Jamestown Beans

Lesson Summary Students will illustrate the scarcity of food during the Starving Time in Jamestown using fractions.

Major Topic and SOL

Math SOL (2009) 4.2.b

Length of Unit 90 minutes

Student Objectives

In Mathematics the student will be able to:

- Represent common fractions (1/2,1/4, 1/5, 1/8, 1/10)
- Apply their knowledge of fractions to practically identify equivalent fractions using a historical event

In Language the students will be able to:

- Use written representation and verbal explanations to demonstrate their understanding

21st Century Skills

- Critical-Thinking and Problem Solving
- Communication
- Creativity and Innovation
- Collaboration
- Information and Media Literacy
- Contextual Learning

Assessment Evidence

- Each group should have the same information in their answers.
- The underlying message is that no matter how small the parts, you will eventually run out of the whole.

Supplies/Materials/Technology

- **Teacher Materials:**
  - Large display equipment (document camera, overhead projector, chalkboard)
  - Overhead calculator or one with large buttons for document camera
- **Student Materials:**
  - 20 beans per student
  - 5-6 calculators

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- Graph paper
- Paper with circles for pie graphs
- Colored Pencils

Lesson Plan

Motivation & Building Background:

- Students should have reviewed and are familiar with the key vocabulary words.
- Students should have a basic understanding of fractions representing parts of a whole.
- Students should have discussed the severity of food shortage during the Starving Time.

Presentation

- The teacher will begin the lesson by reviewing the historical facts.
  - The Starving Time was during the winter of 1609-1610 when the settlers did not have enough food and the Native Americans were hostile. Out of over 400 people, only 60 survived.
- The teacher will then explain that we are going to pretend that the students are one of the Jamestown Colony survivors of the Starving Time.
- Let's see how you are able to ration out your food, but first let's determine the fractional parts of a whole.
- *If I had 16 beans but then ate 1, the fraction of the part I ate would be* $^1/_{16}$. *If I ate* $^1/_{16}$, *then I'd have* $^{15}/_{16}$ *left. If I could survive off one bean a day, I could stretch my food out for 15 more days. 16 is called my denominator. If I put my beans in 4 groups of four and ate one group, I would have eaten one of four or* $^1/_4$ *of my beans…which is the same as* $^4/_{16}$. $^1/_4$ *and* $^4/_{16}$ *are called equivalent fractions. I have 3 groups of 4 left which means I have* $^3/_4$ *or* $^{12}/_{16}$ *beans left. I have 3 more days of food left unless I redo my grouping.*
- Continue finding equivalent fractions ($^1/_8$, $^1/_2$, maybe $^3/_4$) with the 16 beans.

Practice/Application

- Group students in teams of 3's or 4's.
  - Each student should get 20 beans.
  - Appoint jobs within the teams: the speaker, the illustrator, the bean counter, the fraction maker, etc.
  - All groups should be assigned to divide their beans into as many different ways possible, write or illustrate their groups as fractions, and be ready to share their findings with class.
- Scaffold the report-out task by assigning the following options:
  - Report the fractions of bean distribution by coloring spaces on graph paper using 10 X 20 spaces.
  - Report fraction division by coloring in pre-drawn pie graphs.

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  - Report all the equivalent fractions they could think of using the 20 as the denominator.
  - Use calculators to find all the decimals that match their fractions.
- Allow students enough time to work together and to ask for clarification while the teacher moves from group to group.

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