LOOPS
Logging Opportunities in Online Programs for Science

Kimberle Koile
The Concord Consortium
What is LOOPS?

• 5-year NSF-funded program, in year 2
  – Concord Consortium, Univ CA Berkeley, Univ Toronto
  – focus on 8th grade science

• Investigates how technology can support formative assessment
  – providing teachers with timely data about student interactions and learning
  – enabling teachers to modify instruction to improve learning

Formative feedback

Instructional Options
Research Questions

• What LOOPS data gives insight into student learning?

• How can LOOPS evidence help teachers make instructional decisions?

• How can LOOPS instructional features impact student learning?
Data and Feedback

• Log inquiry activities
  – Students interact with computational models, sensors, graphs, drawing tools

• Give teacher feedback
  – View and select student work, histograms, progress

• Teacher tailors instruction
  – During class, between classes, between uses of curriculum unit
Teacher Tools

- Pick N
  - students submit work in class
  - teacher chooses several for anonymous sharing

*Motion prediction graphs, 8th grade* Albany MS
Teacher Tools (cont’d)

- Poll
  - students submit answers to multiple choice questions
  - teacher gets and can display a histogram of responses

8th grade student work from Albany MS
Teacher Tools (cont’d)

- Student Progress

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8th grade student work from Foothill MS
Current Status

- Classrooms: CA Albany MS, Foothill MS, Martinez JHS, Pine Hollow MS
- Curriculum: Force & Motion, Chemistry
  - Motion: motion probe activities for velocity
  - Force: space rescue game
  - Chemistry: simulations, visualizations for chemical reactions

Student explores visualization.

Teacher chooses student responses.
INK-12
Interactive Ink Inscriptions in K-12

Kimberle Koile
MIT Center for Educational Computing Initiatives
INK-12: Interactive Ink Inscriptions in K-12

- NSF exploratory

- PIs: K Koile, MIT CECI, Andee Rubin

- Evaluator: David Reider

- 2-years, Sept 2008 to Sept 2010
INK-12: Interactive Ink Inscriptions in K-12

- Explore in science and math:
  - **Inscriptions**: What kinds of “ink” inscriptions are useful?
  - **Classroom communication**: How can technology support in-class communication between teachers and students?
  - **Inclusion**: Do we see differences in technology use with students having different learning needs?

- Technology: set of Tablet PCs
  - **pen-based interface**: draw and write to create “ink” inscriptions
  - **wireless communication**: share in-class work anonymously

b. Using your diagram, draw arrows to show how the forces of thrust, drag, and gravity act on the racing car as it moves forward on a racetrack. Label each arrow as thrust, drag, or gravity.
INK-12: Fourth and eighth graders

- Cambridge, Lexington, Waltham; in each district:
  - two 4th grade
  - one 8th grade science, one 8th grade math
  - total of 12 teachers
Fourth grade in Lexington

- Fiske (22 students)
- Bridge (21 students)

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Our Crayfish Data
Fourth grade science (no technology)  Fiske, Lexington
Teacher: The children absolutely loved it for many reasons but I believe that once they sent me their info and I displayed it on the board, they were more likely to pay attention because their work was coming. They also liked to see what others came up with.

Teacher: Once children are engaged in such a way, they are motivated to participate, and they care about doing their best work because it will be displayed for all to see. I absolutely loved what it does for my teaching.
Fourth grade science  Bridge, Lexington

**Our Crayfish Lengths**

What is the minimum length? 8
What is the maximum length? 12.5
What is the mode? 9.5

Bar graph:

**Our Crayfish Lengths**

What is the minimum length? 8
What is the range of length? 4.5
What is the mode? 9.5

Bar graph:

**Our Crayfish Lengths**

Now let's try a line plot:

**Our Crayfish Lengths**

Now let's try a line plot:
Fourth grade Baldwin, Cambridge
Fourth grade Baldwin, Cambridge

Special needs: some students more distracted, some less

Student figured out that he could communicate with the teacher...
Fourth grade Baldwin, Cambridge

Special needs: some students more distracted, some less

Student figured out that he could communicate with the teacher…

… so did another one.
Eighth grade science  Clarke, Lexington
(24, 23, 21, 16 students)  2 days in each class

a. Draw a simple diagram of a racing car in your Student Answer Booklet.

b. Using your diagram, draw arrows to show how the forces of thrust, drag, and gravity act on the racing car as it moves forward on a racetrack. Label each arrow as thrust, drag, or gravity.

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Draw two astronauts who have the same mass but different weights. Please do not include any words.

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Eighth grade math  Clarke, Lexington
(28, 27, 24, 11 students)   2 days in each class

We can look at this house as a prism sliced like a cheese. What would be the area of a single slice? First, write the length of each of the dimensions on the drawing. Then figure out the area. Show all the steps of your process. Remember your answer to use on the next slide.

Now construct the net of these solids:

- base = circle
- base = heptagon
LOOPS and INK-12

- **Ideal for:**
  - Immediate feedback, sharing of student work
  - Many subject areas

- **Need:**
  - Streamlined/automatic set-up
  - Teacher training in using immediate feedback
  - Teacher reports with summary info
    - e.g., Inquiry index: infer learning from actions
  - Teacher mobility
  - Support of differentiated instruction

- **Potential obstacles:**
  - Lack of tech support in the classroom
  - Lack of good networking
    * LOOPS is server-based, requires internet
    * INK-12 uses peer-to-peer for now