General Information

- Name: Genevieve Kelly
- Students involved in the lesson:
  - A – 8 years old, 3rd grade, female
  - B – 8 years old, 3rd grade, female
- Student Background: Both students are bright, though Student A is overall more focused and excels more in math than Student B
- Lesson: Patches of Pumpkins
- Questions: See Appendix A

Analysis

I loved giving this lesson! I thought it was fun and engaging, and a great way to introduce perimeter and area to two students that had not previously learned either concept. The lesson involved linking together paper clips to represent fencing for pumpkin patches. When I previewed the lesson on my own, I discovered that linking the paperclips became frustrating and detracted from the lesson. It was hard to create exact squares and rectangles with the clips, and it became difficult to get them to stand up on the paper of pumpkin patches. I decided to leave the paperclips unlinked so that they could easily lie flat on the student's papers.

When I began the lesson, I asked the two girls if they had ever heard of the words "perimeter" or "area" before. Student A said she hadn't, while Student B said that though she wasn't sure what the words meant, she thought they had something to do with measuring. I was excited that Student B made this connection, and told her she was correct! Both students were enthusiastic to find out what the lesson would entail. I started out by giving the girls a brief explanation of perimeter and distance. I told them that perimeter is the length or distance around the outside of a shape, and the area is the amount of space contained inside of that shape. Additionally, I told the students that perimeter is often measured in units such as inches, feet, or meters, and area is measured in square units, such as square feet. I felt that I needed to give the students this background information before beginning the lesson since the concepts were entirely new for them. I then distributed 12 paperclips to each of the girls, and asked them to count their clips to make sure they had the correct amount. I explained that we would be making pumpkin patches out of the paperclips, and the patches could only be in the shape of a square or a rectangle. We then completed the worksheet for the 12-foot perimeter together so I could model how to set up the paperclips to create the patches. We made a 5x1 patch, a 4x2 patch, and a 3x3 patch. We decided together that we had made one square fence and 2 rectangle fences. The girls filled out

their worksheets as we went along. As we made each fence, I asked the girls to count how many pumpkins were contained within each one in order to find the area. Immediately, Student A noticed that the length multiplied by the width was always equal to the number of pumpkins within each patch. I was so excited that the student was able to make this connection so quickly! I told her that I thought it was a great observation, and that we should complete our 14 and 16-foot perimeter sheets to see if the length multiplied by width matched the areas on those sheets as well.

Since I had modeled the 12-foot sheet for the girls, I let them try the 14 and 16-feet sheets on their own. They both did very well. They worked independently and recorded their own data. They spent most time on the 14-foot patches, because they continued to try to figure out a way they could make a square sized patch. After several attempts, they both separately concluded that a square might not be possible with 14 paperclips. Once they both finished making as many patches as they thought they could, they compared their data. Though they had their data in different orders, they were happy to see that they had both come up with the same amount of combinations of lengths and widths. Again, they noted that on both sheets, the length multiplied by the width was always equal to the area. I told them that their observation was correct, and that the formula for finding the area was length multiplied by width.

In addition to the measurements, the girls both made predictions for the smallest and largest areas of the 14 and 16-foot perimeters. Each time, both girls agreed that they wanted to make their predictions one square foot more than the areas of the smallest and largest patches from the previous perimeters. For example, as the smallest area of the 12-foot patch was 5 feet, the girls predicted that the smallest area for the 14-foot patch would be 6 feet. Though all of their predictions were incorrect, they did not seem discouraged.

Finally, during my questioning (see Appendix A) at the end of the lesson, the girls were successfully able to tell me that this exercise could not be completed with an odd number of paper clips. They told me that if the number of paperclips was odd, they would not be able to make a perfect square or rectangle, and they would be forced to make "squiggly looking patches".

At the close of the lesson, I asked the students if they could explain in words the definitions for perimeter and area. I also asked them to explain to me how I could go about finding the area of a space. They worked together to successfully verbalize working definitions for perimeter and area, and

told me the correct formula for finding the area. Additionally, Student B told me that she was excited that she might be able to help her father calculate perimeter and area when he builds things around their home! I thought that this lesson went exceedingly well, and felt assured that both students walked away with new knowledge about which they felt confident.

Appendix A

1) What were the areas of pumpkin patches that you could enclose with a 12-foot fence?
2) What were the dimensions and shapes of the enclosures?
3) Which shape patch had the greatest area?
4) How did these findings compare to your findings for 14- and 16-foot fences?
5) Were you able to accurately predict the sizes of the smallest and largest areas for the 14-foot fence? ...the 16-foot fence? Why or why not?
6) Would you be able to follow our rules and enclose pumpkins using a 17-link fence? Why or why not?