1. Central Focus
   a. Describe the central focus and purpose for the content you will teach in the learning segment.

   The central focus that I will be teaching is about factors and the different elements that make them up. All three lessons are taught on this content.

   The first lesson focuses on finding all of the factor pairs for numbers that fall between 1 and 100. Students will learn how to dissect different whole numbers to find what factors make up those multiples. This is done to help students understand how numbers are correlated to one another as well as giving students a better comprehension of how multiplication facts are related to each other. Students typically have merely memorized their multiplication facts and understand what multiplication is, but working with factors shows how multiplication is related to other facts as well as reestablishing the facts in the memorization process. Students will practice breaking down multiples into factors by completing worksheets that have them practice finding the different factors. This lesson of listing out the factors and understanding how they are related helps prepare students for the second lesson which is understanding multiples.

   The second lesson focuses on building upon the understanding from lesson one where the students find the factors of different whole numbers. The central focus is that students will work to find the multiples that the factors create. This second lesson teaches the students that the factors that multiply together create a multiple, which is also known as a product in multiplication. For students to understand both sides of multiplication and that a product can be broken down into different factors not only aides in the understanding of how multiplication works, but it also aides in the understanding of how division works, as well as for the retention of division facts. In this lesson the students will make a multiples flap book in which they will write out all of the factors for different multiples. They will also work to come up with different ways of finding the factors of different multiples. They will use their knowledge of the previous lesson which will help them understand how multiples are made up of factors.

   The third lesson focuses on whether a number is prime or composite. This lesson builds off the knowledge from the first two lessons where the students will use their knowledge of factors and multiples to understand what numbers are constituted as prime or composite. In understanding prime and composite numbers, students will have a better knowledge of multiplication and what numbers can work as having multiples or factors, and which numbers do not. In this lesson the students will practice looking at multiples and analyzing whether they are constituted as composite or prime numbers.

   b. Given the central focus, describe how the standards and learning targets within your learning segment address

   - conceptual understanding
   - procedural fluency AND
   - mathematical reasoning or problem-solving skills

   The central focus of lesson one is finding all factors that are in whole numbers that range between 1 and 100. The standard that correlates is CCSS.4.OA.4 Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or
completely. The learning target for lesson one is that the students will understand that factor pairs create a whole number multiple. The conceptual understanding is met for the students as they practice finding different factor pairs of multiples in problems that they work through, as will the procedural fluency be met as they continue to practice the skill of finding different factors. Problem-solving skills will be addressed as students work with a number of different problems concerning factors which will allow them to practice the T-chart method of solving the factors.

The central focus of lesson two is to find the multiples that the factors create. The standard that correlates to this lesson is CCSS 4.OA.4 Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite. The learning target for lesson two is that the students will understand that factor pairs create multiples and that multiples are made from factors. The conceptual understanding for this lesson is met as the student understand that the factors that they learned about in the previous lesson make up the multiples that they are more directly working with. Procedural fluency is addressed as the students create multiples flap books that show the different factors that make up the multiples. Problem-solving skills are utilized as the students work through different problems to figure out the multiples that the factors create when put together.

The central focus of lesson three is to determine whether a number is prime or composite. The standard that correlates to this lesson is CCSS 4.OA.4 Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite. The learning target is that the students will correctly identify which numbers are prime and which numbers are composite, and what makes them such. The conceptual understanding for this lesson will be met as students correctly identify different multiples as either prime or composite, building off their prior knowledge of the first two lessons. They will also understand what makes a number composite and what makes a number prime. Procedural fluency will be met as students practice finding and identifying different numbers as either prime or composite. Mathematical reasoning will be employed as the students analyze different numbers and decide if the numbers are either prime or composite.

c. Explain how your plans build on each other to help students make connections between facts, concepts, computations/procedures AND mathematical reasoning or problem-solving strategies to deepen their learning of mathematics

[ All of my lessons are connected to each other and each following lesson builds off the one before it. In the area facts, students learn the terms factor, multiple, and product, as well as how to identify each of those in a problem. The students use this knowledge in their second lesson as they use those same vocabulary words as well as one-digit number to learn get a better understanding of factors and multiples. In lesson three the students will use the same definitions as well as the words prime and composite as they build off their prior vocabulary to gain a better understanding of prime and composite numbers. The concepts that they learn also build off one another as in the first lesson they learn what factors and multiples are and how they relate to each other, while in the second lesson they learn how to create and find factors and multiples, while in the third lesson they use those prior skills to find what numbers do and do not have a number of factors. The computations and procedures build
off each other as in the first lesson the students learn how to find factors by using the T-chart method, and in the second lesson they can again use the T-chart method, but they are instructed to come up with another way of finding factors and multiples. In the third lesson they will use those skills to identify which numbers are prime or composite by looking at the list of factors they contain. The problem-solving strategies also deepen as students first are given one technique of finding factors and in the second lesson they are given the opportunity to create other methods of finding factors, while at the same time looking at the problem backwards in finding which factors create which multiples. The third lesson grows off of this as students will use those same techniques to find factors again, but to look at them in a new angle by identifying their multiples as either prime or composite.

d. How and when will you give students opportunities to express their understanding of the learning targets and why they are important to learn?

[ At the beginning of each lesson, I address this issue as the students are first supposed to write the learning target of the day in their math journals so that they comprehend what we will be covering each day. The students are also given the opportunity each day to express their understanding of the learning target and their importance when I focus on the community connection in the introductory portion of the lesson. The students will be able to voice their opinions on why these techniques and pieces of information are important as well as addressing who in the community may use these skills and for what purposes, thereby giving it a real life connection for the students to see the application of where and when the skills might be used. At the end of each lesson, students will be given the opportunity to either verbally or in written form express what the learning targets are as well as their importance. ]

2. Knowledge of Students to Inform Teaching

For each of the prompts below (2a–c), describe what you know about your students with respect to the central focus of the learning segment.

Consider the variety of learners in your class who may require different strategies/support (e.g., students with IEPs or 504 plans, English language learners, struggling readers, underperforming students or those with gaps in academic knowledge, and/or gifted students).

a. Prior academic learning and prerequisite skills related to the central focus—Cite evidence of what students know, what they can do, and what they are still learning to do.

[ The prior academic learning and skills that the students need to be able to do before the lesson occurs is at least have a basic understanding of multiplication and division as factors and multiples are based off of multiplication and division facts and procedures. It would be most helpful for the students to have their multiplication facts memorized from 0-12, but it is not necessary as students do have reminder sheets in their daily planners. All students do know how to multiply, as they have been working on multiplication of two digit numbers earlier this year. Students have an understanding of multiplication and how to perform it, but not all have an understanding of what multiplication is and how it works. Students are still learning to memorize their multiplication facts, as well as division facts, but, as I mentioned before, all students know how to perform these algorithms accurately. Students with IEPs who have trouble with math in this class are still able to perform multiplication operations and so have the foundation of being able to solve these different problems related to factors and multiples. The struggling readers may have trouble in writing the notes in their journals, but they have been doing this all year long with math, and I will write on the poster and on the board what they need to write in their journals so they will have visual support to help them achieve this goal. Those students will struggle with math will also receive support as they work to solve the different problems involving factors and multiples as they will be working
with their peers on answering the problems in the beginning of the lessons and so will scaffold their learning until they are able to more soundly perform the operations on their own.

This is in addition to working on a few of the problems as an entire class up front as the information is introduced. The higher performing students already have a thorough understanding of multiplication, division, and their factors, but they might not know the terms that go along with their understanding. The higher performing students will learn the vocabulary that goes with their understanding and will be pushed to think outside the box of how to solve for factor and multiple problems.

b. **Personal/cultural/community assets related to the central focus**—What do you know about your students’ everyday experiences, cultural backgrounds and practices, and interests?

The class seems to be split quite evenly in regards to both ethnicity and math interest (although ethnicity is irrelevant to the students’ math interest). The classroom has a relaxed atmosphere where the students feel comfortable to answer questions, and the relationship between the students is often one of camaraderie. The math class is at the beginning of the day where students first practice “Drops in a Bucket” where they work on a common theme of problems daily that sets their mind into math mode. The math portion ensues directly after this problem set where students sit quietly in their desk to learn and perform different mathematical operations. All students have a growing respect for the teacher, although some students have trouble focusing and are more likely to push the boundaries of classroom protocol. Not all students have a deep interest for mathematics, but just about all students are willing to learn and to try to solve the problems and understand the concepts that are before them.

The students’ everyday experiences include coming to school at around 7:45 am with a large portion of the students eating school provided breakfast. The students stay at school until 2:35 pm where they either walk home, get picked up, or ride the bus. Some students stay at school longer for an after school care program which is mainly for the students to have somewhere to be until their parents get off of work. The students are split fairly evenly between this.

The students’ cultural backgrounds are split pretty evenly with half coming from caucasian decent and the other half coming from Hispanic decent. Many of the Hispanic students have parents who are from Central or South America and their parents’ (and the students’) first language is Spanish. This being said, all of the students in my class speak English fluently and can read, but at home they are most likely being spoken to in Spanish.

Many of the students have interests in sports, with many of the boys enjoying playing with balls at recess and some of the girls participating in gymnastics after school. The students overall also enjoy reading a lot, and in their spare time during class can be found reading a book. The students know each other fairly well as most of them have been going to school together since they were in kindergarten, and thus feel comfortable with each other. This means that there is a lot of chatter in the class that isn’t related to school work, but it does mean that they feel comfortable with each other.

c. **Mathematical dispositions related to the central focus**—What do you know about the extent to which your students

- perceive mathematics as “sensible, useful, and worthwhile”
- persist in applying mathematics to solve problems
- believe in their own ability to learn mathematics

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*From the Common Core State Standards for Mathematics*
Many of the students perceive math as useful as they are willing to complete their assignments and consciously use what they have learned in different subjects, as well as some exploring what they have learned and using it in their own endeavors. I will address this issue by asking students why learning about factors and multiples is important, as well as addressing the community connection which will show how these topics are used in everyday life.

The students use the different math procedures to solve the questions that they are faced with in math class. Students show their persistence to understand and apply a concept by asking for assistance if they don’t comprehend a topic or by working together with a group to try and solve the answer, or to just make sure they are doing it correctly. I will address this by having students work together to solve problems as well as informing them to ask for help, either from their neighbors or from myself, if they are having trouble with a concept.

Many students believe in their personal ability to learn and perform mathematics, but a lot of students get caught on some concepts and have trouble working past or around those hitchups. Some students will stop and sit idly if they don’t understand or if it takes too much effort. I will address this in my lessons by having the students be held accountable to one another to complete their assignments correctly, as well as walking around myself to monitor their progress and to take and answer questions.

3. Supporting Students’ Mathematics Learning

Respond to prompts below (3a–d). To support your justifications, refer to the instructional materials and lesson plans you have included as part of Task 1. In addition, use principles from research and/or theory to support your explanations.

a. Justify how your understanding of your students’ prior academic learning and personal/cultural/community assets (from prompts 2a–b above) guided your choice or adaptation of learning tasks and materials. Be explicit about the connections between the learning tasks and students’ prior academic learning, assets, mathematical dispositions, and research/theory.

I chose to teach about the factors and multiples because it was the next sequential portion that the students would be learning about. The students have recently learned about multiplying and dividing and these lessons directly correlate to the comprehension of the relationship of multiplication facts and division facts, as well as how they are applicable outside of merely memorizing facts. I wanted to teach in a way that would show the students that what they are learning about factors, multiples, and prime and composite numbers is applicable to daily life and is something that will be helpful for them to know, not just on a scholastic level, but on a community level. I also wanted to show the students that factors and multiples are directly related to multiplication and division, which is an area that the majority of the class has a hard time focusing on and seeing value in. These tasks were designed to meet each child’s needs, whether they are gifted in math, or if they are struggling. The tasks both challenge and support the students of gifted, average, or below average status by building off of what they already know about multiplication and division and then stretch their understanding as they apply factors and multiples to that understanding. I chose tasks for them to do that have them focus on figuring out factors of multiples, as well as figuring out multiples of factors so that they can see it in two different ways. In their tasks they are given practice problems to practice figuring out the different answers, as well as different methods for solving problems. By using the theory of prior knowledge (Dewey, 1938/1998), students will use their multiplication and division skills to solve their different factors and multiples problems. The lessons build upon each other to support the theory of scaffolding (Vygotsky, 1978; Koch, 2013) where they will use what they learned in lesson one about factors to apply to lesson two about multiples, where they will use both skills about factors and multiples in lesson three to understand the concept of prime and composite numbers. I understand
my students' prior understanding by starting off the lessons with having them work on multiplication, which is something that they just started working on, and then having them begin to work with the concepts of factors and multiples. The students understand how multiplication works, so by labeling the correct vocabulary of factors and multiples and how to solve it, I am scaffolding off of what the students already understand about multiplication. I also understand that the students don’t work on multiplication that much and many do not have any of their multiplication facts memorized. This means that they will need support in finding the answers of the factors that make up multiples, vice versa, and prime and composite numbers, but they have multiplication fact sheets that they are able to use to help them check to make sure their answers are accurate.

b. Describe and justify why your instructional strategies and planned supports are appropriate for the whole class, individuals, and/or groups of students with specific learning needs.

Consider students with IEPs or 504 plans, English language learners, struggling readers, underperforming students or those with gaps in academic knowledge, and/or gifted students.

[ My instructional strategies are appropriate for the whole class because I begin each lesson by teaching the group as a whole how to perform the different operations and we will as a group discuss why these skills are necessary. I will also have a response time available at different times throughout the lessons where students will check to see if they’re getting answers correct. The students are also able to work in groups as they try the first few problems of their assignments alone to make sure they are understanding how the problems are to be solved. Individually, students are given the opportunity to practice what they have learned by solving the different problems that are related to that day’s lesson. The three students that receive assistance for math will be paired with students who have a solid understanding of the concepts who will help aid them in their understanding of the concepts. The three students will also be given less problems to work on which will allow them to work through the problems they will do more thoroughly, as well as allowing themselves to get a better understanding (Burns, 2007) of what they are working on instead of rushing through the assignment to try and get it done. ]

c. How will students identify resources to support their progress toward the learning targets?

[ The students will identify resources to support their progress towards the learning target by the notes that will be taken in their journals at the beginning of each lesson (Burns & Silbey, 2001), the multiplication charts that they will refer to, as well as working with each other to support their learning and comprehension, as well as asking me for help when needed. The students will be able to refer back to their journals at any time to check on the procedure for doing problems or as a reminder for the learning target for that day. Students will be able to refer to multiplication charts to confirm they are finding the correct answers to the problems. The students will support each other in their understanding of how to complete the different problems as they work together through some of the portions of the assignments from each lesson. The students will also be able to ask for assistance or clarification from myself as I walk around the classroom to check on performance and comprehension. ]

d. Describe common mathematical preconceptions, errors, or misunderstandings within your central focus and how you will address them.

[ The central focus of lesson one is finding all factors that are in whole numbers that range between 1 and 100. Students may have preconceptions about this portion by wanting to only determine one set of factors for each multiple instead of working to solve for each of the factors that the multiple contains. The errors may fall into that same thinking as students }
stop solving after they have found one set of factors. I will address this in the beginning of the lesson as I demonstrate the T-chart and that the students are to check each number from 1-10 until they have matched all of the possible numbers that could be found for each multiple. I will also have the students check with each other to make sure they are finding all of the answers needed.

The central focus of lesson two is to find the multiples that the factors create. The students may make similar errors here in that they only see some factors as matching with one multiple, instead of a factor matching with more than one multiple. I will address this at the beginning of the lesson to make sure that the students are finding all of the multiples that the factors match with. They will also create multiples flap books where they will check their answers on their problem sets to make sure that they are solving each of the problems correctly. Again, they will check with other students to monitor their accuracy, and I will be walking around the room to make sure that they are completing their assignments accurately.

The central focus of lesson three is to determine whether a number is prime or composite. Students may misunderstand that a prime number only has one and itself as factors and that a composite number has more than just one and itself as factors. To help students remember that prime numbers only have one and itself, I will remind them that prime is a shorter word than composite, and so has a shorter list of factors. In the opposite way, I will remind students that composite is a longer word than prime and so has a longer list of factors, meaning that it’s list of factors would be more than merely one and itself.]

4. Supporting Mathematics Development Through Language

   a. **Language Function.** Choose one language function essential for student learning within your central focus. Listed below are some sample language functions. You may choose one of these or another language function more appropriate for your learning segment:

   | Categorize | Compare/contrast | Describe | Interpret | Justify |

   [The students will categorize the factors and what multiple they go with. This language function will be used throughout all three lessons as the students categorize the factors on the first day, the multiples on the second, and as they categorize numbers as being prime or composite on the third day. ]

   b. Identify a key learning task from your plans that provides students with opportunities to practice using the language function identified above. Identify the lesson in which the learning task occurs. (Give lesson day/number.)

   [On day one, December 3, lesson one, the students will categorize factors on their worksheet as they determine which multiple the factor goes with. On day two, December 4, lesson two, the students will categorize the multiples and the factors that match to them by completing their multiples flap book. On day three, December 5, lesson three, the students will categorize numbers as prime or composite by completing their worksheet which allows them to solve for finding the factors (as they did on day one) and then categorizing the multiples as either being prime or composite, depending on the factor list that correlates to each one. ]

   c. **Additional Language Demands.** Given the language function and learning task identified above, describe the following associated language demands (written or oral) students need to understand and/or use:

   - Vocabulary and/or symbols
Plus at least one of the following:

- Syntax
- Discourse

Consider the range of students’ understandings of the language function and other language demands—what do students already know, what are they struggling with, and/or what is new to them?

[For the first two lessons, the students will need to understand both what factor and multiple means so that they may properly categorize the numbers as either being factors or multiples. The students should also have an understanding of the terms multiply, divide, and product so that they can see the correlation between multiplication and factors and multiples. The students will be asked to write down the vocabulary words in their journals, and will need to know how to use those words verbally as they discuss problems with their peers. The students will use discourse to identify the language function of categorizing the factors and multiples both in their notebooks and on their problem sheets as they will identify the correct answers for the factors and multiples. While I lead out in showing how these operations are to be used, I will have the floor open for students to discuss how they think the problems should be solved, as well as what the answers are. While discussing these different facets, the students will be properly using the vocabulary words factors and multiples, as well as will be listening to them being properly used in sentences as their peers and myself will be speaking about them. The students will see the words and the definitions written on the poster, they will write the words and definitions in their notebooks, they will hear and speak the words properly in sentences as they discuss as a class and with their partners what factors and multiples are, as well as how they are used, and they will decipher on their worksheets which numbers are factors or multiples and will properly use them in answering the questions on the worksheets.

In the third lesson, students will need to be able to use and understand the terms factors and multiples, just as before, but they will also learn about prime and composite numbers, which are new vocabulary words that they need to understand. Students will use these in discourse by writing the terms and definitions in their journals, as well as correctly labeling numbers as either prime or composite on their problem sheets. As with the previous two lessons, the students will be engaging in a discussion of the previous terms factors and multiples as we discuss how to solve the problems that are presented and what numbers represent the factors and multiples. Again, students will engage in hearing myself and their peers verbalize the correct definitions of factors and multiples as we discuss how to solve problems and what the numbers are, yet added to this list students will also hear and speak the words prime and composite as they discuss what numbers only have factors of one and itself, and what numbers have factors of one, itself, and at least one other factor. In hearing and speaking these words in the discussion of modeling solving the problems, students will begin to understand these vocabulary words, and they will also use the vocabulary words correctly if they engage in the discussion, or while they talk with their partner about how to solve the problems. Students will also be exposed to the definitions of these vocabulary words as I write the words and definitions on the poster, as they write them in their journals, as they determine which numbers are factors or multiples, and which of those numbers are either prime or composite on their worksheets.]

d. Language Supports. Refer to your lesson plans and instructional materials as needed in your response to the prompt.
Describe the instructional supports (during and/or prior to the learning task) that help students understand and successfully use the language function and additional language demands identified in prompts 4a–c.

Students will receive support prior to the learning task by using language in each lesson by first writing down the appropriate terms and definitions in their math journals, as well as giving themselves a visual aid of an example of a few problems that show how the terms are used. Students will receive support during the learning task by working through problems with their peers and discussing the different problems, which will lead the students to use the correct language of the terms that they are using. I will also model the correct terminology before, during, and after the learning task as I perform example problems and discuss questions that the students may have.

5. Monitoring Student Learning

In response to the prompts below, refer to the assessments you will submit as part of the materials for Task 1.

a. Describe how your planned formal and informal assessments will provide direct evidence for you and your students to monitor their conceptual understanding, computational/procedural fluency, AND mathematical reasoning or problem-solving skills throughout the learning segment.

My informal assessments will monitor the students' conceptual understanding as they provide me with verbal answers to how the different concepts of factors, multiples, and prime and composite numbers are used in everyday life by people in the community. The formal assessments of their math journals will document their conceptual understanding by giving them room to document the concepts as well as making notes to remind themselves how the concepts work. Informal assessments will monitor the students computational and procedural fluency as they discuss how they solved different factor and multiple problems with their partners, which they will then discuss with the entire class. Formal assessments about computational and procedural fluency will be given as students complete their practice problems and show their work for how they came to the correct answers. Informally, I will assess the students' problem-solving skills by having a students show on the board how they came to the answers of the practice problem. I will assess them formally on their problem-solving skills by looking over their problem sheets to determine if they have properly and thoroughly completed the problems assigned on factor and multiple performance.

b. Explain how the design or adaptation of your planned assessments allows students with specific needs to demonstrate their learning.

Consider all students, including students with IEPs or 504 plans, English language learners, struggling mathematics students, underperforming students or those with gaps in academic knowledge, and/or gifted students.

The set up of my assessments allows students who need help with math to first write down in their journals what they are to be doing so that they may look back on their notes and follow the steps if needed. I also have opportunities for the students to work within their pairs to solve the problems that arise. By looking at their notes and working with a partner who understands how to solve the problems, they will be better equipped to solve the problems themselves and comprehend what to do to solve the problems, as well as why it is done that way. I will also allow students to ask me questions while they are solving the problems on the assessments, as well as reducing the number of problems on the assignment so that the students aren’t overwhelmed by the task at hand and so that they are able to focus more on comprehension of the problems at hand than being worried about finishing the assignment.
c. Describe when and where you will elicit student voice (oral or written) during instruction to raise awareness in both you and the students of where students are relative to the learning targets.

[I will elicit student voice verbally at the beginning of each lesson as the students come up with ideas of how the concepts of factors, multiples, and prime and composite numbers are used in the community. This shows their understanding and concept of the learning target of the day as they will understand what factors and multiples are and how they work, as well as prime and composite numbers. The understandings of these concepts are then applied to the community and how the community is able to use these concepts in everyday life. I will also have the students discuss amongst themselves how to solve problems in each of the three lessons during the learning activity as they perform the problems together. At the end of the learning activity in each of the lessons I will allow time for the students to explain a few of the problems and demonstrate how they solved for the answer. In lesson one students will explain their different answers for a few of the problems, while in lesson two students will discuss how they used different techniques to find the factors of multiples, both at the end of the learning activity. In lesson three at the end of the learning activity the students will voice what numbers are prime and which are composite. To understand the learning target and its relevance to these different themes, the students will reiterate the learning target at the end of the day (as well as stating it at the beginning of the day) and how they have applied it in their work and lesson. The exit tasks for the day are focused on the learning targets and the students will examine the learning target and will write down comments that are related to the learning target, as well as the quotation of it. ]

d. What tools and strategies will students use to monitor their own learning process during the learning segment?

[ The students will be able to monitor their own progress throughout the learning process by referring to the notes that they have taken in their journals that correspond to the concepts that they are going over that day. They will be able to check the definitions of key words as well as see how they previously performed operations to make sure that they are still completing the operations correctly. Students can refer to the multiplication charts in their lesson planners to make sure that they are coming up with the correct factors and multiples. Students can also check their progress by checking with their neighbors to make sure that they are coming up with the same answers and performing the operations accurately. And, of course, students can check with me to make sure that they have the concept straight and that they are on the right track to solving the problems correctly. ]