CCRC

Adapting Lesson Study for Community College Mathematics

Can *Lesson Study* be adapted for use in the community college context?

- Can it be feasibly implemented?
- What are math faculty experiences with Lesson Study?
- Does the model show promise for improving teaching and student learning?

Project Activities (2018-2019)

- Three community college teams participate in cycles of Lesson Study with support from experts at Education Northwest
- CCRC researches feasibility and faculty experiences and collects formative data on student learning and outcomes

education northwest

Lane Community College

Clackamas Community College

Portland Community College

ies INSTITUTE OF EDUCATION SCIENCES

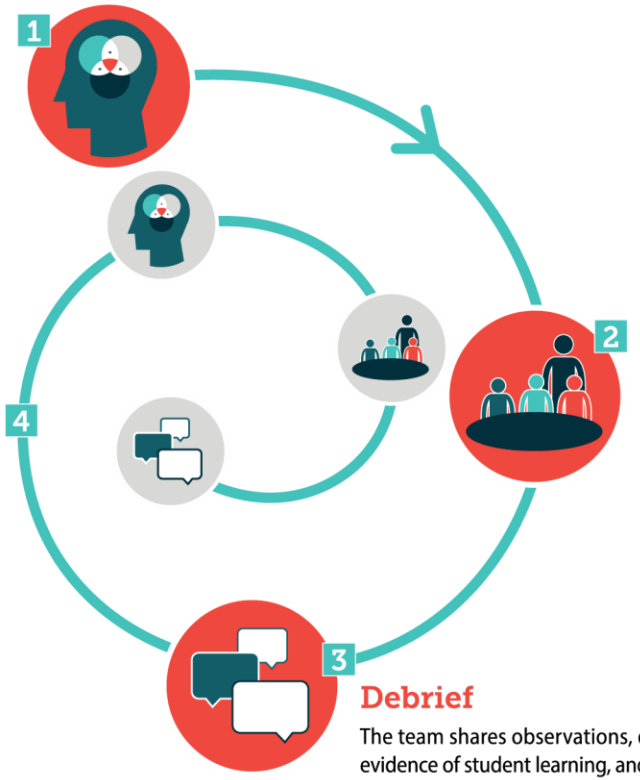
This project is supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305A170454 to Teachers College, Columbia University. The opinions expressed are those of the authors and do not represent views of the Institute or the U.S. Department of Education.

Lesson Study

Plan

1

The team develops a lesson by investigating curricula and examining research. The plan includes goals, learning outcomes, anticipated student responses, instructional strategies, and evaluation questions.



Teach and Observe

2

One team member teaches the lesson while others observe and collect evidence of student learning.

Debrief

3

The team shares observations, discusses evidence of student learning, and explores the effectiveness of the lesson.

Revise, Reteach, Reflect

4

Based on findings from the first teaching, the team revises and reteaches the lesson. The team reflects on the reteaching results and synthesizes lessons learned.

Implementation Practices

Develop and Sustain a Collaborative Lesson Study Team

Study Research and Apply Evidence-Based Practices

Generate and Share Professional Knowledge

Research Theme

How do we build students' confidence in their mathematical reasoning and willingness to persevere in problem solving?

– Promote a productive disposition
– Support a growth mindset
– Embrace and learn from confusion

Embrace Confusion.

"Confusion is the beginning of Wisdom."

–Socrates

Path to Dimensional Analysis

Cycle 1: Units of Measure, Perimeter, Area, and Volume
    Lesson: The Candy Box

Cycle 2: Rates and Unit Rates
    Lesson: Cost of Gas vs. Water

Cycle 3: Dimensional Analysis
    Lesson: Speed of Toy Car vs. Bug

Cycle One: Key Instructional Decisions

Student goal:

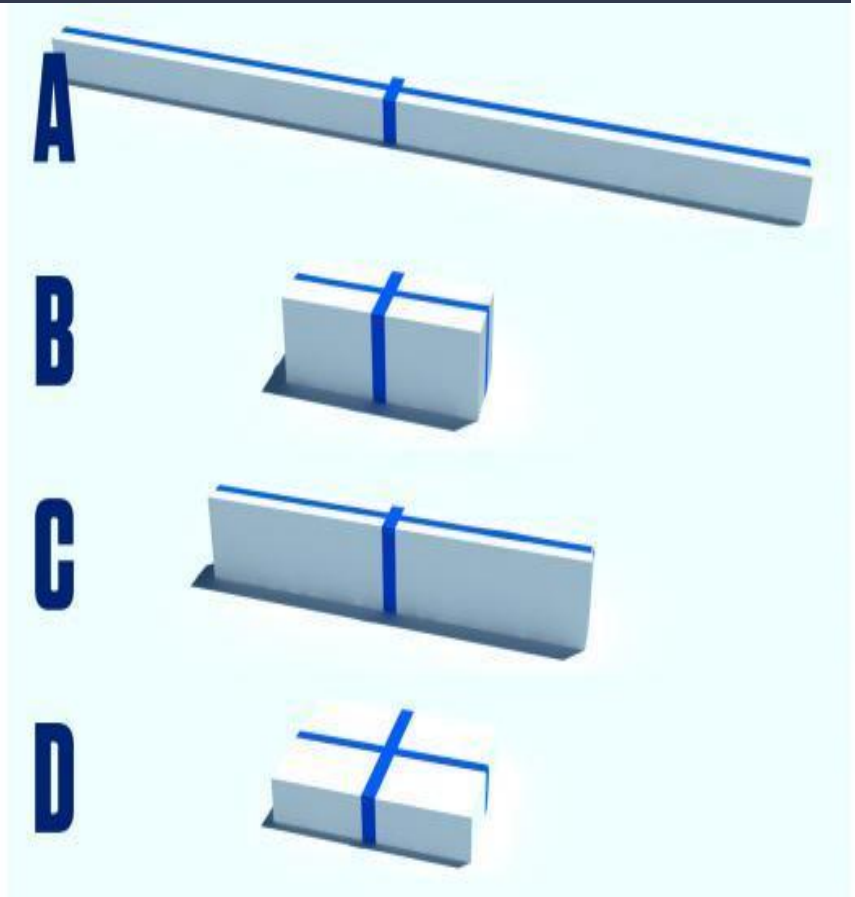
- Work cooperatively in an open-ended activity to develop an understanding of length, area, and volume.

Student challenges:

Students may have difficulty

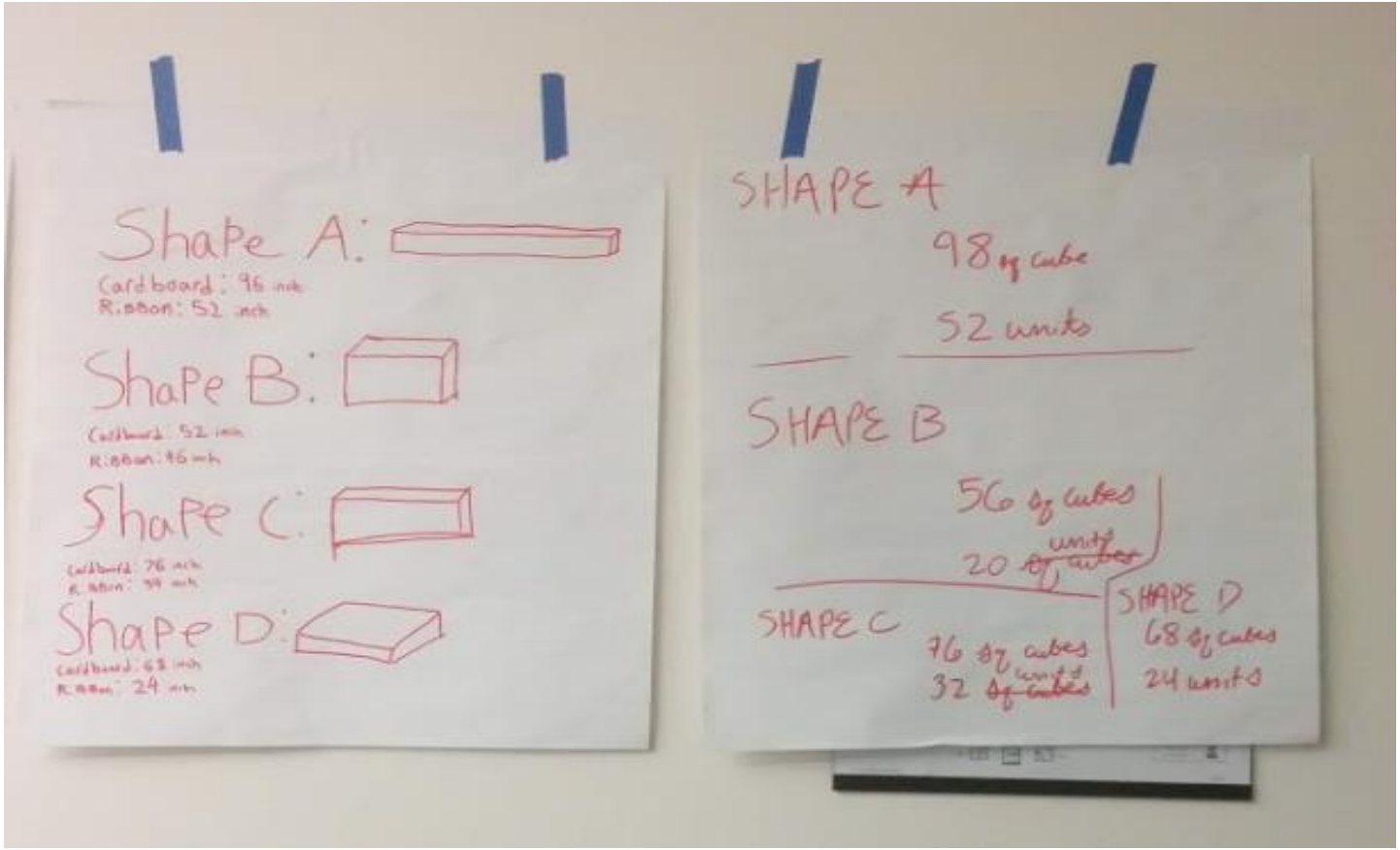
- differentiating between the three types of measurement and their units
- not depending on formulas

The Task



Based upon the picture and video, guess….

1. Which of these packages, if any, uses the least cardboard?
2. Which of these packages, if any, uses the most ribbon?
3. Which of these packages, if any, holds the most candy?
4. Which package would you use if you had a candy company?



Student Results

Key Lessons Learned by the Team

Cycle One: We got through it unscathed

- **Logistical changes of handouts to help clarify the task**

- **Students need more practice with :**
  - open-ended questions
  - articulating their thinking processes
  - estimation

- **Ongoing questions:**
  - How do we help students address misconceptions?
  - How do we guide students in the moment?

Cycle Two: Key Instructional Decisions

Student Goal

Build an understanding of rates and unit rates

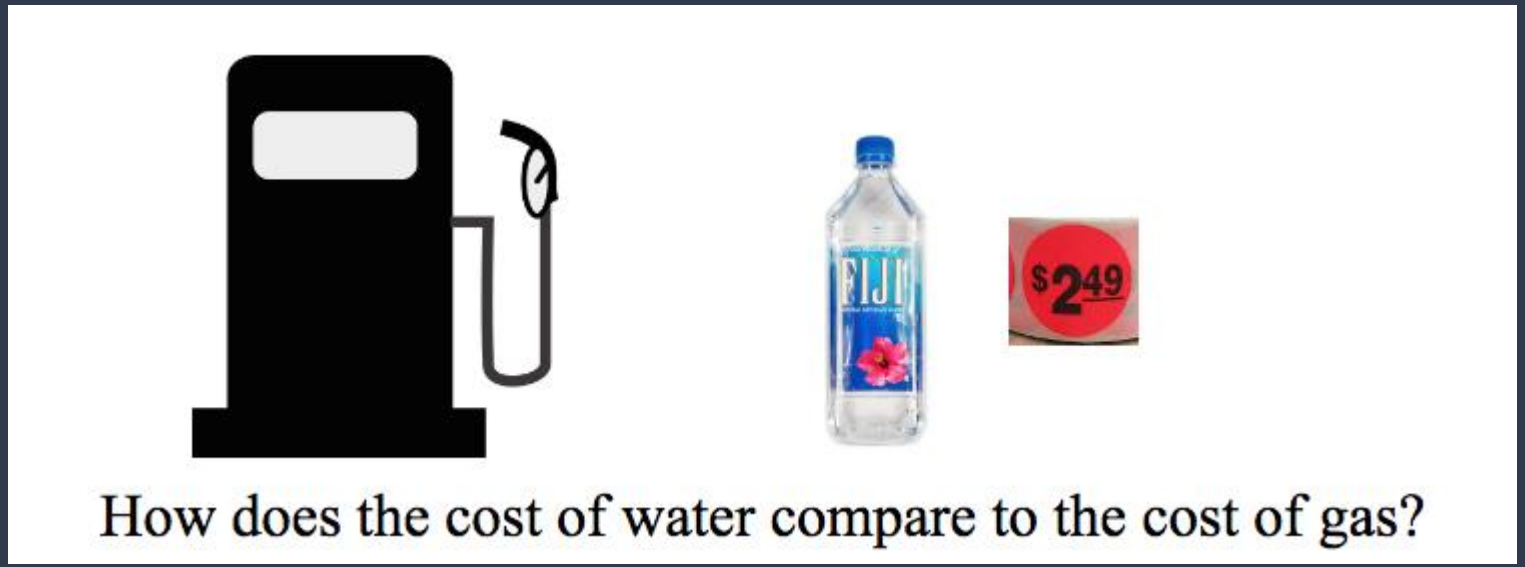
Challenges

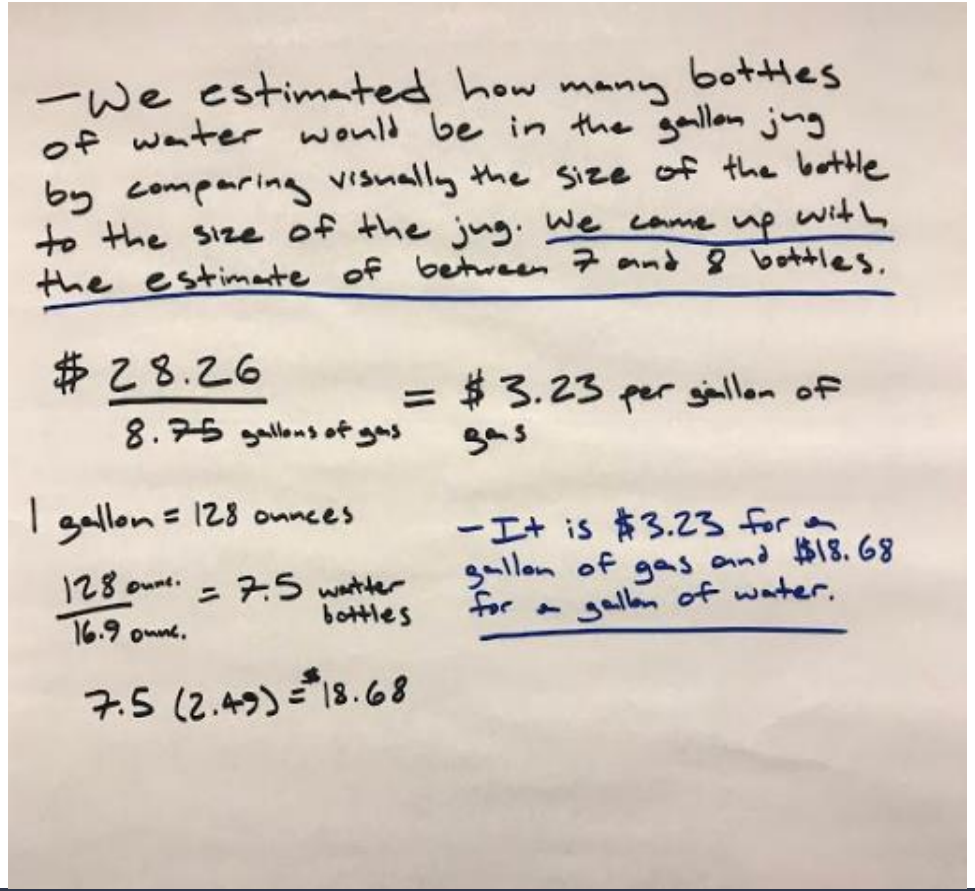
Students may have trouble:

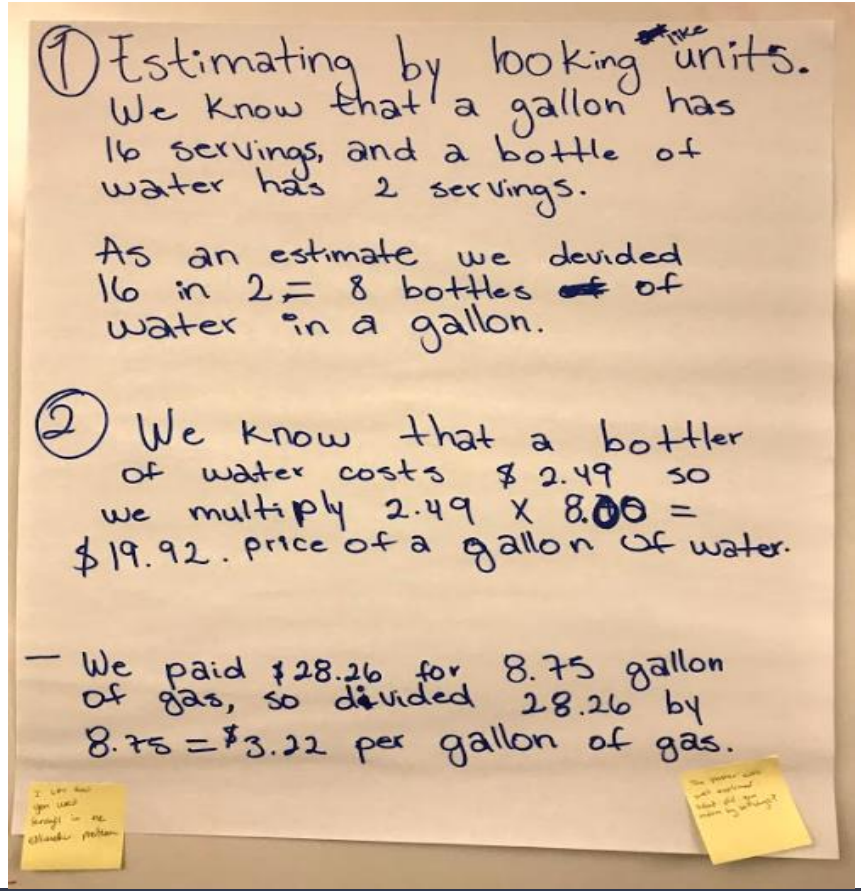
- Estimating or be hesitant to try estimating
- Converting between units

The Task

Cost of Water vs Cost of Gas







Student Samples

Key Lessons Learned by the Team

Cycle Two: Effective and *Accomplished*

- **Logistical changes on handouts and gallery walk format**

- **Instructional lessons:**
  - Students were more willing to tackle open-ended question
  - Ok to let go of control (instructor)
  - Ok to have different approaches to the same problem (students)

- **Ongoing issues:**
  - Time: processing, exploring, working, concluding

Cycle Three: Key Instructional Decisions

Student Goals:

Build an understanding of dimensional analysis

- Convert between measurements and rates

Challenges:

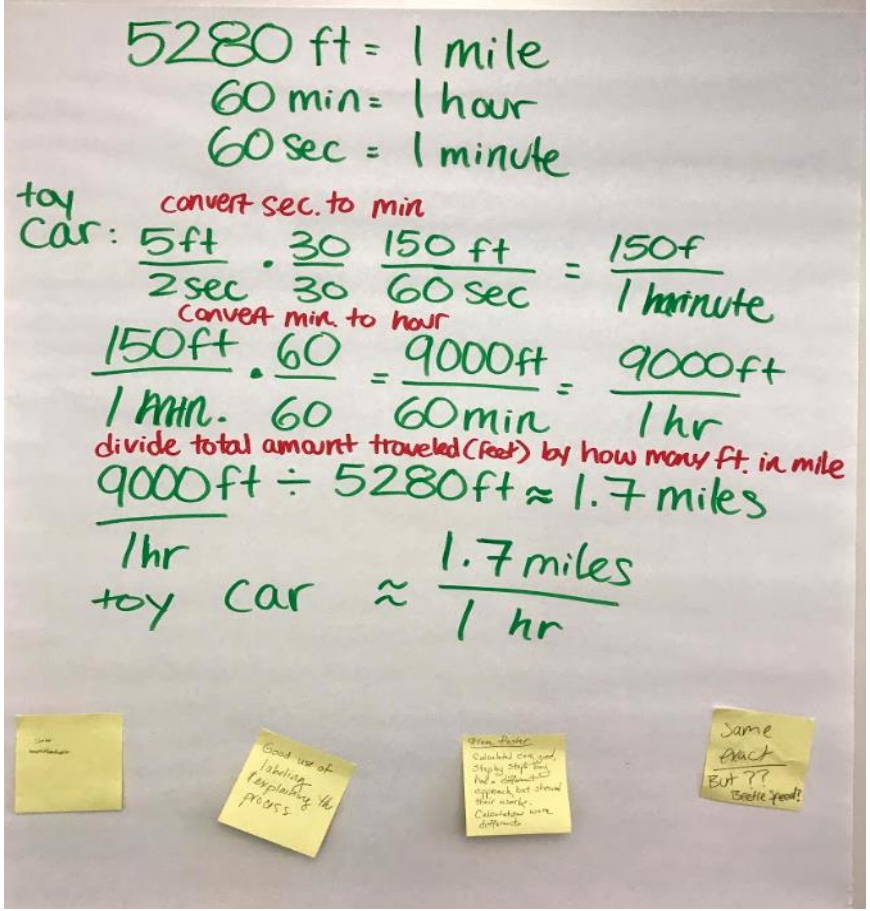
Students may have difficulty

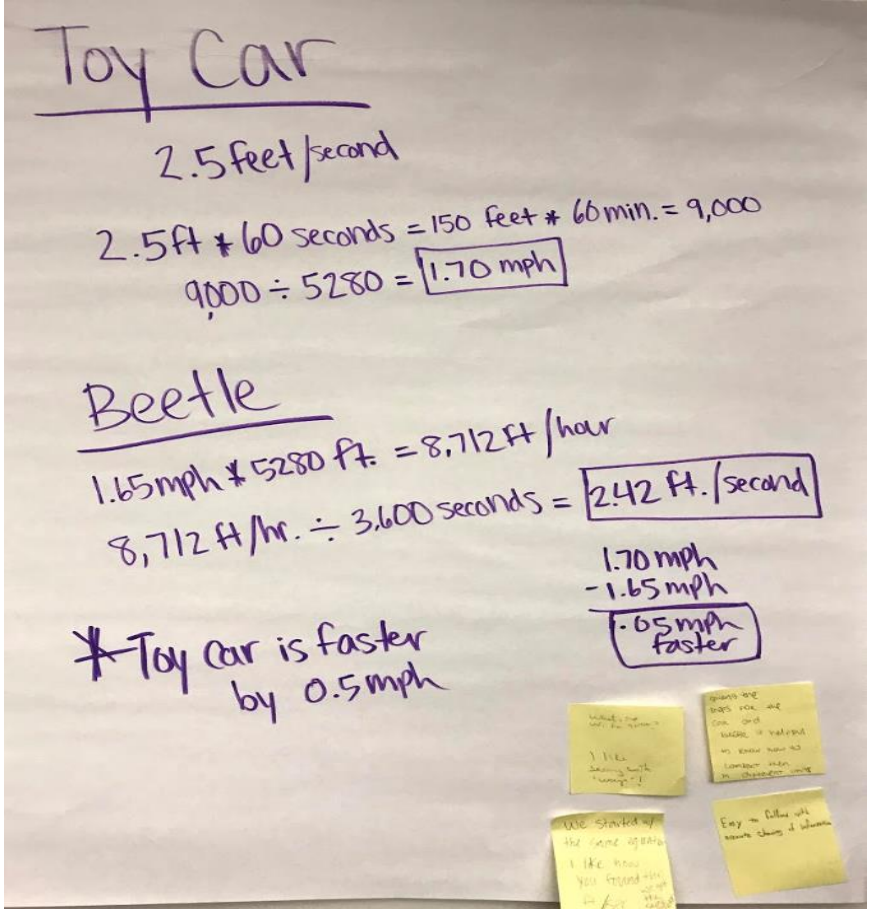
- Understanding equivalence after completing conversions
- Applying systematic approach to conversion using unit fractions

The Task: Bug vs Toy Car

Which moves faster, the bug or the toy car?

- Preview HW
- Tap into prior knowledge
- Guess
- Experiment
- Calculate





Student Samples

Key Lessons Learned by the Team

Cycle Three: Efficient, Effective, Accomplished, Confident

- **Logistical changes**
- **Instructional changes**
  - More guided estimation practice helped
  - Changed the approach to the systematic unit fraction process
- **Ongoing Issues**
  - Are we willing to let go of the rigidness of some of the procedural math?

Why lesson study?
Quotes from instructors

- Changes the way you see your practice
- Way to develop collective efficacy
- Learn what students are thinking, see the lesson from their point of view
- It is culturally relevant
- Gives voice to mathematical thinking, it values student thinking
- Informs us for how we teach other classes
- Student-centered, students are active participants in the learning process

Questions?

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