

EDU 320 – Synthesis Paper

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In this paper I will pull together many of the aspects of curriculum, instruction, and assessment that we have discussed in EDU 320. In each chapter that I will cover I will include a description, an artifact that I have created, and a reflection on how the concept will be used in my future classroom. The chapters or topics that I will be reflecting on are the effective teacher, understanding one's students, goals, standards, and objectives, unit and lesson planning, technology integration, questioning strategies, direct instruction, indirect instruction, and assessment. I will then conclude with some of my "take-aways" from this class.

The Effective Teacher

Description

A "good" teacher is no longer measured by their character, rather there has been a shift towards measuring the effectiveness of a teacher. In other words, a teacher's effect on their students is studied in addition to their individual qualities. The focus is now on teacher-student relationships and ensuring that students are getting a helpful education. In class, we looked at the 10 InTASC Standards that teachers should know and meet in order to be an effective teacher

Artifact

See Appendix A for my personal experiences with effective teachers, meeting the ten InTASC Standards.

How it Will Be Used in Classroom

I will aim to be an effective teacher by recognizing the InTASC standards in my own classroom plan. I see these standards, not as tasks or chores to get done, but rather as a way to give my future students an effective education experience. The focus of these standards is not about making me a better person, but providing a better experience to my students. Although

“good character” is important for anyone who is working with children, there is more to teaching than being a “good” person.

Understanding Your Students

Description

Every human person has differences, and children are by no means an exception. It is important for both a teacher and students to recognize that individual differences can be an asset to learning. The only way to effectively use individual differences, however, is to take the time to know your students and form a relationship of mutual respect. Although relationships take time and trust, it is beneficial to begin the school year with a way of getting to know your students, both personal interests and academic strengths and struggles.

Artifact

See Appendix B for an example of how I may get to know my students at the beginning of the year.

How it Will Be Used in Classroom

Building a trusting and caring relationship with my students will be extremely important to me. I will look to the example of so many of the Professors in the Education Department to foster an understanding of my students. I will not simply give my students a “get to know me” sheet and call that good. Rather, I will constantly build on understanding my students so as to find ways to best adapt their learning to be the most effective.

Goals, Standards, and Objectives

Description

Goals give a sense of direction with a general expression of important values. Standards take those goals and specify what must be accomplished to meet the goal. Objectives take a

standard and articulate specific behaviors and outcomes that are expected in order to successfully accomplish the standard. In Education, local educators and consultants offer core standards for the state, so as to try to keep students at more or less the same rate as others their age.

Artifact

See Appendix C for my top ten takeaways when reading the introductory information of the North Dakota Mathematics Content Standards.

How it Will Be Used in Classroom

Although the State standards are technically not mandatory, they are still a helpful guideline for a school year. I know that I will not be able to get my students to the level of mastery in every standard every year, but I intend to use them for the sake of any of my students who may need to move out, or who may have moved in. It is important for me to recognize, however, that every school year will be different based on the students that I have that year, and that it is ok if my objectives look a bit different throughout various years.

Unit and Lesson Planning

Description

Unit and lesson planning is a necessary aspect of teaching. It is important that teachers are prepared with what they will be teaching, saying, asking, and striving for in each lesson. Another aspect of planning instruction is that it gives teachers the opportunity to take a step back and imagine and possible issues or concerns of a lesson. Opportunity to create backup plans or differentiation options is also provided. It is important to be proactive and prepared for issues, rather than being surprised and frazzled when they happen in front of students.

Artifact

See Appendix D for the lesson plan that I created.

How it Will Be Used in Classroom

Lesson planning will be a crucial aspect of teaching. I recognize now that “winging it” is never going to work out. As I get more teaching experience, I may not need as detailed lesson plans, but I will still always need a plan. Just as much as I will need to plan, I will also need to be adaptable. Lesson plans are a great base, but they are not the present moment. Circumstances may come up that I did not account for in the lesson plan, and I will need to make changes on the spot.

Technology Integration in Instruction**Description**

Integrating technology into a lesson should never be a “fix” for a poorly planned instruction period. Technology is intended to be used as an asset to a lesson, not as the teacher. When technology is integrated into instruction it should not feel disconnected from the lesson. Students should be given resources that help them to see that they can use technology to assist them in their own life.

Artifact

See Appendix D for the integration of technology into my lesson plan.

How it Will Be Used in Classroom

I know that I am not the most technologically savvy person, but that being said, I do intend to integrate technology into my future classroom. There are so many programs and sites available that will make the lessons feel applicable to “real life”. In addition, adding technology in a intentional manner will give my students an exciting change in their school day. I will not use technology as an excuse or replacement for not being prepared.

Questioning Strategies

Description

There are many benefits to, or reasons for, asking effective questions. Questions can gain interest and regain attention, improve understanding of content, and encourage higher thought processes. Both Convergent and Divergent questions are important in a classroom. Convergent questions have a single answer, or a small number of pre-taught responses. Divergent questions (also known as “open-ended” questions) can have a wide variety of responses. It is important to give at least 3-5 seconds of wait time after a question is asked to reach reflection, as well as give time for students to process the question.

Artifact

See Appendix D for questioning strategies used in my lesson plan.

How it Will Be Used in Classroom

I know that I, personally, need time to process questions, so I will be implementing a wait time in my classroom. It will often feel awkward to wait, but I know that waiting would be effective in the long run. I also intend to maintain a balance of convergent and divergent questions. I can see the benefit of both, especially in gauging where my students are struggling and what they are understanding.

Teaching Strategies for Direct Instruction**Description**

Direct instruction is also known as a Type 1 learning outcome. With this type of instruction students are learning new information. They are being told facts, rules, and sequences, often using lower levels of Bloom’s Taxonomy. Direct Instruction lessons follow the flow of explanation-examples-practice-feedback. Content is presented clearly and sequentially and there are frequent check-ins for understanding.

Artifact

See Appendix E for a direct lesson plan that I taught to my peers.

How it Will Be Used in Classroom

In my future classroom there will be many opportunities for teaching with direct instruction. I know that too much direct instruction time is ineffective, so I will do my best to provide brain breaks and differentiation strategies when I do need to present new information. I think that one struggle I will work on is remembering to frequently check in with student's understanding. I can see where this may come easier when teaching the lesson to students who truly are learning it for the first time, instead of my peers who already knew the concept.

Teaching Strategies for Indirect Instruction**Description**

Indirect Instruction is also known as a Type 2 learning outcome. Indirect instruction is used for teaching specific concepts and relationships for concepts that have already been introduced. Indirect instruction should often be inquiry based, using the upper levels of Bloom's taxonomy. These types of lessons can lead to discovery and encourage high levels of thinking and problem solving. These lessons can also often tap into interests and abilities of individual students.

Artifact

See Appendix F for an indirect lesson that I created, along with a rubric for assessment.

How it Will Be Used in Classroom

Although indirect instruction may take more planning on my part, I think that the benefit of this type of lesson is worth it. I see problem-solving and individuality as being big focusses in my future classroom, and I think that indirect instruction and Project Based Learning fosters both

of these ideas. I can see myself using the lesson that I created in my future classroom, and I am excited to find many more indirect instruction ideas!

Assessing Learners

Description

There are two types of assessments: formative and summative. A formative assessment could be a pre-assessment, or any way of gauging what students know, remember, or are struggling with. This could be a small written assessment, or it could be observation or questions and answers asked out loud. A summative assessment is given at the conclusion of a lesson or instructional period to be graded. A summative assessment should never be used to trick students, rather it should be a good representation of the individuals understanding of the content.

Artifact

See Appendix G for a test that I created and administered to a classmate. See Appendix H for a blueprint to ensure that each level of Bloom's Taxonomy is incorporated into my test.

How it Will Be Used in Classroom

As much as I do not want the focus of my classroom to be on tests and grades, assessments will be a necessary aspect of teaching. I want to use as many small formative assessment strategies as I can, so as to help my students feel empowered to ask questions, and therefore feel more confident for their summative assessments. One strategy that I plan to implement is to have two boxes at the door, one labeled "I know" and the other labeled "I wonder". After lessons I will ask students to write and place something in each box.

Conclusion

The thought of curriculum, instruction, and assessment initially intimidated me. I have been excited to teach content and to work with children, but the idea of meeting standards and

grading made me nervous. After this class, however, I recognize that these three aspects of teaching are ultimately for students to have the opportunity to have an effective education experience. This class has shown me that every aspect of teaching can provide an opportunity for creativity, relationship, and excitement. I am very passionate about uniqueness and individuality and I now know that curriculum, instruction, and assessment do not take these things away from students. I think that, ultimately, this class solidified my desire to be a teacher. It showed me that the parts that I have been nervous for are do-able, and that gives me confidence to push forward. I know that I have much more to learn and practice, but I appreciate that this class has shown me that I can get through things that may be difficult.

This class gave me the opportunity to practice writing lesson plans and creating assessment opportunities. Even if I will not use the specific lesson plans that I created in my future classroom, it helped me to get into the mindset of implementing strategies and differentiation into lessons that meet standards. Being able to teach my lesson to my peers or administer a test to a peer gave me a better idea of my strengths, as well as the things that I need to improve on when it comes to teaching. As mentioned previously, this class solidified my excitement to teach students, and having the opportunity to teach my peers was one of the influences for this.

References

L Borich, Gary D. (2017). *Effective teaching methods: Research based practice*. University of Texas at Austin: Pearson Education, Inc.

Appendix A

InTASC Standards Paper

Standard #1: Learner Development – One of the High Schools I attended was very small, so we were not able to choose our own classes. Everyone in my grade had the same classes. I noticed my Physics teacher would give us different options for projects. This enabled the students who were not as developed in areas of math or science to still participate in class. I appreciated that he did not just leave them behind, rather, he allowed them to choose the way in which they would get the most out of an assignment.

Standard #2: Learner Differences – The same High School was a private, Catholic, school. In my class, one student was not religious at all. Instead of isolating her, my religion teacher would make a point of asking her what her thoughts were. He would give her assignment submissions just as much thought, not dismissing her because her beliefs were different. It was interesting to get an “outside view” of the Catholic faith since many of us in the class grew up with it.

Standard #3: Learning Environments – At the other High School I attended, I participated in a hybrid online/in-class schedule. For the students who were online, we were able to work in a separate building that had many different collaborative rooms and quiet rooms. Students had their pick of where they wanted to study, eat lunch, take tests, socialize, and even get tutoring from staff. It was a very positive and helpful environment.

Standard #4: Content Knowledge – When I read this standard, I thought of Mr. Cleary here at UMary. He taught many of us Elementary Education majors for MAT 201 and 202. He taught in a way that showcased his passion for math and his understanding of how individual people may have learned math differently. He showed many different examples of a particular concept in order to help each student understand.

Standard #5: Application of Content – This past spring I had the opportunity to study abroad in Rome. I noticed an incredible application of content in our art class. Mrs. de Mesmay was able to keep us all engaged as we looked at art for an entire week. Art weeks were exhausting but we all loved that class. By the end of the week she would be able to call on one of us to look at an art piece and identify different aspects of it. She taught in a way that even those of us who previously had no particular interest in art learned more than we thought we ever could.

Standard #6: Assessment – When we went online in the spring, my Search for Happiness professor used multiple different methods of assessment. She would have readings with quizzes, short papers, or reading guides to fill out, and in addition she would also give us the opportunity to discuss with our peers. This would take place in both discussion boards on canvas and weekly zoom calls that were dedicated to discussion rather than lecture. She would assess both our academic progress as well as how we were all doing mentally and work with us when we were overwhelmed.

Standard #7: Planning for Instruction – In the private High School that I attended, my English teacher was also my History teacher. He would often plan his instruction in the two classes to line-up or build on each other slightly. If the content itself did not line up, he would connect terms or time periods. This allowed all of us students to think about these subjects, not as two separate things, but two parts of the same world.

Standard #8: Instructional Strategies – In the Classroom Environments class with Mrs. B. we were taught using many different strategies. Some days would be lecture, some would be collaborative work, some would be individual work days to catch up on assignments, and some days would be filled with arts and crafts and acting games. Because the instructional strategies were varied, I found myself very engaged during each class.

Standard #9: Professional Learning and Ethical Practice – I have found all my professors at UMary to be professional in their teaching and in building relationships with the students. They all seem to be very open to student ideas and critiques, showing that they are both teaching us, and learning from us.

Standard #10: Leadership and Collaboration – My math teacher at the private High School took on the role of the Senior class leader. He took it upon himself to check up on our college applications and plans; he would make sure we were each able to get senior photos taken; he would encourage us even when we all had senioritis. I think that he wanted us to each have a special senior year where we knew we were cared for and supported.

Appendix B

Movement Guided Questions

1. Step to the right if you work best when its quiet

Step to the left if you work best when there is noise in the classroom

2. Stay standing if you like to work at a table or a desk

Sit down if you like to work on the floor

3. Stand on one foot if you like to work by yourself

Stomp your feet if you like to work in a group

4. Take a step forward for every brother or sister that you have

Fill in the Marauder with your favorite color:



Which do you like better: music or art? Color in your choice!



Which do you like better: math or reading? Color in your choice!



What is your favorite thing to do in your free time? Draw yourself doing it!

Appendix C

ND Mathematics Content Standards (K-12)

1. Many months of conscientious work by a group of ND math educators plus many months of open, public review
2. They will typically be reviewed every five to seven years
3. Three areas of focus: conceptual understanding (why concepts work), procedural skill and fluency (how concepts work), and application (when concepts will be used in real life)
4. Mathematical practice standards characterize ways in which students engage with mathematics, not just outline the knowledge and skills that should be known
5. The standards link math with the 21st century skills (communication, creativity, collaboration, & critical thinking)
6. They are ordered by standards under a cluster, under a domain. Clusters are groups of related standards, and domains are groups of related clusters
7. The first characters of the code represent the grade; the second characters represent the Domain and the last characters represent the number of the standard. The characters are separated by a period
8. Just because one standard appears before another, it does not mean that that standard must be mastered before moving on. They are not a pacing guide
9. The standards include practices that should be developed in students such as problem solving, reasoning and proof, communication, representation, connections, productive discipline, and procedural fluency
10. Because students may learn at different grade levels, the standards may not always line up with what students know. It is important to make an effort to meet the needs of each individual student

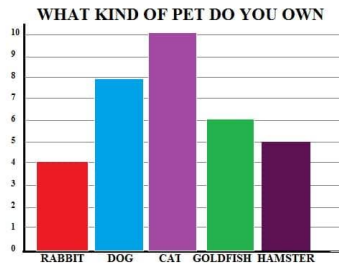
Appendix D

<p>Grade: 2nd</p>	<p>Subject: Math</p>
<p>Materials: Student notebooks, whiteboard and marker</p>	<p>Technology Needed: computer/projector, student chromebook</p>
<p>Instructional Strategies:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Direct instruction <input type="checkbox"/> Guided practice <input type="checkbox"/> Socratic Seminar <input type="checkbox"/> Learning Centers <input type="checkbox"/> Lecture <input type="checkbox"/> Technology integration <input type="checkbox"/> Other (list) <ul style="list-style-type: none"> <input type="checkbox"/> Peer teaching/collaboration/cooperative learning <input type="checkbox"/> Visuals/Graphic organizers <input type="checkbox"/> PBL <input type="checkbox"/> Discussion/Debate <input type="checkbox"/> Modeling 	<p>Guided Practices and Concrete Application:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Large group activity <input type="checkbox"/> Independent activity <input type="checkbox"/> Pairing/collaboration <input type="checkbox"/> Simulations/Scenarios <input type="checkbox"/> Other (list) Explain: <ul style="list-style-type: none"> <input type="checkbox"/> Hands-on <input type="checkbox"/> Technology integration <input type="checkbox"/> Imitation/Repeat/Mimic
<p>Standard(s) 2.MD.10 Draw picture graphs and bar graphs with single-unit scales to represent data sets with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.</p>	<p>Differentiation</p> <p>Below Proficiency: Work with student/check in frequently while they collect the data. While they create the bar graph, assist and/or point their attention back to my example on the board.</p> <p>Above Proficiency: If student shows a better understanding of the concept, have them split their data to include boys/girls answers. Instead of having 3 bars on their graph, they will have 2 graphs with 3 bars each.</p> <p>Approaching/Emerging Proficiency: Students will be expected to include 3 bars on their graph without excessive assistance.</p> <p>Modalities/Learning Preferences:</p> <ul style="list-style-type: none"> • Visual: Create my own bar graph example on the board, with the data shown written close by • Auditory: Along with the visual of the data and bar graph, I will verbally explain what I am instructing the students to do • Kinesthetic: Students will move around when asking their classmates their questions • Tactile: Students will be creating their own bar graph out of a question and answer combination that they have the liberty of choosing. They will convert their data into a bar graph using the website provided.
<p>Objective(s) By the end of the lesson, students will gather, and compare & contrast data from three possible outcomes to a question by constructing single-unit scale bar graphs. By the end of the lesson, students will accurately draw their data in the form of a bar graph.</p> <p>Bloom’s Taxonomy Cognitive Level: Analyze, Create</p>	<p>Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules and expectations, etc.) Students will be expected to get their data in the allotted time. Students will not be required to be silent, but there will be an expectation of an efficient learning environment: volume level 2 (quiet voices). Students will be expected to move down the line or stay in place when asked, and then work independently when their data has been collected.</p>
<p>Classroom Management- (grouping(s), movement/transitions, etc.) Students will work with their data independently but will need to ask their classmates questions. I will have students line up in two lines (Line A and B) facing each other. They will each have their notebook and pencil. Students in line A will ask their question to student in line B and record answer. Student in line B will then ask their question and record the answer of student in line B. After 1-2 minutes I will ring a bell and line B students will step to their left. The process will be repeated until each student has collected data from each of their classmates.</p>	

Minutes	Procedures
2	<p>Set-up/Prep: Brainstorm possible questions to ask the students when demonstrating collecting data. Be prepared to show examples of bar graphs. Be prepared to draw a bar graph on the board based on the data gathered from the class. Have this website on hand: https://www.mathsisfun.com/data/data-graph.php</p>
12	<p>Engage: (opening activity/ anticipatory Set – access prior learning / stimulate interest /generate questions, etc.) Put the word ‘data’ on the board. Ask “how do you think you would you pronounce this word?” (Getting interest and attention-application (use sounding out)). Explain that some people pronounce it as day-ta and some as dah-ta, and that neither is right or wrong. Ask students: “Do you recall what data means?” (Recalling specific facts or information-knowledge) (possible answer: different results for the same question). Show an example of a bar graph; explain that this is one way of collecting and organizing data. Do Pre-Assessment. Ask if students can think of questions that would result in different answers in the classroom. Use their ideas or these examples: Vanilla/chocolate/strawberry, cats/dogs/rabbits, beach/mountains/flatlands, etc. Have students get up from their seats and go to a designated spot in the room depending on each answer (i.e. front wall if you like vanilla, back wall if you like chocolate, right wall if you like strawberry). Record this data on the board using tally marks.</p>
10	<p>Explain: (concepts, procedures, vocabulary, etc.) Explain that students will be collecting their own data in the classroom. They will first collect the data in their notebook, and then create a bar graph. At this point, use one of the previous examples to create a bar graph using https://www.mathsisfun.com/data/data-graph.php as a visual. Show students that it will consist of 2 axes, with the bottom labeled with their 3 answers, and the side marked with numbers (i.e. 1-10). Ask the class: “What will go on the bottom axis? And What will go on the side axis? Draw those two axes in your notebook and add labels corresponding to our activity that we just completed” (Diagnosing and checking-knowledge/synthesis). Explain that when they enter their data, their bar will line up with the answer on the bottom. If their data is entered correctly each bar will line up with the number that they recorded. They will choose a question to ask their classmates, and then choose 3 options for answers. Explain that in their notebooks they will write their three answer options, leaving space between each one. When they collect the data, they will make a tally mark under the answer that their classmate chooses. By the end of the time, the number of tally marks will match up with the number of classmates that they asked.</p>
28	<p>Explore: (independent, concrete practice/application with relevant learning task -connections from content to real-life experiences, reflective questions- probing or clarifying questions) Ask student “Now that we have worked on collecting data as a class, are you ready to collect your own data?” (Structuring and redirecting learning-comprehension) Give students 5 minutes to write their question and answers in their notebook. Give clear directions for the movement of the lines while collecting data. Have students collect their data with tally marks. Watch to make sure students are asking all of their classmates. If students are not staying in order, ask “What were my directions for collecting data? Do you think we need to try again or do you know where you had trouble?” (Managing-knowledge). After data has been collected, students will return to their seat and create a bar graph with their findings using their chromebook (mathsisfun.com). Be present in case students need help converting their data on to the graph. Leave your example on the board as a visual.</p>
5	<p>Review (wrap up and transition to next activity): Ask for volunteer: “would anyone like to share any interesting things that they found from the data that they collected? (Allowing expression of affect-evaluation). Ask students: “What are some ways that you could use this method of collecting data in your own life? (Encouraging higher-level thought processes-analysis). Encourage the students to try this activity with their family. Suggest that they ask those at home the same question and see if there are similarities to their classmate’s answers. If they ask permission, they can use the same website at home to collect more data.</p>

Formative Assessment: (linked to objectives)
Progress monitoring throughout lesson- clarifying questions, check-in strategies, etc.

Pre-assessment: Project an example of a simple bar graph onto the board. Give each student an index card and have them draw a line down the middle. Ask students “how many rabbits are owned in total? Put that answer on the left side of your index card. How many goldfish are owned in total? Put your answer on the right side of your index card.” Remind them to put their names on the card and pass them all in. Briefly look at the answers and see if the students were able to read the data.



Formative assessment: Are students writing down the data that they are collecting? Are they asking their question and answering their classmates? Are they able to create a bar graph (incorporates visual)?

Consideration for Back-up Plan:

If it is clear that students are not understanding the concept, focus on creating more graphs as a whole class, instead of having them create their own.

If technology is not cooperating, help students draw a bar graph in their notebook using a ruler

Summative Assessment (linked back to objectives)

End of lesson:

Have students turn in both their collected data and submit a screenshot of their bar graph through google classroom. Does the data collected match up with the bar graph created? Does the student have the correct amount of data (number of classmates)? Are their answer choices relevant to their question?

If applicable- overall unit, chapter, concept, etc.:

Data collection and interpretation

Reflection (What went well? What did the students learn? How do you know? What changes would you make?):

The lesson itself seemed to be understandable, but I have changed some of my wording since receiving feedback. I needed to be more decisive in the way that I was wording what the students will be doing.

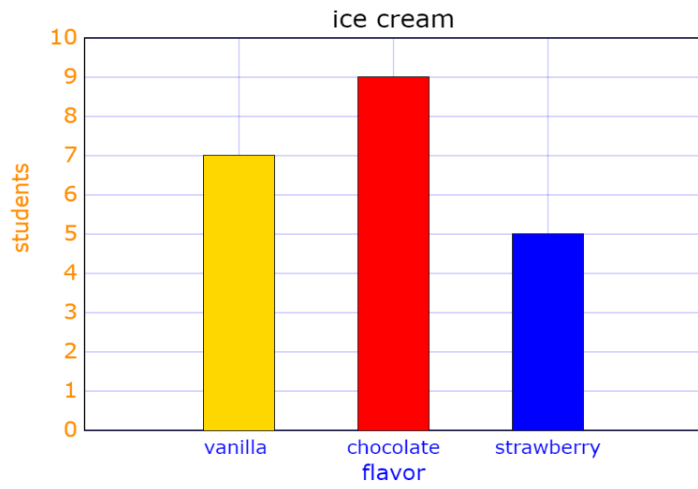
Bar Line Dot Pie Histogram Raw Data

Title: X: Y:

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Appendix E

Grade: 3rd		Subject: Math	
Materials:		Technology Needed:	
Instructional Strategies:		Guided Practices and Concrete Application:	
<input type="checkbox"/> Direct instruction <input type="checkbox"/> Guided practice <input type="checkbox"/> Socratic Seminar <input type="checkbox"/> Learning Centers <input type="checkbox"/> Lecture <input type="checkbox"/> Technology integration <input type="checkbox"/> Other (list)	<input type="checkbox"/> Peer teaching/collaboration/cooperative learning <input type="checkbox"/> Visuals/Graphic organizers <input type="checkbox"/> PBL <input type="checkbox"/> Discussion/Debate <input type="checkbox"/> Modeling	<input type="checkbox"/> Large group activity <input type="checkbox"/> Independent activity <input type="checkbox"/> Pairing/collaboration <input type="checkbox"/> Simulations/Scenarios <input type="checkbox"/> Other (list) Explain:	<input type="checkbox"/> Hands-on <input type="checkbox"/> Technology integration <input type="checkbox"/> Imitation/Repeat/Mimic
Standard(s) 3.NF.1: Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b equal parts. Understand a fraction a/b as the quantity formed by “ a ” parts of size $1/b$.		Differentiation Below Proficiency: Above Proficiency: Approaching/Emerging Proficiency: Modalities/Learning Preferences:	
Objective(s) By the end of the lesson, students will recall that a fraction is written as part over the whole by working with $1/b$ fractions where b is various numbers.			
Bloom’s Taxonomy Cognitive Level:			
Classroom Management- (grouping(s), movement/transitions, etc.)		Behavior Expectations- (systems, strategies, procedures specific to the lesson, rules and expectations, etc.)	
Minutes	Procedures		
	Set-up/Prep: Engage: (opening activity/ anticipatory Set – access prior learning / stimulate interest /generate questions, etc.) (Because I was on Zoom I used whiteboard feature and drew on the computer in place of physically drawing and writing on the whiteboard) Draw a stick man dreaming of pizza. Ask: “how many slices of pizza could this guy eat right now?” and write those numbers on the board. Then “give me a number for how many slices a pizza might be cut into” and write those under the other numbers. Say “you just created a fraction!”.		
	Explain: (concepts, procedures, vocabulary, etc.) Say, “a fraction usually looks like a number, over a line, over a second number (add a line to the pizza examples). Have any of you seen something like this before, if so where?” Give students 7 seconds to think and offer examples. One example could be baking (print recipe examples and pass them around). You are going to be using fractions for a lot of different things in your future. “A fraction is a specific part over the whole” (or the total number of parts). “The top number is how many parts we are looking for or using, this is called the numerator” (write numerator). “The bottom number is the total number of parts in the whole, this is called the denominator” (write denominator). “We say fractions as (number) <u>over</u> (number)”		

	<p>“In the numerator, I am going to write a 1. How many parts am I using if I put a 1 in the numerator?” (1). “In the denominator I am going to write a 2. How many parts is the whole separated into if I have a 2 in the denominator?” (2). Draw a horizontal rectangle on the board. Separate it into two equal parts by drawing a line down the middle. “How many parts is this rectangle divided into?” (2) (label the parts as 1 and 2). “How could we use this drawing to help us figure out our fraction?” Take student suggestions and if possible, draw them on the board. If students do not suggest shading in one of the parts, try it on the board and see what they think. Remind students that shading does not mean that it has to be completely filled in, it just has to be clear which one you mean. “See how we are using one part out of the total two parts”. Keep the same rectangle but erase the shading. Next, shade the other part (the one that is labeled as 2). “How many parts are we using now?” Students may say 2 since you have the part labeled as 2 but show them that it is still just one part being used. “Now let’s try the fraction 1 over 4. How many parts will I separate my rectangle into?” (4). “and how many parts will I be using?” (1). Shade in one part. Next draw a rectangle separated into 3 parts and shade 1 part. “What fraction could this drawing represent?” (3 separated parts make up the whole, 1 part is being used). Repeat for 1/8.</p>
	<p>Explore: (independent, concrete practice/application with relevant learning task -connections from content to real-life experiences, reflective questions- probing or clarifying questions)</p> <p>Ask “what questions do you have about these fractions?” Pause. “Do you think you would feel comfortable enough to try one on your own? (If yes, say,) In your notebooks, I want you to write 3 examples of fractions with a 1 in the numerator. Hold up your notebook when you are finished. Pick one of them and try to draw it out like my example on the board. Don’t forget to shade one part out of the total number of parts.”</p> <p>If we have time, say “I want you to take that recipe that I gave you and rip it into 2 pieces. Now give one of your classmates $\frac{1}{2}$ pieces (write $\frac{1}{2}$ on the board)</p> <p>Use feedback such as “awesome job using these new vocabulary words!” and “thank you for putting the right numbers on the top and bottom!” and “I like how _ is following my directions and holding up their notebook”</p>
	<p>Review (wrap up and transition to next activity):</p>
<p>Formative Assessment: (linked to objectives)</p> <p>Progress monitoring throughout lesson- clarifying questions, check-in strategies, etc.</p> <p>Exit check-out: Have two boxes, one labeled “I know”, and one labeled “I wonder”. Have index cards available for students. Give students 3 minutes at the end of class to write something that they know about fractions now and place it in the “I know” box, and something that they still have questions about fractions placed in the “I wonder” box. Students should come up with at least one per box, but they will not be penalized if they do not. At least one index card will be required per student. One thought should be placed on each index card so that you can then read and sort them easily to determine what was understood and what you may need to go back over.</p> <p>Consideration for Back-up Plan:</p>	<p>Summative Assessment (linked back to objectives)</p> <p>End of lesson:</p> <p>If applicable- overall unit, chapter, concept, etc.:</p>

Reflection (What went well? What did the students learn? How do you know? What changes would you make?):

I could see where doing it in class would have been easier and more effective. I would have liked to walk around and comment on each student's fractions, but it was hard to do that over zoom. I think that ultimately it went well. It was very repetitive for my audience, but I think that it would be necessary for introducing a brand new concept to third graders. I had not planned on leaving the words numerator and denominator on the board, but it ended up working really well as a way of referring back to the new vocabulary. I think that if I had more time I would also include the concepts of calling " $\frac{1}{2}$ " "half". I also wanted to use manipulatives as an additional way of representing fractions but that was not possible due to me being on zoom. I should have also planned a more concrete way of ending the lesson or wrapping up.

Chocolate Chip Cookies

$2\frac{1}{2}$ cups flour
 1 tsp. baking soda
 $\frac{3}{4}$ teaspoon salt
 1 cup butter
 $\frac{3}{4}$ cup sugar
 1 tsp. vanilla
 2 eggs
 $\frac{3}{4}$ pound of Chocolate Chips

Makes 60 cookies.

Sugar Cookies

$\frac{1}{2}$ cup butter
 $1\frac{1}{3}$ cup sugar
 $\frac{1}{4}$ teaspoon baking soda
 1 large egg
 $\frac{1}{2}$ teaspoon vanilla
 $1\frac{1}{2}$ cups all purpose flour

Serves 20 people.





Banana Bread

3 bananas
 $\frac{1}{3}$ cup melted butter
 $\frac{2}{3}$ cup sugar
 1 egg
 $\frac{3}{4}$ teaspoon vanilla
 $\frac{1}{2}$ teaspoon baking soda
 $1\frac{1}{2}$ cups flour

Serves 10 people.

Appendix F

Indirect lesson plan/Performance assessment (see on pages below rubric)

	Exceeds expectations!	Looks great!	Getting there...	Still learning
				
Survey	You presented all your products in an engaging manner. You correctly used tally marks to keep track of how many classmates chose each product.	You presented all your products before conducting the class survey. You kept track of how many classmates chose each product.	You presented your products while conducting the class survey. You kept notes on how many classmates chose each product.	You presented your products while conducting the class survey. You did not keep track of how many classmates chose each product.
Product Choice	You created a fraction for each product and chose the 5 most wanted products. You explained why you chose products with high fractions. You chose one product to be “on sale” and explained why.	You created a fraction for each product and chose the 5 products with the largest fractions. In your presentation you revealed the fractions.	You created fractions for your products, but the 5 products chosen did not have the largest fractions.	You did not create a fraction for each of your products. As a result, the products chosen did not have the largest fractions.
Creativity	Your business name, logo, flyer, and presentation were visually appealing. Your “Grand Opening” presentation was exciting and engaging.	Your business name, logo, flyer, and “Grand Opening” presentation showed creative effort.	You have a creative aspect in one of the following: your business creation, your flyer, or your presentation.	Your business creation and presentation lacked apparent creative effort.
Collaboration	You use encouraging dialogue when working collaboratively with your business partner. Work on the project is done collaboratively or separated evenly	You and your business partner work together to create your business, calculate your product fractions, and create and present your business on “Grand Opening” day.	Both you and your business partner participate in the conduction of your survey and your “Grand Opening” presentation.	You did not collaborate with your business partner, or you did not come to agreements about aspects of your business.

Standard 3.NF.1: Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b equal parts. Understand a fraction a/b as the quantity formed by “ a ” parts of size $1/b$.

Objective: By the end of this project, students will understand that fractions are used to represent parts of a whole by creating a “store” with an emphasis on products that fractions of students would prefer.

After the direct instruction lesson on fractions, students should be able to represent a fraction a/b in a rectangle with b sections and a of those sections shaded. Students will now take this information and apply it to a real-world use of fractions. In this student-centered indirect lesson students will take a week to create a “store” with food products that their classmates would be most likely to buy.

On day one, each student will be paired up with a classmate who will become their business partner. This day will be dedicated to coming up with their “business” and 7-10 possible food products that they would like to “sell”. Students will be able to decide on their store name, design their logo, and create a flyer with their products.

On day two, students will collect data from their classmates about the products that they have chosen. This will be done by each business presenting their store and products in front of the class. After listing off their products, a survey will be conducted by raise of hand. The information being collected will be “which one of the products from our store would you be most likely to buy”. On the flyer, the business partners will tally up the number of raised hands for each product. On this day, tell students about stores conducting online surveys, or collecting data of which products are being bought, in order for them to have the highest customer satisfaction.

Ask questions such as “why do you think stores would care what their customers think?” or “what would be the reason for stores conducting these types of surveys?”.

One day three, open with “Now you have created a business that sells food and you have conducted a customer survey. Unfortunately, however, your shelves only have room for 5 items. How can you use fractions to determine which 5 items would be best to sell to your classmates?”. If students need more prompting, encourage them to create a fraction to represent each of their products. If they are still confused, remind them that the denominator of a fraction is the total number of parts in a whole (depending on the understanding level, either gesture to the class, or tell them the number of students in the class) and the numerator of a fraction is the number of parts that are wanted. Students should be able to then use those fractions to see which product is wanted the most, and line the rest up in order. They will then pick their top five most wanted products.

On day four and five students will create a “Grand Opening” presentation for their store. Explain what a Grand Opening is, and that many stores will have a sale during their Grand Opening. Business partners can choose how they would like to present their information. This could be done electronically, as a skit, on a poster, or any other creative presentation idea that the students come up with. What will need to be included in their presentation is a visual of their five products along with the fraction that each of those products received, an explanation for why those five products were chosen out of their original number of products, which product they want to put on sale and why, and why they think it is important to take into account customer feedback. I would like this step to be done in class since it is often hard for students to meet up outside of class, so this phase of the project will be given more time in-class.

On day six (preferably after a weekend to give them preparation time), it will be Grand Opening day! Each business will give their presentation to the class, introducing their business, products, and giving their explanation on their product choice. They will choose one of their products to bring in and the class will have a potluck with all of the different products during the presentations. As much of the day as possible should be set aside for this celebration of all their hard work!

Appendix G

Standard(s)

3.NF.1: Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b equal parts.

Understand a fraction a/b as the quantity formed by “ a ” parts of size $1/b$.

Objective(s)

By the end of the lesson, students will recall that a fraction is written as part over the whole by working with $1/b$ fractions where b is various numbers. (Knowledge)

By the end of the unit, students will understand that a/b is equal to a parts of $1/b$ by referring back to the first lesson of unit fractions ($1/b$) and shading 1 section a times.

(Application)

By the end of this unit, students will recognize that fractions are used to represent parts of a whole by reading shaded sections of equally separated rectangles as part/whole.

(Comprehension)

By the end of the unit, students will produce representations of fractions a/b by drawing a rectangle separated into b parts, and shading a of those parts. (Synthesis)

By the end of the unit, students will explain the parts of a fraction by using correct verbiage (numerator, denominator, a over b , part, whole). (Knowledge)

By the end of the unit, students will compare fractions with like denominators by comparing the amount shaded on each rectangle representing the two fractions and revealing which is greater. (Evaluation)

By the end of the unit, students will defend that one fraction is larger than another with a like denominator by drawing and shading representations of the fractions. (Analysis)

Name _____ Number _____ Date _____

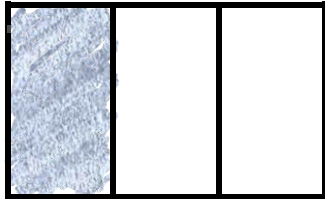
Write a T on the line if the statement is true, and an F on the line if the statement is false:

(True/False)

- ____ 1. When reading a fraction, the denominator is said first
- ____ 2. A fraction represents a part over a whole
- ____ 3. When a fraction is said out loud, you say the numerator, over, the denominator
- ____ 4. A rectangle that represents any fraction is always separated into 4 equal parts
- ____ 5. A fraction that has a 3 in the denominator could be represented by a rectangle separated into 3 equal parts

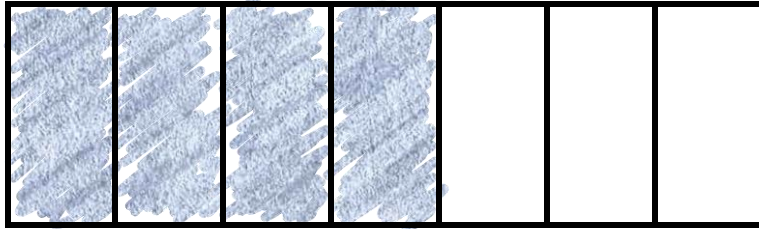
Circle the letter that corresponds to the correct answer: (Multiple Choice)

6. Which fraction does the following picture represent:



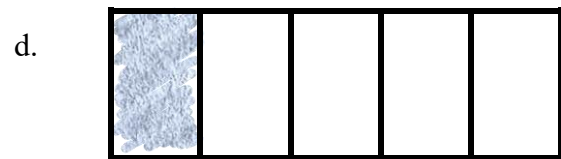
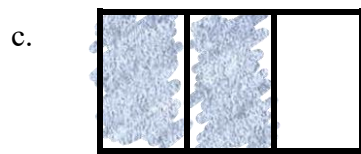
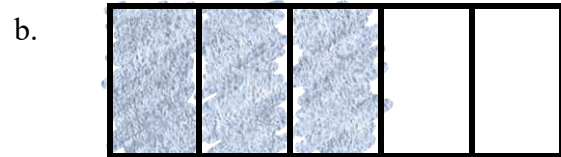
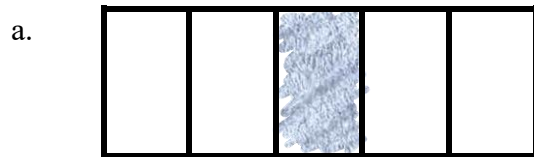
- a. $1/3$
- b. $3/1$
- c. $1/6$
- d. $2/3$

7. Which fraction does the following picture represent:

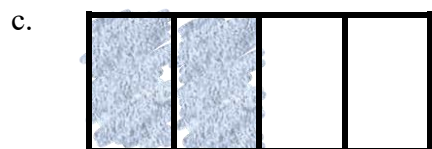
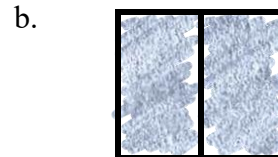


- a. $4/8$
- b. $4/7$
- c. $7/4$
- d. $2/7$

8. Which picture represents the following fraction: $3/5$



9. Which picture represents the following fraction: $2/4$



10. In the fraction, $\frac{5}{6}$, which number is the denominator?

- a. 5
- b. 6
- c. 1
- d. None of the above

11. In the fraction, $\frac{7}{9}$, which number is the numerator?

- a. 9
- b. 1
- c. 7
- d. None of the above

Write the letter of the definition that matches the term: (Matching)

- | | |
|-----------------------|--|
| 12. _____ Part | A. the word used to separate the numerator and denominator |
| 13. _____ Over | B. the number that is above the line in a fraction |
| 14. _____ Whole | C. the portion of a whole that is wanted/used |
| 15. _____ Numerator | D. the number that is below the line in a fraction |
| 16. _____ Denominator | E. the total amount of parts |

Represent the fraction provided by drawing a rectangle, splitting it into the total number of parts, and shading in the amount of parts used: (Completion)

17. $\frac{1}{4}$

18. $\frac{2}{3}$

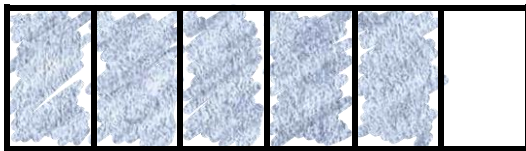
19. Represent the 2 fractions provided by drawing 2 rectangles, splitting them each into their total number of parts, and shading in the amount of parts each fraction uses.

Circle the fraction that is greater: (Completion)

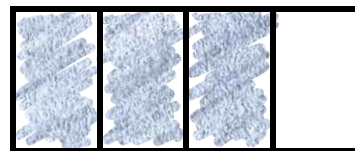
$\frac{2}{5}$ & $\frac{4}{5}$

Write the fraction that the rectangle represents on the line below the drawing: (Completion)

20.



21.



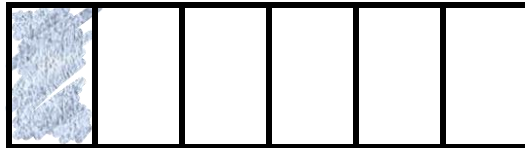
The following statements are true. Convince me that they are true: (Essay-Restricted Response)

22. Use drawings to prove that $\frac{2}{3}$ is less than $\frac{3}{3}$.

23. Use 1-2 sentences to prove that $\frac{4}{6}$ is greater than $\frac{2}{6}$.

Write your answers using 2-5 sentences: (Essay-Extended Response)

24. Steve has a chocolate bar that is divided into 6 sections. He wants to share it evenly with Joe. Steve remembers the representation shown below from class, but it is only $\frac{1}{6}$. How might Steve use this representation to split his chocolate bar evenly?



25. Where have you seen fractions used in your own life? Or where do you think you could use fractions when you are not in school?

Appendix H

	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation	Total	Percent
students will recall that a fraction is written as part over the whole	2					1	3	12%
students will understand that a/b is equal to a parts of $1/b$			1				1	4%
students will produce and/or read representations of fractions a/b	2	4	2		2		10	40%
students will explain the parts of a fraction	6		2				8	32%
students will compare fractions with like denominators			1	2			3	13%
Total	10	4	6	2	2	1	25	
Percent	40%	16%	24%	8%	8%	4%		100%