

Lesson Study



August 3, 2007

Setting Goals

- Four levels of Lesson Study goals:
 - Level 1: Goals Specific to the Lesson
 - Ex. Discover that the circumference of a circle is always about three times its diameter
 - Level 2: Goals Specific to the Unit
 - Understand how to calculate the area of a circle and how the area of a circle relates to the area of a rectangle.
 - Broad Subject-Matter Goals
 - Actively use prior knowledge to solve novel mathematics problems.
 - Long-Term Goals for Student Development (Research Theme)
 - Provides a research question to answer
 - Plan all lessons with this goal in mind
 - “Develop students who are critical thinkers”
 - “Fostering student problem-solving and responsibility for learning”
 - “To encourage, record, and share student thinking”

Research Theme and Broad Subject-Matter Goals

- Research theme may begin with two questions:
 - Ideally, what qualities do we want our students to have?
 - What are the actual qualities of our students now?
 - Compare ideal and actual to locate a meaningful focus
- Research theme is designed to embody a particular goal or vision of education.
- Could choose a goal that is part of the national educational debate.
 - “Take initiative as learners”
 - “Be active problem-solvers”
 - “Be active problem-seekers”

Broad Subject-Matter Goal

- More specific to a content area, but still can encompass many topics and grade levels.
- Ex. Actively use prior knowledge to solve novel mathematics problems.
- Ex. Clearly communicate mathematical thinking.

Process Standards

- ❑ Ideas for goals
- ❑ Examine the Process Standards

Setting the Research Theme and Broad Subject-Matter Goals

- ❑ Work in groups to brainstorm ideas for the Research Theme and Broad Subject-Matter Goals
- ❑ These will guide development of all four lessons.
- ❑ Unit and lesson goals will be specific to a given lesson.

Lesson #1

□ Grid and Percent It

- Presents a method of solving percent problems that focuses on the basic concept of percent, that of “parts per hundred.”
- Uses a 10 x 10 grid as a model for visualizing percents and for solving various types of percent problems.
- Lesson from Illuminations web site, grades 6-8.

Percents

- What are some difficulties students have with the concept of percent?

Percents: What the Research Says

- ❑ Students often lack understanding of basic ideas about percents (Gay & Aichele, 1997)
- ❑ Students who understand the idea of percent as being out of one hundred and who have a good pictorial representation of percent usually have more success (Reys et al., 1995)
- ❑ Students with little formal instruction on percents use benchmarks, ratios, and fractions to reason about percent problems (Lembke & Reys, 1994)
- ❑ General mathematics students in middle and high school are often non-formal thinkers (mismatch between strategies and students' cognitive level) (Lawson, 1978; Chiapetta, 1977)
- ❑ Studies comparing the use of manipulative materials to abstract methods for teaching percents indicate that the manipulative approach is better for general mathematics students (Bledsoe, 1974; Shoecraft, 1972; Olley, 1974)

NAEP Question

- On a comparison question, such as "76% of 20 is greater than, less than, or equal to 20," only 37% of seventh graders and 69% of eleventh graders responded correctly (Kouba et al., 1989).

Number sense

- In addition to having number sense about whole numbers, fractions, and decimals, students should develop number sense about percent. This includes understanding the meaning of numbers expressed as percents, developing equivalent expressions for percents, comparing quantities expressed as percents, and recognizing the relative effect of finding a percent of a number.

Only rules and procedures!?!?

- Allinger and Payne (1986) claim that the way percent is taught encourages students to rely exclusively on rules and procedures to solve percent problems.