

For the lunch talk, you and a partner need **one** device larger than a phone (tablet, laptop) and a writing implement



Using Technology to Increase Conceptual Understanding in Algebra and Geometry*

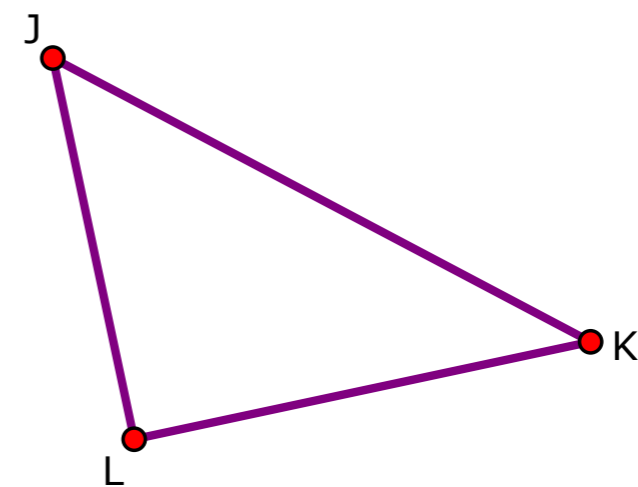
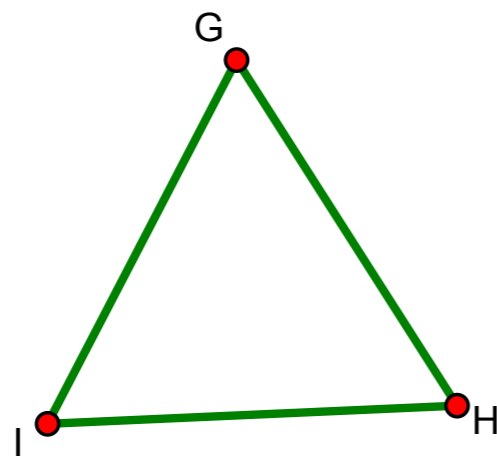
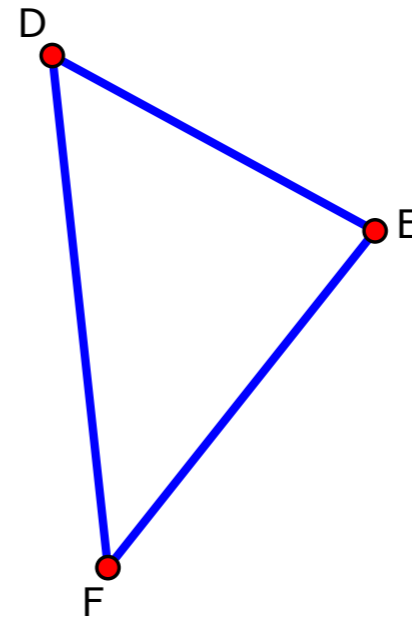
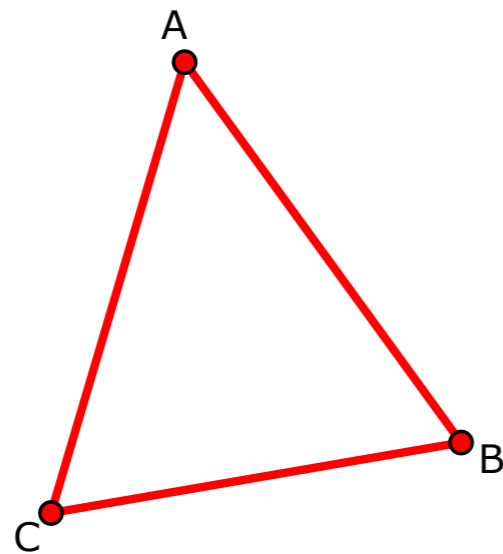
Annie Fetter, @MFAnnie, afetter@nctm.org
The Math Forum at NCTM

Desmos TMC Pre-Conference, 2017

A PDF of the slides and the handout, plus links to the technology, will be available after the session at <http://mathforum.org/blogs/annie/>

Types of Triangles

tinyurl.com/triangletypes



Types of Triangles

	Always True	Sometimes True	Never True
Red			
Blue			
Green			
Purple			

Types of Triangles

	Red	Blue	Green	Purple
Purple		Y		
Green				
Blue				

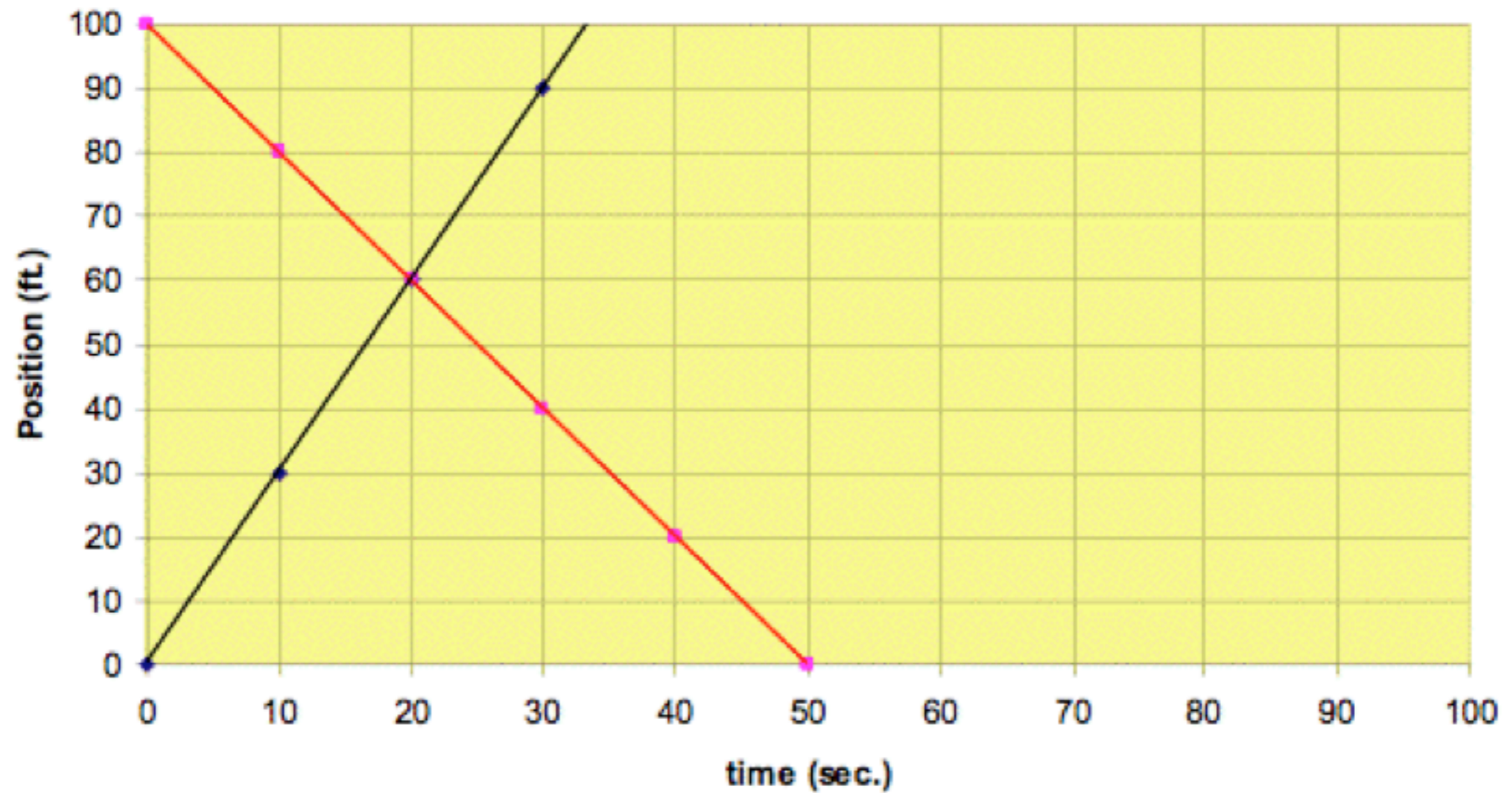
Types of Triangles–Strengths

- Infinitely many examples of each type.
- Develop intuition about types of triangles.
- No need for formal vocabulary.
- No laundry lists of properties to remember.
- Great formative assessment opportunity.

Types of Triangles

iPad versus laptop
(tech equivalent of #VNPS?)

Runners



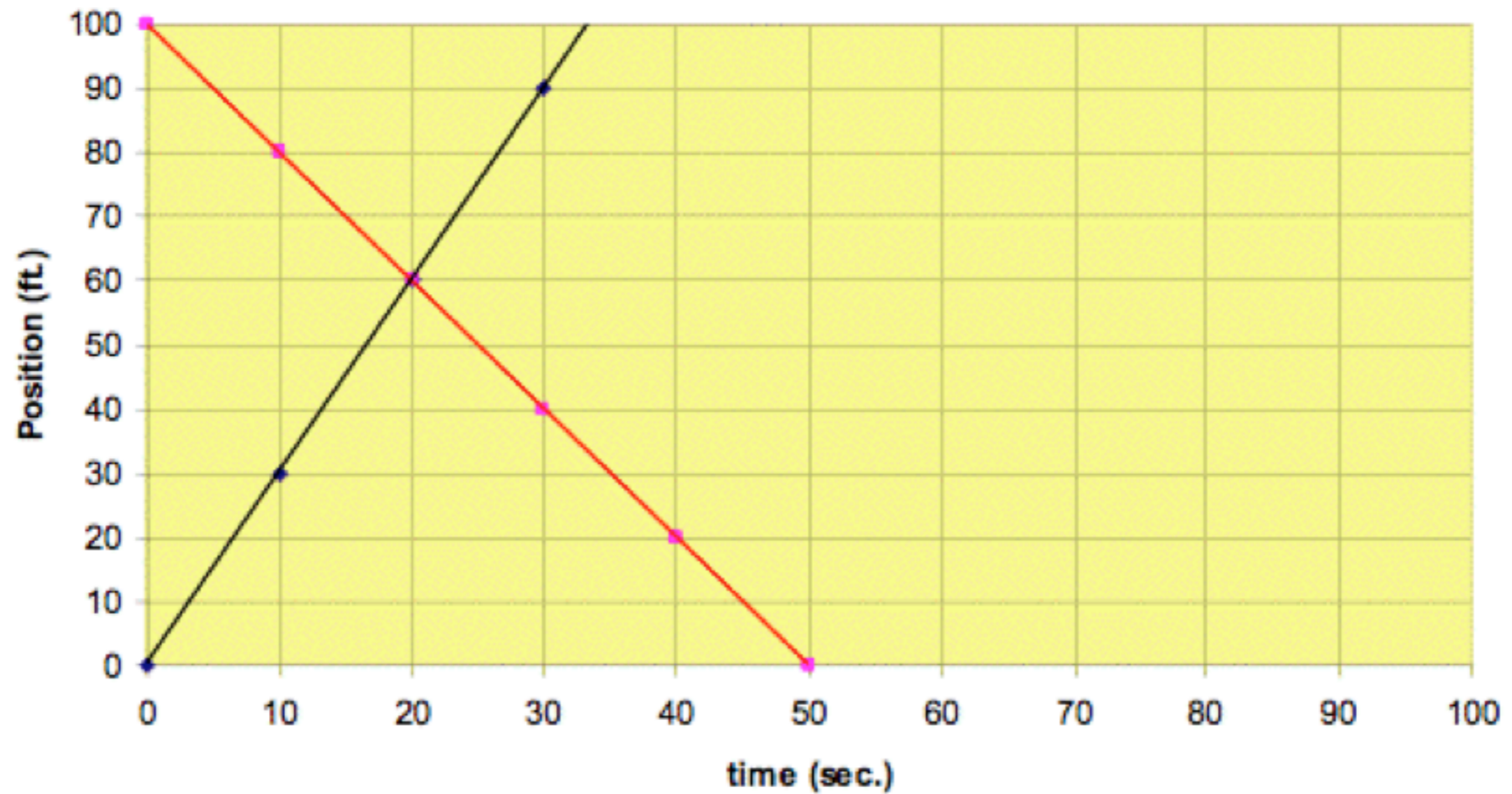
Runners

I Notice

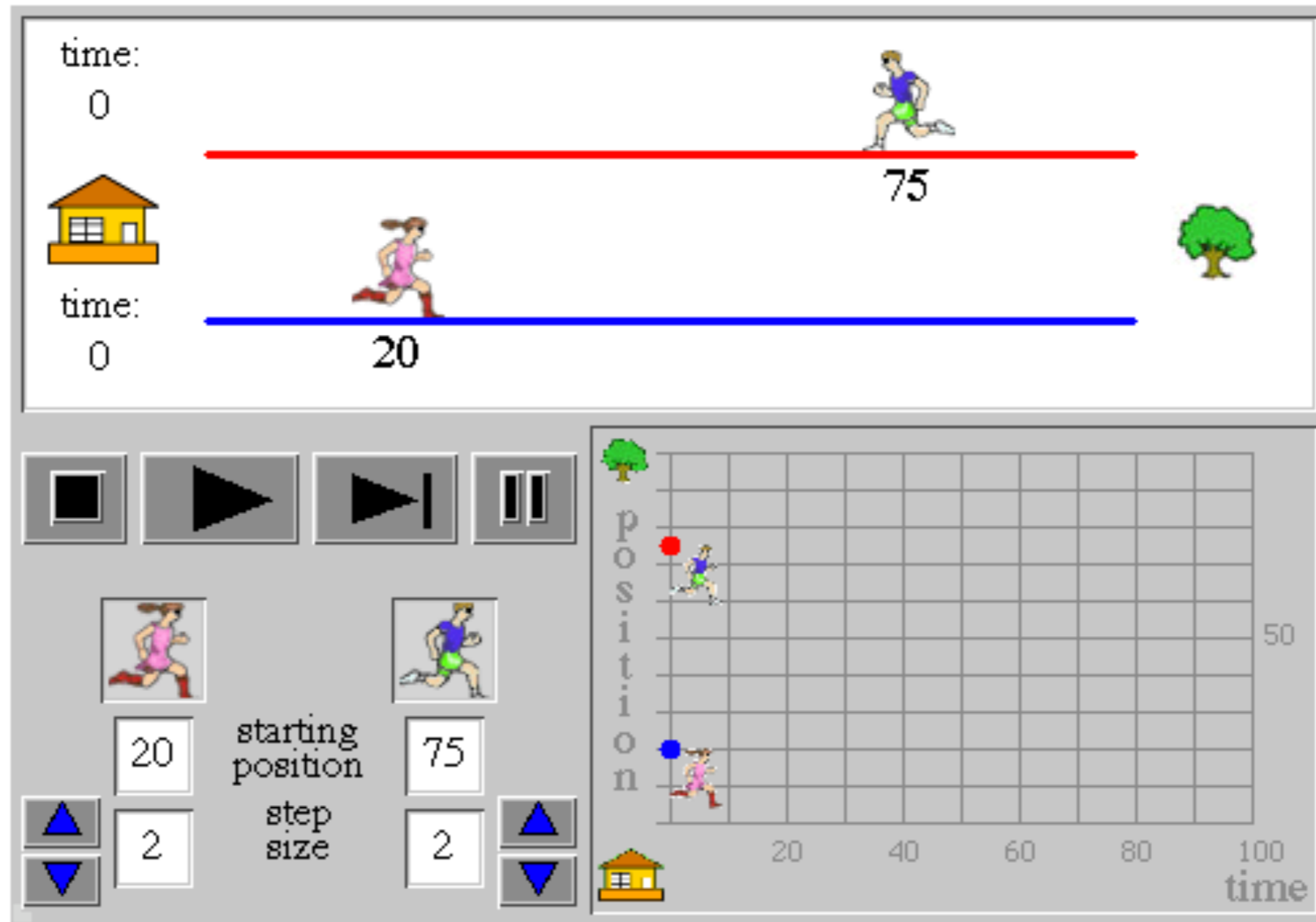
I Wonder



Runners



Runners



Runners

tinyurl.com/mathrunners

Go!
Reset



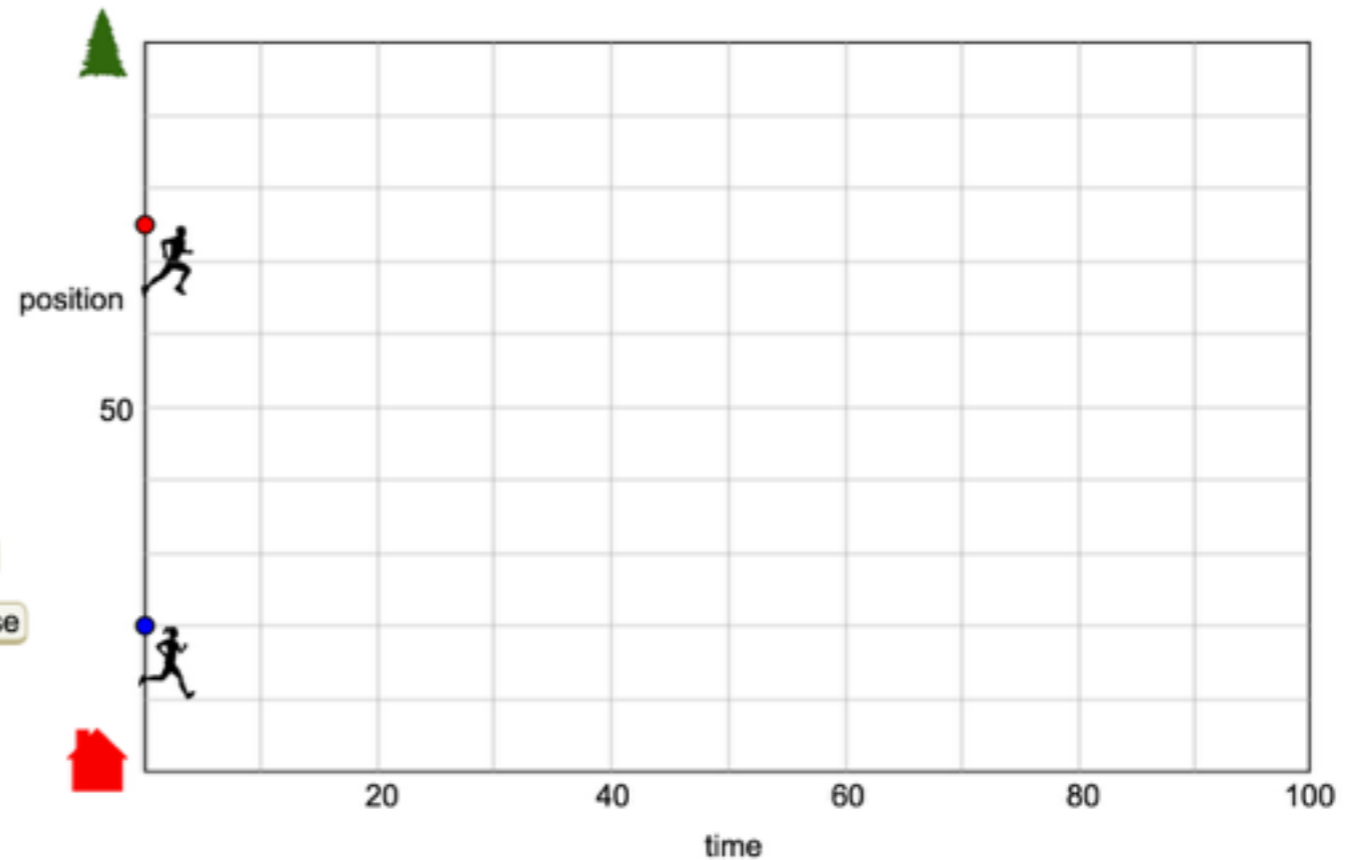
Girl Start =
Girl Step =

Girl Moves Towards Tree
Girl Moves Towards House



Boy Start =
Boy Step =

Boy Moves Towards Tree
Boy Moves Towards House



Runners–Possible Tasks

1. Generate the situation shown in the diagram.
2. Have the runners start and end at the same time.
3. Have the runners generate paths that are parallel.
4. Have the runners generate paths that don't intersect but aren't parallel.
5. Pick a point on the graph: _____ Make the runners generate paths that intersect there.
6. Generate a task to challenge your classmates.

Runners–Strengths

- Develop intuition about distance, rate, time relationships.
- Develop intuition about slope.
- No need for formal vocabulary.
- Can guess and check as many times as possible since the app gives near-instant feedback.
- Identifying the many points of entry and methods of solving systems of equations, from concept, to methods, to procedures.

Principles to Actions

An excellent mathematics program integrates the use of mathematical tools and technology as essential resources to help students learn and make sense of mathematical ideas, reason mathematically, and communicate their mathematical thinking.

The Thinking Classroom

“...a **thinking classroom** is a classroom that is not only conducive to thinking but also occasions thinking, a space that is inhabited by thinking individuals as well as individuals thinking collectively, learning together and constructing knowledge and understanding through activity and discussion.”

—Peter Liljedahl, **Building Thinking Classrooms**

(yes, the same guy who brought us vertical non-permanent surfaces)

Back in the 90s...

“We’re not teaching people how to use the Geometer’s Sketchpad. We’re teaching them how to change their classrooms and fundamentally alter the way they teach.”

And So...

How and in what ways can technology play a pivotal role in the thinking classroom?

Using Technology to Increase Conceptual Understanding in Algebra and Geometry

Technology at the Heart of the Thinking and Talking Classroom

Technology's Role in the Thinking and Talking Classroom

Technology and the Thinking and Talking Classroom



Annie Fetter
The Math Forum at NCTM

afetter@nctm.org
@MFAnnie

mathforum.org/blogs/annie/

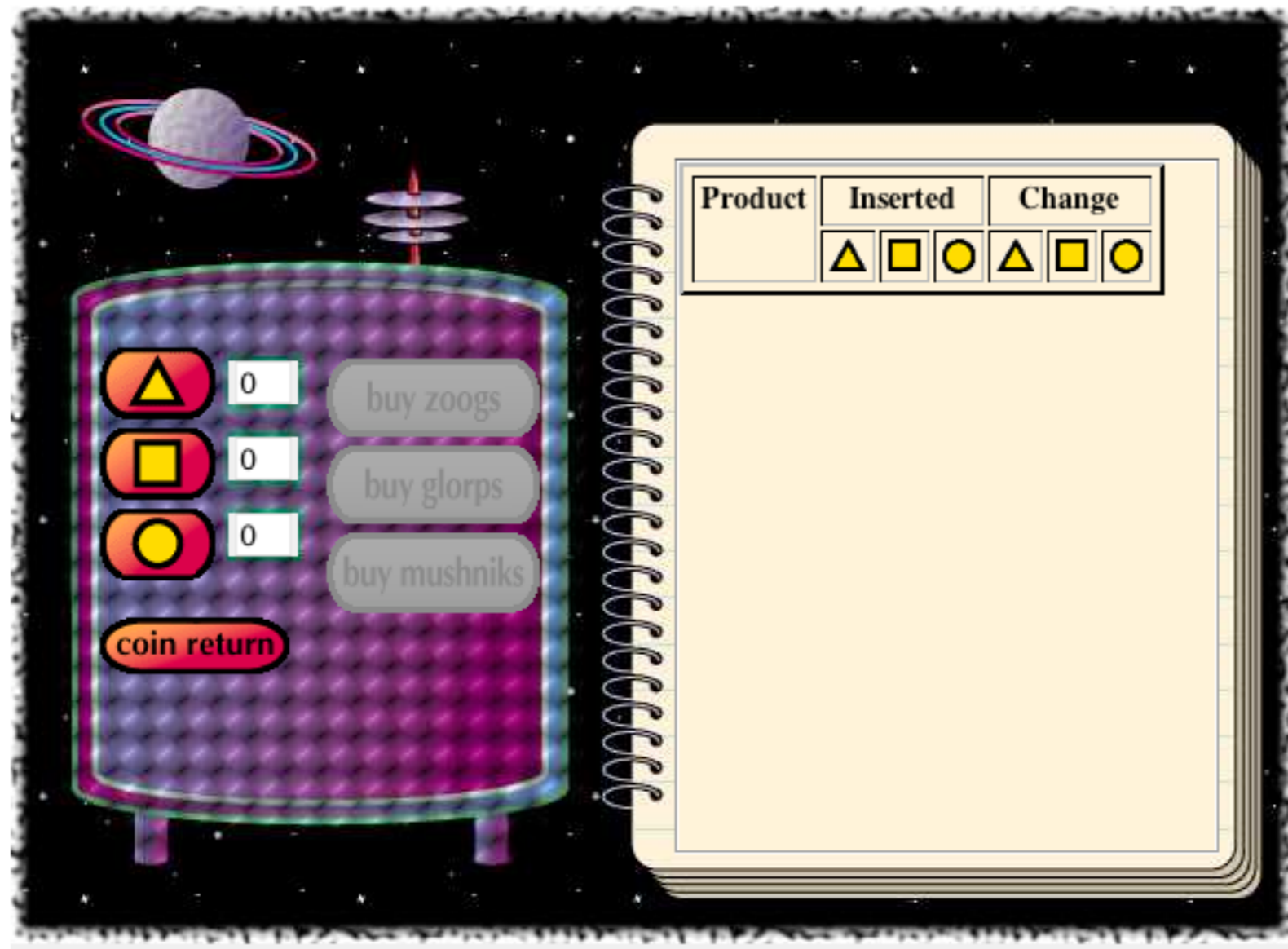
(We didn't get to this next thing, but I left it in here anyway, and there's a link to the app on my blog post.)

Galactic Exchange



Galactic Exchange

tinyurl.com/galacticexchange



Galactic Exchange

Use the Galactic Exchange applet to find as many ways as you can to buy something without getting back any change.

Galactic Exchange—Strengths

- user generated data
- record keeping
- identifying the many points of entry and methods of solving systems of equations, from concept, to methods, to procedures