

## **Differentiated Math Small Group Instruction**

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### **Abstract**

Educators are feeling the pressure to provide their students with the most enriching instruction more than ever. In 2019, the world experienced an unprecedented

global crisis that has impacted education in a way that we have never seen before. Due to massive school closers and students transitioning from in-person instruction to digital learning, teachers are seeing major foundational learning gaps in mathematics. This is due in part to digital learning never being implemented for full classroom instruction. Teachers and parents were left to facilitate digital learning with little to no experience (Aditya, 2021). These foundational learning gaps in mathematics can be filled using differentiated small group math instruction. Teachers are motivated to do whatever it takes to make sure struggling, gifted, and in-between learners grow and help fill those learning gaps using differentiated small group instruction (Tomlinson, 2016). The researcher will analyze their school's math curriculum and see how Common Core Math Standards promote differentiation within the small group math instruction.

*Keywords: differentiated instruction, small group instruction, instructional strategies, Common Core Math Standards*

### **Introduction**

Being a classroom teacher during a global pandemic has had its challenges. Teachers have had to adjust from in-person instruction to full digital learning, and for

some, teaching concurrently both in-person and digital learning. COVID-19 has caused a massive disruption in students' learning. This disruption has caused major learning gaps for students. Many teachers are noticing distinct gaps in students' learning that they have never experienced before. The need for teachers to provide students with individualized learning has become a necessity to help bridge these learning gaps.

According to Coffey, differentiated instruction is a teaching approach that responds effectively and promptly to each student's diverse needs (Coffey, 2011). Differentiated small group instruction is one of the many ways teachers can help meet students' educational needs and help fill the learning gaps from the disruption of learning caused by COVID-19. During whole group instruction, teachers teach students generalized learning strategies, but with differentiated small groups, teachers can customize or modify instruction based on each student's unique needs. These small group instructions help the teachers collect hard data and observe students.

I have found using differentiated small groups in both reading and math to be an effective method to help meet the needs of the diverse students in my class, perform better on District Assessments, improve student engagement, and increase students' confidence. Furthermore, my school district has provided professional developments on the importance of differentiating instruction and has encouraged us to implement this school-wide. Nevertheless, many teachers and colleagues struggle to find the best practice to differentiate instruction due to the extra time that it takes to prepare instruction daily.

This study will further provide evidence of the advantages of using differentiated small group instruction in a primary school classroom during math instruction. It will

provide information on how this teaching approach can improve students' learning and how teachers can best implement this in their classrooms.

### **Purpose of Study and Research Questions**

The purpose of this study is to analyze my school district math curriculum to see how it allows differentiated small group instruction in my second-grade classroom. I will specifically be examining Georgia Standards of Excellence in mathematics and seeing how they support differentiation instruction.

In doing so, this study will determine the following:

- 1) What does differentiated instruction look like in a second-grade classroom using the Georgia Standard of Excellence in mathematics?
- 2) How do Common Core Math standards promote differentiation?
- 3) In what ways do the Georgia Standards of Excellence in mathematics supports best practices for differentiated small group instruction?

The goal of these questions is to determine how Common Core Math standards promote differentiation and what differentiation looks like in a second-grade classroom.

## **Literature Review**

### **Differentiated Instruction**

Many teachers are familiar with the term differentiated instruction. Differentiated instruction has been utilized in the education field for well over seventy years

(Tomlinson, 2016). Differentiated instruction is to provide individualized instruction to meet the needs of each student (O'Meara, 2010). But many other experts have referred to differentiated instruction in varying terms. For example, Carol Ann Tomlinson refers to the term differentiated instruction as the process in which a teacher proactively plans varied approaches to what students need to learn and how they will learn it (O'Meara, 2010; Tomlinson, 2016).

During whole group instruction, the teacher will teach the whole class a certain strategy at the appropriate grade level. Teachers will explicitly model how to do this strategy and allow the students to practice the strategy independently. But what happens to the students that are not on grade level? What about those students that we're unable to master the strategy taught independently? The average classroom today has a variety of students that come from diverse linguistic and cultural backgrounds that have unique learning needs (Tomlinson, 2016). Educators must meet all of these learning needs. Every student deserves to have educational opportunities and a fair education (Schleicher, 2016). Education for students should not be a "one size fits all" approach (Presseau et al., 2006). Differentiated instruction is one of the methods to help students that are not mastering a strategy and is for those students who are not on grade level. Teachers will observe students during whole group instruction and take anecdotal notes. These anecdotal notes will be used to help teachers create small groups and plan differentiated activities to help fill students learning gaps. These small groups will be flexible and will change frequently based on the students' needs at that very moment. This is the responsive teaching that students desperately need. These small groups are perfect to use for math instruction. In these

small groups, teachers can model math standards by using math manipulatives such as base ten blocks, math linking cubes, hundred charts, and number lines. Teachers can use the “I do, We do, and You do” model. The “I do” is where the teacher is specifically modeling their math thinking, math language, and how to solve the problem. The “We Do” is where the small group starts using the same thinking and language as the teacher modeled but solving the problem as a group. This allows students the opportunity to collaborate with the group as well as the teacher. The “You do” is where students try to solve math problems independently. This allows the students the chance to show what they have learned from the small group. This is the responsive teaching that students desperately need.

### **Common Core Math Standards**

According to the Georgia Department of Education, in 2009 governors and state education chiefs from 48 states came together to develop a common core of state K-12 English-Language Arts (ELA) and Mathematics standards. Georgia adopted common core state standards (CCSS) in the summer of 2010. The state ensured that the common core state standards met the expectation they had already set with their Georgia Performance Standards (GADOE, 2021). Common core standards were created to help streamline education and prepare students for college.

Many administrators expressed concerns about how prepared teachers were to teach the new common core math standards that made teachers change the way they would typically teach math (Allensworth et al., 2021). Studies have shown that there are many different variations in which teachers modified their math instruction, especially

teachers with low-performing students, who are spending less time on instructional time engaged in standard-aligned practices (Schweig, Kaufman, & Opfer, 2020).

While most states adopted common core state standards for math, how these standards were implemented was left up to the school districts (Desimone et al., 2019). It is up to the school district to decide how they can support teachers when implementing the common core state math standards. School districts can help instructional changes through new resources such as textbooks, technology, mini-lessons, professional development (PD) to help support new instructional practices, and Professional Learning teams (PL). Evidence has supported that more professional learning around the standards is related to stronger student outcomes (Kane et al., 2016). School districts must provide teachers with professional development on how to properly teach common core math standards and instruct what are the best practices to help support students who struggle with the increased difficulty that common core math standards have prescribed. According to researchers, one of the most frequent concerns teachers have about common core math standards is the lack of confidence in their ability to help students with low achievement to attain the skills required by the new standards (Hamilton et al., 2016). This is where teachers can implement differentiated math small group instruction. Differentiated math small group instruction can help low-achieving students have access to the challenging curriculum by meeting their students' needs where they are and assisting them with their individual needs.

### **Instructional Strategies**

Many teachers are facing the challenge of determining the best instructional strategies when it comes to differentiated instruction specifically when it comes to math instruction.

Transitioning from whole group instruction to differentiated can be intimidating. One of most of the most important things for a teacher to do when making instructional decisions is to use ongoing assessments. Effective teachers are constantly engaging informative assessments. These formative assessments will provide teachers with the necessary data to determine what their students' needs are.

After taking formative assessment data, you can start creating guided math groups. Guided math allows teachers to address students at their instructional level this will allow students the opportunity to learn to their full potential (Newton, 2021). Guided math allows teachers to support students learning by grouping students into small instructional groups to teach them in their zone of proximal development (Vygotsky, 1978; Newton 2021; John et al., 2014).

The goal for guided math groups is for students to become proficient mathematicians that can problem-solve independently and can pick a math strategy from their "strategy tool belt" to solve math equations. Guided math helps to get students comfortable with numbers, operations, and mathematical concepts so that they can independently work with new and different contexts (John et al., 2014). Guided math groups help build students' skills, strategies, and confidence using teachers' modeled and self-directed tasks. These groups are pre-selected based on the data collected through formative assessments or observations throughout the whole group lesson.

After reviewing the literature review, the researcher was able to show the importance of differentiation within the classroom, the ability to differentiate math instruction using common core math standards, and instructional strategies to help



promote differentiated math small groups. The research from the literature review supports the need for differentiated math small groups to help fill learning gaps students have regarding math instruction.

## **Methods**

### **Rationale**

The purpose of this study is to analyze my school district's math curriculum to see how it allows or promotes small group instruction in my second-grade classroom. I will specifically be examining Georgia Standards of Excellence in mathematics and seeing how they support differentiation instruction. This research was guided by the following research question: What does differentiated instruction look like in a second-grade classroom using the Georgia Standard of Excellence in Mathematics, How do Common Core Math standards promote differentiation, and What ways do the Georgia Standards of Excellence in mathematics support best practices for differentiated small group instruction. Many teachers and colleagues struggle to find the best practice to differentiate instruction due to the extra time that it takes to prepare instruction daily. This study assisted in determining how common core math can promote differentiation by using differentiated small group instruction in a primary school classroom during math instruction. It has provided information on how this teaching approach can improve students' learning and how teachers can best implement it in their classrooms. The type of research conducted was the qualitative approach. The teacher used anecdotal notes over 4 weeks. These anecdotal notes focused on the common core standard that was being covered for the week, materials needed, and how long was spent on the differentiated task.

**Measures**

The county in which the study was conducted is large in the southeast region of the United States. According to the Governor's Office of Student Achievement, 55% of the school students are identified to come from low-income families that received free or reduced breakfast and lunch. Since the school has a high number of students identified as low-income, the school is a Title I school. The classroom of the study consists of 22 second-grade students. The students were divided into four math groups based on daily formative assessments collected during the "You do" portion of the math mini-lesson. These groups consisted of distinguished, proficient, developing, and beginning learners.

**Procedures**

During the four weeks of the study, the teacher reviewed the common core math standards and Academic Knowledge and skills standards (AKS) that were being taught for the week. This curriculum is for grades kindergarten through twelfth grade and uses Academic Knowledge and Skills (AKS) that are aligned to state-adopted Georgia Standards of Excellence in language arts, mathematics, and literacy standards for science, and social studies. The AKS for each grade level spells out the essential concepts students are expected to know and skills they should acquire in that grade or subject. The AKS offers a solid base on which teachers build rich learning experiences. The Academic Knowledge and Skills (AKS) curriculum was developed by the county's teachers. The Georgia Standard of Excellence standard that was being taught during this time was:

**MGSE2.MD.8** Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and ¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?

While reviewing the standard, the teacher created “You do” questions that were used to collect data to create differentiated math groups. These “You do” questions consisted of multiple-choice word problems that students would solve independently. The answers the students chose helped determine what differentiated math small group they would be a part of. This helped the teacher prepare for the differentiated math small groups in advance. On average, it took the teacher approximately forty-five minutes a week to review common core math standards and create math small groups based on the standards being taught. Anecdotal notes were taken before the small group, during the small group, and after the small group.

The teacher first taught the students a whole group instruction lesson using the structure of a mini-lesson. The teacher introduced the lesson by making a connection to the previous math lesson taught to help students use their prior knowledge and get students in the mindset of doing math. Next, the teacher introduces the lesson by telling the students what they are learning today, the strategy they will be using, and why the students need to know how to do this. Then, the teacher follows the gradual release, “I do”, “We do”, and “You do,” model with the students. First, the teacher does the “I do”. This is where the teacher models how to solve the problem explicitly. Typically, the teacher will talk through their thoughts aloud to the class, so the students understand how the teacher walked through the problem and came up with the solution. Next, the teacher does the “We do”. This is where the teacher and the class work together to

solve a problem. This allows students to collaborate with their classmates and have the opportunity to work through any misconceptions they might have about the problem. Lastly, the teacher would then allow students to do the “You do”. This is where students are allowed to solve a problem independently and where the data was collected for small groups. Students were given an index card to solve their math problems. Students were asked to write the equations for the word problems and use one of the strategies they were taught to solve the problem. They were also asked to circle the multiple-choice answers to help the teacher be able to easily sort students into groups. Students were given approximately 5-7 minutes to solve the problem independently.

Once the students were divided into groups, the teacher then started pulling guided math groups. The teacher started the guided math group by explaining to students why they were pulled into a guided math group. The teacher showed the students a similar word problem to the word problem they solved independently and talked through the steps again. During this time, the teacher used different math manipulatives such as base ten blocks, hundred charts, number lines, and plastic coins depending on the students’ needs. This helped guide the students through the process and helped them understand what they misunderstood previously. After the teacher modeled the problem, the students were given another problem to solve independently at their seats while the teacher pulls another guided math group. The guided math group typically takes about fifteen minutes. On average, the teacher can meet with two to three groups during the math block. If the teacher is unable to meet with all four math groups, she will pull the remaining math groups first thing in the morning. The guided

math groups change every day allowing teachers to responsively teach to their students' needs and allowing teachers to proactively assist students promptly.

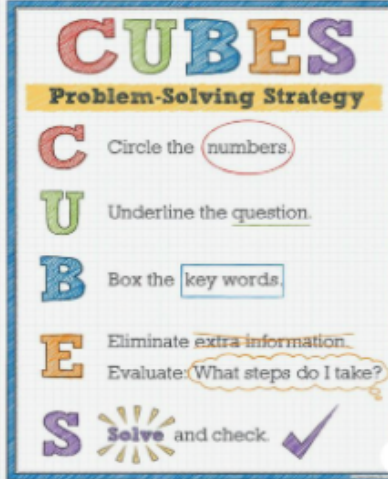
### **Results**

Before beginning the research, three questions were asked: First, what does differentiated instruction look like in a second-grade classroom using the Georgia Standard of Excellence in mathematics? Second, how do Common Core Math standards promote differentiation? Third, in what ways do the Georgia Standards of Excellence in mathematics supports best practices for differentiated small group instruction? To determine how my school district's math curriculum allows or promotes small group instruction in my second-grade classroom the teacher used anecdotal notes that were taken before the small group, during the small group, and after the small group. These anecdotal notes focused on the common core standard that was being covered for the week, materials needed, and how long was spent on the differentiated task. Figure 1 is a sample of the anecdotal notes that were taken throughout the week. In the anecdotal notes, I was able to create differentiated math small groups based on students' answer choices. I strategically made the multiple-choice answers easy for me to sort students into differentiated math small groups and was able to plan the small groups. This helped me ensure I had all of the math manipulatives ready and had the word problems ready for each group.

Week 1 Total time to plan: 45 minutes	Math Standard: <b>MGSE2.MD.8</b> Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and ¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?
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Differentiated Task:  
 Monday: Koby spent 55 dollars on an Xbox game and 43 dollars on a new pair of shoes. How much money did he spend in all?

A. \$12  
 B. \$98  
 C. \$89  
 D. \$18



**CUBES**  
**Problem-Solving Strategy**

**C** Circle the numbers

**U** Underline the question.

**B** Box the key words.

**E** Eliminate extra information.  
 Evaluate: What steps do I take?

**S** Solve and check. ✓

This is the "You Do" students will complete independently. This will decide what differentiated task the student will complete and which small group they will join. If the student picks A, the student didn't understand the language in the question and chose the wrong operation to solve the problem. If the student choose B, they would have been correct meaning they understood the question and could continue practicing the standard. If a student choose C, they would have set up the equation incorrectly and would need guidance on how to set up equations properly. If a student choose D, they mixed up the operations by adding and subtracting.

Group A- Small group focusing on dissecting the word problem using the CUBES math strategy.  
 Group B- Work in groups together solving more challenging word problems involving two steps or regrouping.  
 Group C- Small group focusing on different adding and subtracting strategies using math manipulatives(money/base tens) also using CUBES math strategy  
 Group D- Small group focusing on math language that tells you if you are adding or subtracting and how to set up equations correctly using math manipulatives (base tens)

Figure 1- Week 1 anecdotal notes explain the "You Do" of the mini-lesson and how students were divided into small groups.

At the end of the study, I was able to see that common core math does promote differentiation well. I was able to see that the common core math standards were very broad and somewhat vague when addressing the skills students should be able to do. For example, the math standard that was covered for the four weeks of this research: **MGSE2.MD.8** Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and ¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?

The standard does not give teachers much guidance when it comes down to instructing students on this standard. It would be helpful if common core math standards

had more suggestions as to how to model our teaching for the students to help maximize whole group instruction. I also found that guided math small groups were quite easy to differentiate and allowed me to use my time wisely to teach responsively for my students' needs. Referring to figure 1, I was able to actively assess my students' needs immediately and already planned each group out. This allowed me to use my time effectively and help my students master the standard.

### **Discussion**

Based on the findings of the study, common core math standards do promote differentiation, as well as teachers, can promote differentiation through guided math small groups. Given the findings, the way that states chose to implement common core math standards is left to local school districts. Being a part of a large school district, I have access to many resources that help ease the process of differentiation. For example, my county has math mini-lessons, access to technology, process charts of all math standards, and provide professional learning on differentiation. I must wonder if a smaller school district has access to these types of resources and if they do not have these resources what would differentiation be like for them? For those that do not have access to these types of resources, I suggest teachers take charge and research differentiated small groups and try implementing this practice within their classroom. I have found the best way for me to differentiate common core math standards was through guided math small groups. Guided math allows teachers to address students at their instructional level this will allow students the opportunity to learn to their full potential (Newton, 2021). The guided math small groups allowed me to take the common core math standards and break them down to help my students become

independent and confident with their math abilities. Using the “You do” part of the mini-lesson as my formative assessment data made it very easy to group my students based on their needs. Using these assessments, I was able to easily determine what students needed remediation and which students needed acceleration. Students were engaged and enjoyed their small group time.

Overall, I was able to determine that common core math standards do promote differentiation and guided math small groups help promote differentiation instruction in my second-grade classroom. My findings are significant to my study because this means districts that use Common Core math standards can promote differentiation within their classrooms and help students with diverse needs get their academic needs met. Guided math small groups allow teachers to support students learning by grouping students into small instructional groups to teach them in their zone of proximal development (Vygotsky, 1978; Newton 2021; John et al., 2014). As an educator, I will continue implementing guided math small groups in my classroom. I have seen my student’s confidence grow significantly in math and I have been able to challenge my students by adding more rigor to my math instruction. I will be meeting with my assistant principal and grade level chair to share my findings from this study. My goal is to host a professional development at my school for the teachers, instructional coaches, and school administration on how guided math small groups have impacted my class and how it has helped me as a teacher meet my students’ needs. Based on the research investigated within the literature review and the action research conducted, common core math does promote differentiation within guided math small groups.



## Conclusion

There are a few limitations throughout this study. First, this study is not generalizable to a larger population. This is a small-scale research study on differentiated math small group instruction that is limited to a second-grade classroom. Secondly, I would like to have some type of quantitative data to help show the growth students gained while being in guided math small groups. I think using a mixed-method approach would have added more data to support my study. Lastly, I could have conducted my research longer than four weeks. I think this would have shown more of a variety of common core math standards that were covered rather than just the one standard that was covered in four weeks.

Based on my findings, I believe future researchers should continue seeing how math curriculums help promote differentiation but examine smaller school districts. I am curious to see if a smaller school district has access to resources such as math mini-lessons, access to technology, process charts math standards, and provide professional learning on differentiation if they do not have these resources how are they meeting their students' diverse individual academic needs? Are they able to promote differentiation within their classrooms?

As we continue to see distinct gaps in students' learning due to the COVID-19 pandemic, I can't help but feel this utter sense of hope. I hope that these learning gaps can be closed. I hope that teachers can provide students with individualized learning. With the help of differentiated small group instruction, I truly believe we can help our students gain these foundational learning skills back and foster a love of learning.

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