

GRE 565

Final Project

April 29, 2013

Fractions: An Observation of a Grade 4 Lesson

Introduction:

When I starting observing my grade 4 class at Madrid Waddington Elementary, I surprised with the harder level topics they were learning. The math curriculum is very different from what I can remember from my elementary school career. Throughout my observation time in the class, I have witnessed them doing concepts I remember addressing in upper grades, especially 7-9. I have witnessed many techniques that allow students to build a stronger understanding of math and also use strategies in attempts to capture their interest.

For the past months I have been observing a grade 4 class at Madrid Waddington Elementary. My main objective for writing this paper is to elaborate on the observations I have made during math lessons, but with one fraction lesson in particular. Since the grade 4 year is very focused on math, I had ample opportunity to observe math lessons. To start, I will begin by describing the lesson I chose to write about with aims to give you a better understanding of the lesson. The rest of my paper will focus on the basic assumptions of contemporary pedagogy: conceptual development, reflective inquiry, connections, and use of technology with regards to the lesson I observed.

Grade level: 4

Topic: Fractions

The lesson I observed was in the first days learning about fractions. The students' understanding of fractions was very basic and not precise.

Educational Objectives:

Students need to have a strong understanding of fractions because of their role in upper elementary and throughout their schooling career. Without the strong understanding of basic fraction characteristic, students will inevitably fail at more complex math problems.

Key Ideas:

Fractions

Standards:

Problem Solving Strand

Students will apply and adapt a variety of appropriate strategies to solve problems.

- 4.PS.11 Make pictures/diagrams of problems
- 4.PS.12 Use physical objects to model problems
- 4.PS.13 Work in collaboration with others to solve problems

Reasoning and Proof Strand

Students will develop and evaluate mathematical arguments and proofs.

- 4.RP.5 Justify general claims or conjectures, using manipulatives, models, and expressions

Communication Strand

Students will organize and consolidate their mathematical thinking through communication.

- 4.CM.1 Understand and explain how to organize their thought process

Students will communicate their mathematical thinking coherently and clearly to peers, teachers, and others.

- 4.CM.5 Share organized mathematical ideas through the manipulation of objects, drawings, pictures, charts, graphs, tables, diagrams, models, symbols, and expressions in written and verbal form

Students will use the language of mathematics to express mathematical ideas precisely.

- 4.CM.9 Increase their use of mathematical vocabulary and language when communicating with others

Number Sense and Operation Strand

Students will understand numbers, multiple ways of representing numbers, relationships among numbers, and number systems.

- Number Systems:

- 4.N.7 Develop an understanding of fractions as locations on number lines and as divisions of whole numbers
- 4.N.8 Recognize and generate equivalent fractions (halves, fourths, thirds, fifths, sixths, and tenths) using manipulatives, visual models, and illustrations
- 4.N.9 Use concrete materials and visual models to compare and order unit fractions or fractions with the same denominator (with and without the use of a number line)

Students will understand meanings of operations and procedures, and how they relate to one another.

- 4.N.23 Add and subtract proper fractions with common denominators
- 4.N.24 Express decimals as an equivalent form of fractions to tenths and hundredths

Materials:

- Paper
- Pencil
- Scissors
- Promethean Board
- Expressions

Procedure:

1. The teacher introduced the students to the concept of fractions. She showed images such as half an apple or a quarter of a pizza and had the students identify the corresponding fractions.
2. She then instructed the students on how to make fraction strips of: $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, $\frac{1}{8}$ and $\frac{1}{10}$. The students cut out their 7 strips and labeled them with the correct labels.
3. With the aid of these fraction strips, the teacher conducted a pre-made lesson through the promethean board.
4. Students were required to enter in their answers with their expressions that were connected to the promethean board. This questions were basic fraction understand such as: Which is greater? $\frac{2}{5}$ or $\frac{3}{6}$.
5. After several questions were worked on together as a class, homework was assigned to review on the concept of fractions as explained in class.
6. The teacher assessed the students by observing them in class, by their answers submitted into the promethean board and by the homework that was being submitted the next morning.

Conceptual Development:

When we teach mathematics, it is crucial to not only address the conceptual knowledge but the operational knowledge as well. From what I observed, the teacher did a fairly good job connecting both for the students. I believe she was able to do this with the aid of manipulatives. Since the students were able to look at their fraction strips, they were able to build a greater understanding of fractions by physically creating their own solutions.

The lesson I observed was the first actual lesson students had with fractions. All of the students had informal training with fractions that they observed in their daily life. This was clarified at the beginning of the lesson when the teacher asked the students where they have seen fractions. Many students had seen a half of something or a quarter of something. Since many of them knew the key terms such as numerator and denominator, the teacher just quickly reviewed these terms.

The lesson used manipulatives which allowed students to use concrete examples to build their understanding of fractions. With the aid of paper manipulatives, students partook in a hands-on learning program. By doing so, students quickly learned what fractions were and could be able to visualize different fractions. They used the fraction strips for this lesson, but were slowly going to move away from the manipulatives. Building a strong understanding of the concept allows students to effortlessly move throughout more challenging math problems as time progresses.

Since the students created their own manipulatives, they had a better overall grasp of the concept of fraction. They measured out the lines and were able to see the concept of fractions. If they were just given pre-made fraction strips, they would not have had an opportunity to become well acquainted with it before having to use it. Children learn by doing, and by creating these tools, they learnt what fractions looked like.

The end goal of the lesson was to have students perform basic addition and subtraction as well as looking at them in terms of size ($<$, $>$ or $=$). Gradually scaffolding the students, the teacher engaged the students in a pre-made program. It started with very basic problems to slowly working toward

Reflective Inquiry:

Reflective inquiry is an important part of learning because it forces students to elaborate on their understanding. One of the ways this is accommodated in the lesson I was observing, was by using the expressions through the program board. During the lesson, problem solving questions would show up on the board. Students each had their own expression and would vote on which answer they believed to be correct. If all

answers came in and they were all correct, the teacher would move onto the next question. If there was at least 1 incorrect answer, the teacher would review the answer with the class. I really like this method of submitting answers because it is anonymous. For struggling students who get the question wrong, they are not singled out attention isn't put on them for getting it wrong. This allows all students to participate and get the clarification if needed.

For some parts in the lesson, students would work with their shoulder partner to discuss their findings. The teacher would ask for the students to share their findings and decide if they were right. By doing so, students worked together to justify their understanding and communicate through mathematical lingo. For students who had a different answer, they were forced to talk amongst themselves to figure out where the discrepancy lied.

The students, throughout the lesson, were asked to give the next step in solving a problem. By doing so, students were all taking turns asking questions that ensured comprehension. They were asked many "why" and "how" questions which made them think on the spot. Attention to lesson is not a strong point in this class, and so several times students did not have an answer to give. Since I have been in this class for a number of hours, I know which students are poor at math. The students who were not doing well overall in math were the ones who essentially "passed" on a question. If I was conducting the lesson, I would have allowed the student to pass, ask another student for the right answer and then return to the original student to ensure clarity. I would make them re-answer the question so they would continue to pay attention. If the students knew they were going to be asked more questions, I would think more students would be engaged in the lesson.

As I was correction^{ing} the students' homework for this assignment, I realized that there was a handful of students who were not grasping the concept and made many errors. As I thought back to the lesson, there was no chance given to ask questions. No students posed a question about the material they were learning. As I corrected the homework, I noticed there was the same error being made over and over. Clearly more than one student was having trouble in the exact area. I think the failure to ask questions is the atmosphere created in the classroom which is if you ask a question, it must mean you are not paying attention. If I was teaching the lesson I would stop periodically and ask the students what they are unsure about. By doing so, I would make the students feel comfortable with question asking and let them know I value their question.

Making Connections:

Students must be able to see the connection between math and not only other subjects, but their own world. Without seeing this connection, students are less likely to fully engage and grasp the concept. Fractions are a fairly easy concept to connect to real-life instances and the teacher did a good job showing them. She showed several examples to the students such as $\frac{1}{6}$ of a pie and $\frac{1}{2}$ of a sandwich. The students very quickly caught onto this concept and were able to see the size comparisons. The students discussed with their shoulder partner different times we've heard fractions and what they could compare.

The students also very quickly were able to use addition and subtraction while working with fractions. With the aid of the fraction strips they were able to see the solution to such problems as $\frac{3}{4} - \frac{1}{4}$. There were times where students were encouraged to say their way of solving the problem and as the lesson progressed, some chose not to use the fraction strips. The teacher was beginning to teach mental math tricks that did not require the use of fraction strips. The class had a brief discussion about what they found to be easier, and which one they preferred. Although it was nice for the students to discuss the matter in this format, it was irrelevant because in a week the students were no longer allowed to use the fraction strips. I felt bad for the visual students who explained why they needed them; only to find out they were not allowed to use them.

If I were teaching the lesson, I would have used more examples besides showing a fraction from a whole object. I would have used fractions that showed distance and total objects together such as: 4 friends deciding to pay for a pizza equally between them, or having 2 dogs out of 5 pets. Many of the students believed that fractions were just limited to parts of one whole. I think the students would have been able to grasp the concept of fractions better if different styles of fractions in the real world were used.

Technology:

One of the best pieces of technology I saw in my lesson I observed was the use of the expressions for the promethean. When a slide would come up that required students to answer, they would enter their answer in their expression and it would send it to the promethean board. I thought this was a great idea because all students were participating and were able to see immediately if their answer was correct. It allowed students to answer a question and if they happened to get it wrong, they were able to get the assistance they needed to obtain the right answer. The students also treated this system like a game and would get very excited when they were right. The students all were excited to have their own expression to be able to answer a question.

The pre-made promethean lesson was not as effective as I think it could have been. It was very basic and was essentially nothing more than a basic PowerPoint. I have seen the amount these boards can do and the teacher was failing to use certain characteristics that could have benefitted the students. Students love to work with the board and I believe it is great to have them come up and show the class their idea.

Since there is no concrete manipulatives made, the teacher decided to be creative and teach the students how to make their fraction strips. This worked quite well and the students enjoyed having their own strips to keep. This also built on the skills of measuring with a ruler which was beneficial because many students still have difficulty measuring.

Conclusion:

Overall I believe this was a successful lesson on fractions. Because it was the first day, the concepts addressed were fairly basic and the majority of the students were able to grasp a fair amount of information.

The fraction strips were a nice addition to the lesson because students were able to see how fractions were represented. From what I can remember from my elementary school career, we never used such things as this. Fractions were always the dreaded concept, but now I realize it was only because it was taught poorly. With the right tools, fractions are a fairly easy and enjoyable concept to understand.

Although technology was use fairly well in the lesson, I believe it could have been used more. I know there are ample features on the Promethean board that explain and display fractions quite well. Also, I would have asked to the students where they needed clarification to ensure clarity from more students. I would also make the atmosphere more comfortable where questions are encouraged.