. It is especially useful to use being that students are not working with any arbitrary numbers. Students are being tasked with

closely examining a phenomenon (funding allocations), making sense of it, and reconstructing it. *Fix The Funds* is written as a template or skeleton to be modified and taught for grades spanning from elementary to high school. However, in the Appendix, there will be a sample lesson plan for each of the 5 phases of the unit to apply to 4th graders. In those lesson plans, there is also notes and suggestions for scaffolding the lessons for middle and high school students.

Day 1: Teacher Introduces a Class Discussion

When introducing the *Fix the Funds* Unit lesson, the teacher should first hook students by practicing skills they are already more than familiar with. Many teachers enjoy using platforms such as Kahoot.it, Quizziz, Math Playground or Nearpod to game-ify a skill review and that would be helpful in establishing that initial engagement with students before the discussion topic and Unit is introduced. The teacher may even want to throw in a few hints and clues about the Unit through creation of the game. In activating student prior knowledge and hinting at what is to come in the unit, teachers will be able to execute the first E of the 5E model which is engagement. See the appendix for an example of a *Fix the Funds:* Day 1 lesson.

Day 2: Students Explore

On day two, students have moved into the second E of the 5E Model, explore. There are several ways teachers can have students explore governmental funding allocation. Once again, this depends on the approach the teacher wants to take and the students that are in that teacher's class. Teachers could print out a picture of the local and federal budget and put students in groups to discuss and record what it is they notice and wonder about what they are seeing. Teachers could also use the internet and have students explore the NPP Trade-Off Calculator or Vera Institute of Justice's Calculator. Regardless of the approach, the objective in this part of the unit is for students to make

sense of the budgets they see, try manipulating the numbers themselves and being able to name where the majority of taxpayer money goes. See the appendix for an example of a *Fix the Funds:* Day 2 lesson plan.

Day 3: Students Explain The Implications

In this section of the unit, students are tasked with forming their own opinion about what they explored in the previous day's activity. Students forming these opinions, based on what they have explored, is how students will move toward the next stage of the 5E model, explain. Students should be given space to do a lot of talking because there may be emotions tied to some of the responses given depending on the life experiences of those in the room. In the spirit of Ladson-Billing's Cultural Relevancy and "supporting students' critical consciousness or their ability to recognize and critique societal inequalities" (Ladson-Billings, 1996, pg. 20), this part opens the floor for students to have a critical discussion about what their findings mean and how they have seen the effects of it in their personal lives. While students are sharing how they feel, have students explain what they feel regarding about a specific data point, percentage or number that they saw in their exploration the previous day. See the appendix for an example of a *Fix the Funds:* Day 3 lesson plan.

Day 4: Begin Group Work on Budget Proposal

At this point in the curriculum, students are moving toward the next phase of the 5E Model, elaborate. By now, groups should be established in the classroom regarding this project. It is highly recommended that groups be assigned before introducing the unit altogether. For the budget proposal, groups are tasked with deconstructing and reconstructing the government budgets that have been looked at in the previous three days. For earlier elementary, use the budgets that are shown by a pie chart and round the decimals to the nearest whole number. If students are upper elementary and beyond, it would be beneficial to allow them to grapple with manipulating percentages with

decimals. Essentially, all grade levels will be tasked with adding and subtracting within 100. However, as the grades advance and mathematical skills are improved, teachers ought to construct their questions and requirements for students accordingly. The structure for the Group Budget Proposals can be whatever the teacher decides it will be. See the appendix for an example of a *Fix the Funds:* Day 4 lesson plan with components for a group project rubric.

Day 5: Group Proposal Presentations & Class Reflection Share-Out

On the last day, group presentations should be an opportunity for students to feel more empowered than they ever have in the K-12 setting. Urge students to encourage each other, ask clarifying questions, and even debate. All those things will help deepen the learning for students. Those actions are also what move students into the final stage of the 5E model, evaluate. As students are presenting, the teacher should look out for trends in what the students find is the most important thing that deserves more funding than it already is receiving. Catching onto those trends will inspire some powerful reflection questions. Once again, this unit may require more than five days to be completed and if this ever is the case, that is okay. It may take more than one instructional day for students to complete their budget proposals and it may also take more than one instructional day for group presentations to be completed. The pacing of the unit is completely dependent upon the teacher and students in the room. One thing to keep in mind, and to maybe share with students is that it usually takes City Council and Congress months to agree on budgets, so it is more than normal for students in a classroom to take a few days to finalize a budget proposal.

Once every group has had the opportunity to present and students have also had the opportunity to ask questions and provide feedback to their classmates, the unit can be wrapped up with a few reflection questions that can be answered depending on how the teacher's students are best engaged. See the appendix for an example of a *Fix the Funds:*

Day 5 lesson plan to see possible reflection questions.

After reflecting with the class on key takeaways, remind students that they are the future thought-leaders and decision-makers of this world. It is important for them to understand that math can function to discriminate and oppress, or it can be a tool used to aid resistance and necessary disruption. If students describe themselves at any point feeling angry, affirm that. In 1961, author James Baldwin shared with a radio host, "To be a Negro in this country and to be relatively conscious is to be in a rage almost all the time.". Rage from students regarding systemic oppression is rage that is righteous and is a rage that deserves to be met with affirmation by revolutionary pedagogues. Be mindful that when discussing topics of inequality, not every marginalized person feels the same way about the oppression they experience. Additionally, it is imperative that teachers avoid the risk of disempowering students when going through the unit plan. In the "Guide for Integrating Issues of Social and Economic Justice into Mathematics Curriculum" it is shared that:

> The risk of disempowering students Talking about inequality, racism, sexism, poverty, etc., can be overwhelming for anyone, especially young people. It can be disempowering for those who know these realities firsthand, just as it can be disempowering for those whose families, relatives, neighbors, etc., are in part responsible for perpetuating and exacerbating these problems. Make sure your students know that they are not to blame (as victims nor perpetrators) for these systemic problems. (Osler, 2016, pg. 5)

Knowing this risk, teachers must be intentional about centering empowerment at every point of delivering the curriculum. Motivate and inspire students by reminding them that there is nothing that is beyond their reach. Teachers should remind themselves that as educators, the skillset that is not mentioned in the job description but is done every day in the classroom is world-building through *World-Framing*.

Conclusion

Circling back to the original question, why is math important, in *World-Framing pedagogies* we encourage students and teachers to ask and answer the question, "Why?" about a specific context and to ask, "why not?" as they continue to imagine new and better futures for themselves and their communities. In this curriculum, through *World-Framing Pedagogy*, the teacher asks students to develop their ideas around the question "Why not" and extend those ideas beyond existing contexts. Using math education as a tool for freedom, liberation, and *World-Framing*, learning math can be made to be more than simply memorizing mechanical approaches to working with numbers. In teaching mathematics, it is my hope that this curriculum inspires educators to connect the skills being taught in the classroom to a future that looks better than this present moment. Perhaps teachers might modify this curriculum to inform students about how school or district budgets are being allocated. Imagine how much students would be empowered if they were more informed about the process in which decisions are made and given space to propose radical alternatives they generate on their own. This is something that can happen when one has the capacity to dream of worlds that do not exist yet after critically examining the world one currently exists in. bell hooks (1994) explains how theory can be merged with practice when "our lived experience of theorizing is fundamentally linked to processes of healing and collective liberation" (p. 61). I believe hooks, in this quote, pushes educators to think of theory in terms of how it can be realized in practice as well as how "silence can be transformed into language and action" (Lorde, 1984, p. 43). Such transformations are at the heart of all enactments of *World-Framing pedagogies*.

What does *Fix the Funds & World-Framing Pedagogy* offer Black students specifically? The theories that make up the theoretical framework of this curriculum come together and move further through *World-Framing Pedagogy*. These theories are put into practice by way of the 5E instructional model. All are present in the *Fix the Funds Curriculum*. As stated in the introduction, the commitment I have to education is

to (as much as possible) hold honest conversations about Black education and the Black experience in the context of US white supremacy that extend beyond the framework of the white gaze. In Freire's problem-posing education, through a *World Framing* lens, students critically interrogate oppressor consciousness and articulate radical alternatives. In doing so students are engaged in both their world and the academic content. Culturally Relevant Pedagogy goes a step further with *World-Framing Pedagogy* because students are not only being tasked with having a critical understanding of their place in the world, but they are also being tasked with using that understanding and their mathematical skills to dream and frame a world that is more just and more human than this one. This sort of understanding of the world is an example of students in the explain phase of the 5E model. In *Fix the Funds,* students are grappling against the notion that there are not enough resources or money to improve and transform living conditions for their communities and neighborhoods. Once again, as previously mentioned, Dr. Mazie Butler Ferguson reminds us that "White racists do not wear white sheets, they write on them." Through Osler's Radical Math and this project's *World-Framing Pedagogy*, Black students are empowered to write on their own sheets to determine and frame their own future. What does it look like to apply the principles of "education as a practice of freedom" (hooks, 1994 p. 59) when teaching academic standards? This looks like using the standards being taught with the goal of empowering students to transcend and transform their contexts and communities. With this, in the 5E instructional model, students are elaborating on what they have learned and applying it toward something. Lastly, if teachers have a strong understanding of the social and political contexts in which they serve with theories like the hidden curriculum, they will be able to provide a stronger support for students in (re)framing their/our world. With this the teacher and students are moving through the Evaluation stage of the 5E model and even moving toward another stage where learning extends. Thus, to answer the question, making space for students to frame a new world and their own future is how teachers can make learning

math important.

Mathematics could be taught through the means of traditional and respectable standards. Students could be tasked with counting apples or computing the amount of money Johnny spent on candy at the market. It is not impossible for students to learn math in this way. What happens, though, when mathematics is taught through the grappling of social, political and racial issues? Perhaps looking at military spending helps students and teachers to better conceptualize larger numbers. Perhaps it helps teachers and students to better conceptualize the material determinants in their lives and the areas that must be transformed if we are to realize a more just social reality. When students have the space to combine their mathematical knowledge with their own critical assessment of the current and local socioeconomic and political contexts, they then develop the tools they need to understand what is happening in present day politics and the language they need to name when things are not *adding* up. From there, the probability for a better future becomes certain and the possibilities, infinite.

Appendix

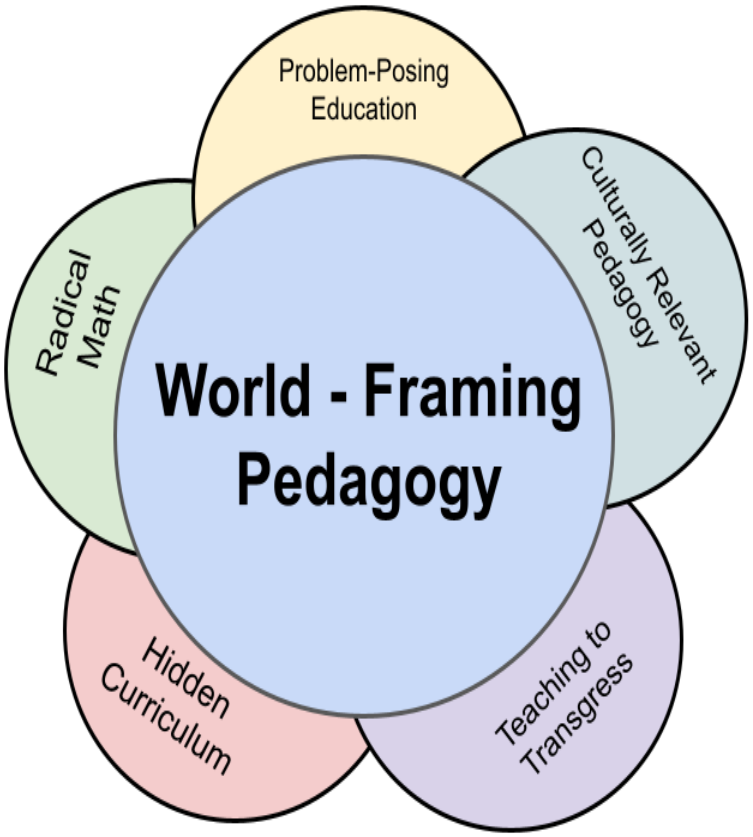


Figure 1. A diagram showing how the theories named in the theoretical framework contribute to the larger focus of the *Fix The Funds* curriculum.

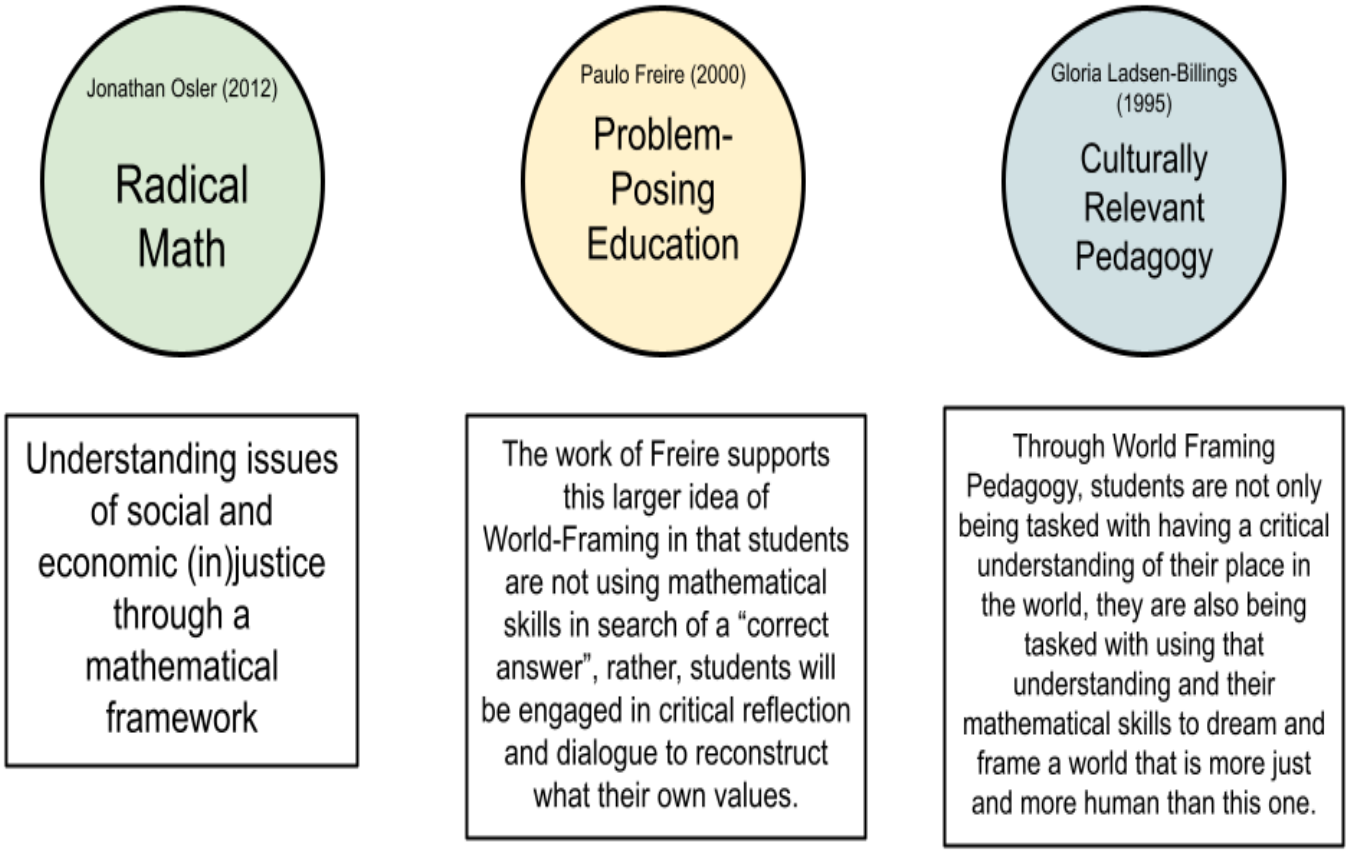


Figure 2. Drawing the connections between *Radical Math, Problem-Posing Education, and Culturally Relevant Pedagogy* to *World-Framing Pedagogy.*

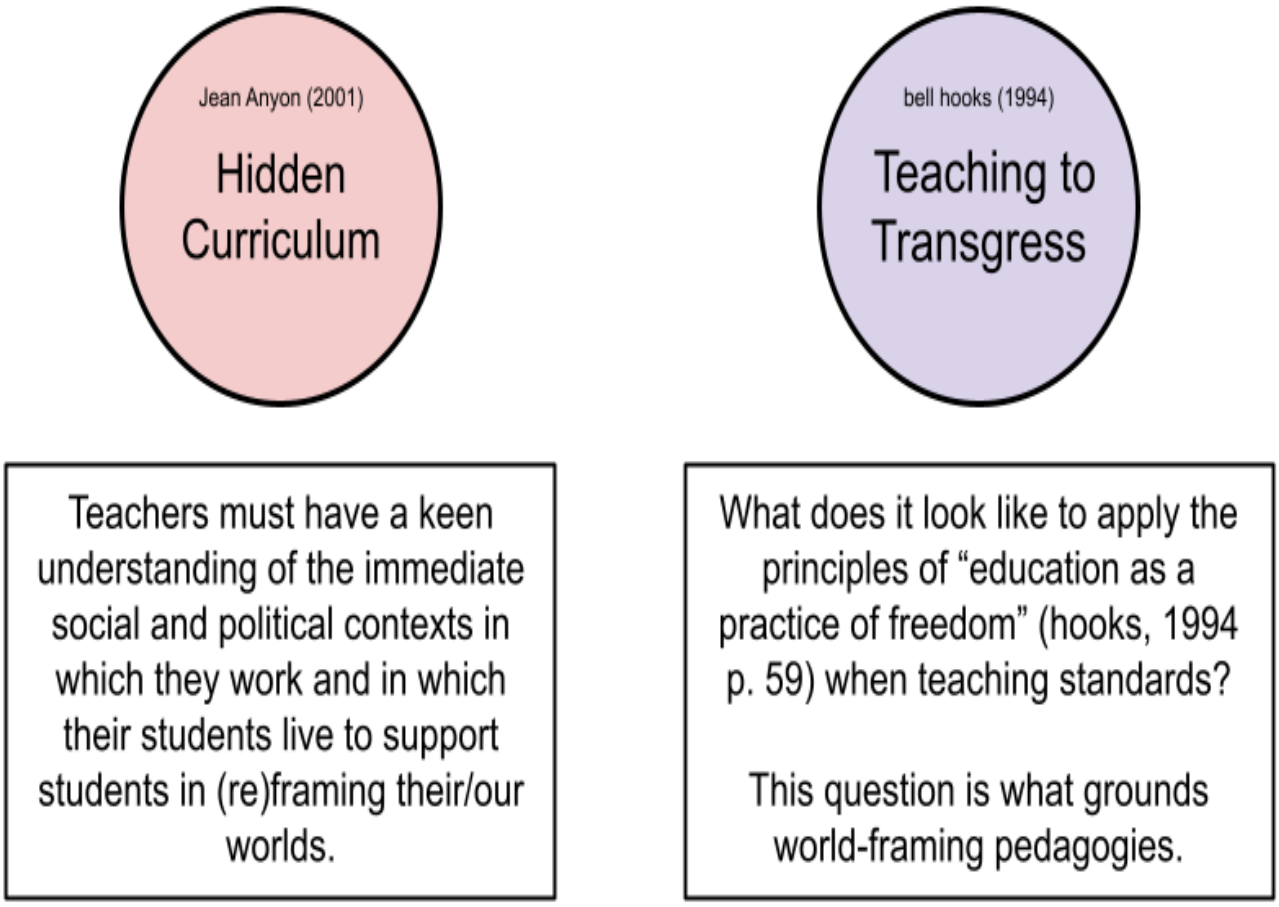


Figure 3. Drawing the connection between Jean Anyon's *Hidden Curriculum* and bell hooks *Teaching to Transgress* to *World-Framing Pedagogy.*

Fix The Funds

4th Grade Example Lesson Plans

DAY 1

Topic : Day 1, Fix The Funds	Subject: Math
Goal: Critically examine funding allocation and collaboratively create a new local budget.	Standards: 4.NBT.B.4 4.NBT.A.3

Objective

SWBAT use their understanding of addition and place value IOT determine the cost of improving their neighborhood with 3 budget items.

DO NOW (10 min)	Students will practice skills they are already more than familiar with. Fluency Activity: Add Two Digit Numbers, Add & Subtract, Matching Pairs, Subtract Matching Pairs
Whole Group Discussion (25 min)	Teacher: Why is learning math important? Students: *answers will vary* "Learning math is important because.. " "Learning math is not important because.." Teacher: Take a few minutes and think about your neighborhood. What are two things you would like to see change?

	Students: *answers will vary* Teacher: Why do you think the two things you named don't already exist in your neighborhood? Students: *answers will vary* Teacher: Why doesn't the city or government pay for the things you named? Students: "There is not enough money to pay for it" (answers may still vary)
Independent Practice (20 min)	Teacher: Write down the two things you mentioned wanting to see added to your neighborhood and research the costs of those things. If you cannot find the exact or close to the costs of those things, try picking something else. Be ready to share how much money it would cost altogether.

	Notes: Provide students with the sentence stem “Cost of _____” and model for them how to research the costs by researching the cost of a new playground and a new grocery store. Model for them how to add the higher numbers together on a calculator and determine the costs for both objects
Exit Ticket (5 min)	Based on what you researched and the numbers you added, could you improve your neighborhood with either $10 million or $20 million? Yes or no? How do you know?

Notes

To scaffold this for early elementary, round the numbers and review place value with students. To scaffold this project for middle and high school, have students to estimate the costs of their ideas before researching and adding them up. 5^{th} grade – 12^{th} grade should be able to add their values without the use of a calculator.

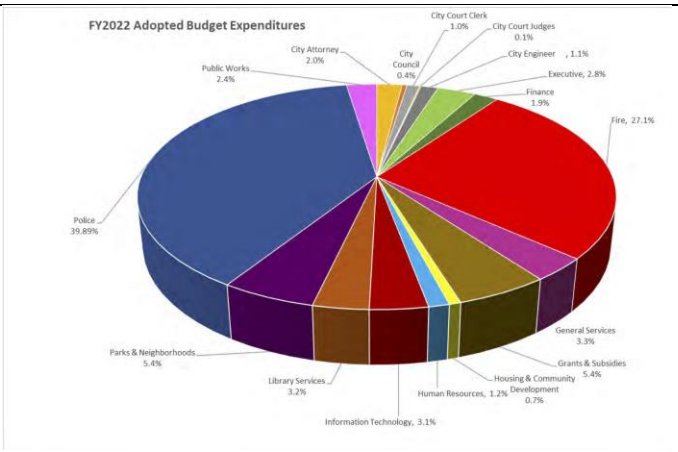
DAY 2

Topic: Day 2, Fix The Funds	Subject: Math
Goal: Critically examine funding allocation and collaboratively create a new local budget.	Standards: 4.NBT.B.4 4.NBT.A.3 4.NBT.A.2

Objective

SWBAT use their understanding of percentages and comparing numbers IOT identify where MOST of the government's budget goes toward and what items receive the LEAST amount.

Do Now (10 min)	Comparison Fluency: https://www.mathgames.com/skill/4.27-compare-numbers-up-to-10000000 https://nearpod.com/t/math/3rd/reading-writing-comparing-multi-numbers-35-L106607389 https://nearpod.com/t/math/kindergarten/comparing-twodigit-numbers-k2-L110505554
Whole Group Discussion (25 min)	Teacher: Take a look at this image. Based on what you see, which item has the GREATEST amount of the government's budget?

	 (See Figure 4) Students: Police Teacher: Which budgetary items received the LEAST amount of funds? Students: Housing, Parks, etc. *answers may vary* Teacher: Reflect on what you know about your own neighborhood and community. Would you say that what you are looking at is a fair budget? Why or why not? Students: Yes, it is fair because we need the police to keep us safe. Students: No, it is not fair because there needs to be more money given for more people to have homes.

	Teacher: All great answers and there is no wrong or right answer. At this time, let's find out how much money the city has in that budget and calculate how much goes to the largest item. Work with students to determine the amount in the budget and exactly how much the largest percentage is worth by dollar amount.
Independent Practice (20 min)	Teacher: So, we know that item costs the city _____. Now, how much does it cost for your neighborhood to have the ideas you came up with yesterday? Allow students to explore this link and model for them how to use the calculator. https://www.vera.org/publications/what-policing-costs-in-americas-biggest-cities What is one thing you noticed while playing with the calculator?
Exit Ticket (5 min)	Talk with your neighbor or group then record your answer. Could you improve your neighborhood with $10M? What about $20M?

Notes

The teacher should anticipate students to share mixed feelings about the questions and mixed feelings about their peers' answers. In this event, hold space for students to engage in critical dialogue and practice using accountable discussion sentence stems. Below is an example of how the teacher can redirect an emotionally charged response by a student back to the objective of the lesson.

Hypothetical #1

Student: Ms. _____, if they are saying that military/police receive too much funding, does that mean my dad who is a police officer/military personnel is a bad person?

Teacher: Let's look at the answers you wrote out based on the figure you looked at. What would you say needs to be funded more or less? Do you think the budget should remain the same? Why?

In scaffolding this lesson for older grades, have students look at the local city budget and compare it to the federal budget. Ask students what similarities and differences they notice when comparing the two documents.

This is a link to a resource to support students in that comparison.

https://www.nationalpriorities.org/cost-of/?redirect=cow

DAY 3

Topic : Day 3, Fix The Funds	Subject: Math
Goal: Critically examine funding allocation and collaboratively create a new local budget.	Standards: 4.NBT.B.4 4.NBT.A.3 4.NBT.A.2

Objective

SWBAT use their findings and notes from budgets IOT form their own opinion about government funding allocation.

Do Now (10 min)	Have students review the notes they took on the previous day's lesson. Have students observe again the budget(s) they looked at previously
Whole Group Discussion (25 min)	Teacher: After looking again at those figures, what data point, percentage, or money amount stood out to you the most? Why? Students: *answers will vary but will refer to an item in the budgets they looked at* Teacher: If budgets are moral documents and we can determine what is valued based on what is spent, what would you say is valued most by the city?

	Teacher: What message do you think this sends to people?
Independent Practice (20 min)	Teacher: Discuss this question in your group, would you say that what is valued according to the city budget, is in alignment with the values you or your community and neighborhood have? Next, discuss whether a budget you and your friends were creating a budget for the nation or the city, would it come out the same or different? Why?
Exit Ticket (5 min)	In a few sentences describe your stance on the city budget. Do you agree, disagree, somewhere in between? Explain.

Notes

In this section of the unit, students are tasked with forming their own opinion about what they explored in the previous day's activity. Students should be given space to do a lot of talking because emotions may be tied to some of the responses depending on the life experiences of those in the room. In the spirit of Ladson-Billing's Cultural Relevancy and "supporting students' critical consciousness or their ability to recognize and critique societal inequalities" (Ladson-Billings, 1996, pg. 20), this part opens the floor for students to have a critical discussion about what their findings mean and how they have seen the effects of it in their personal lives. While students are sharing how they feel, have students explain what they think regarding a specific data point, percentage, or number that they saw in their exploration the previous day. For older grades have them read articles about the divest/invest movement and discuss their opinions on it informed by what they have learned thus far. Here are a few links to support: https://defundthepolice.org/united-states/

https://m4bl.org/policy-platforms/invest-divest/

https://m4bl.org/wp-content/uploads/2020/05/CutMilitaryExpendituresOnePager.pdf

Develop questions around these readings or build the readings into the questions already in the lesson plan.

DAY 4

Topic : Day 4, Fix The Funds	Subject: Math
Goal: Critically examine funding allocation and collaboratively create a new local budget.	Standards: 4.NBT.B.4 4.NBT.A.3 4.MD.A.2

Objective

SWBAT deconstruct and reconstruct government budgets IOT create a group budget proposal aligned with the values held individually and shared collectively.

Do Now (10 min)	Have students review the notes they took on the previous day's lesson. Have students observe again the budget(s) they looked at previously
Whole Group Discussion (25 min)	Teacher: Today, you will have the opportunity to create your own budgets with your group Teacher: Yesterday I asked if budgets are moral

	documents and we can determine what is valued based on what is spent, what would you say is valued most by the city? Today, with this project, I am asking what is most valued by you! (Model for students how to create a budget using the budget they already have.) Ex: Teacher may use the city budget and add items for the neighborhood to build a new grocery store and a new playground. Teacher will model the concept of subtraction from one item as a means to add to another. This interactive pie chart could support that http://www.shodor.org/interactivate/activities/PieChart/
Independent Practice (20 min)	Have groups assigned before this part of the lesson. Consider using this rubric for students to guide them in creating a budget proposal and presentation. In the creation of their budget proposals, also task students with explaining what they subtracted from and where they added to in order to include their initiatives. **Participation** (25%) This includes grading teamwork, sharing weight, and completing the proposal. **Critical Assessment of Existing Gov't Budgets** (25%) Reflection and explanation of the notes gathered and recorded in class discussions throughout the unit **Revisions Made and New Budget Presented** (25%) Presenting a new budget for the city/nation

	Completion looks like 100% of the budget accounted for. **Explanation** (25%) Explaining how the group's personal and collective values led to each decision made about the budget. Explaining the potential impact this new budget will have on the city/nation.

Notes

By now, groups should be established in the classroom regarding this project. It is highly recommended that groups be assigned before introducing the unit altogether. For the budget proposal, groups are tasked with deconstructing and reconstructing the government budgets that have been looked at in the previous three days. For earlier elementary, use the budgets that are shown by a pie chart and round the decimals to the nearest whole number.

For older grades, have them to create pie charts for each budget item and task them with determining how much they subtracted from one area to add to another area.

Hypothetical Scenario

Students arguing about values and budget items

Teacher: Understand that this is good. Deciding on how funds are allocated is difficult and you all are really working hard to be sure you stay true to the values you hold. Be mindful that everyone shares their own values, and the goal of this project is for you as a group to express what all of you value together. Take your time and remember our expectations around accountable dialogue.

DAY 5

Topic : Day 4, Fix The Funds	Subject: Math
Goal: Critically examine funding allocation and collaboratively create a new local budget.	Standards: 4.NBT.B.4 4.NBT.A.3 4.MD.A.2

Objective

SWBAT present their Group Budget Proposals IOT show what they know about addition, subtraction and percentages.

Do Now (10 min)	Have students work with groups to finalize their budget proposals
Whole Group Discussion (25 min)	Teacher: Today, you will be presenting your budget proposals to the class. This is you expressing what it is you value through the use of numbers and percentages. Teacher: As you observe group presentations, be sure to encourage your classmates as well as provide constructive feedback Each group will have 10-15 minutes to present and if do not get to everyone today we will finish tomorrow.

	At the end of every presentation, the audience should ask at least 2-3 questions and give 2-3 comments. Remember this rubric for evaluation **Participation** (25%) This includes grading teamwork, sharing weight, and completing the proposal. **Critical Assessment of Existing Gov't Budgets** (25%) Reflection and explanation of the notes gathered and recorded in class discussions throughout the unit **Revisions Made and New Budget Presented** (25%) Presenting a new budget for the city/nation Completion looks like 100% of the budget accounted for. **Explanation** (25%) Explaining how the group's personal and collective values led to each decision made about the budget. Explaining the potential impact this new budget will have on the city/nation.
Reflection Questions (25 min)	Teacher: In one word, describe how you felt after learning where the majority of tax money in local and federal budgets went. What can you do with the information and understanding you have now about local and federal budgets? There have been demands made by organizers to defund the police and divest from the U.S. military. How do you feel about those demands after going completing this project?
Exit Ticket	Based on what you learned in this unit, why is learning math important?

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