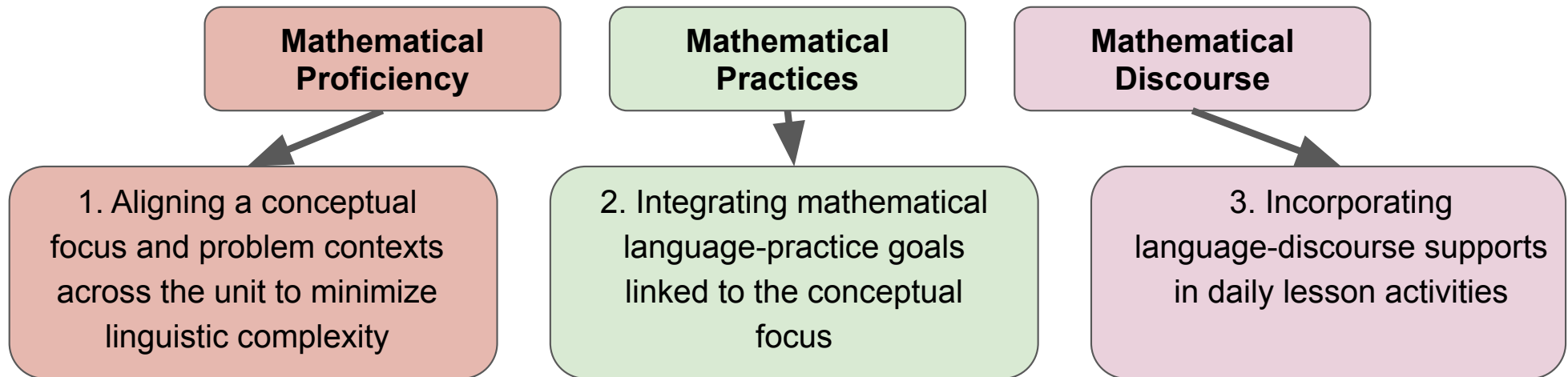


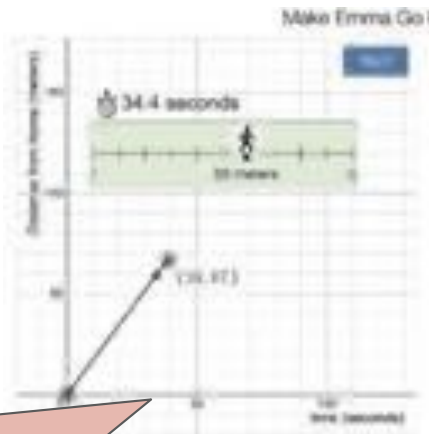
# Changes Linked to Design Principles



# Changes Linked to Design Principles

## Mathematical Proficiency

1. Aligning a conceptual focus and problem contexts across the unit to minimize linguistic complexity



“Slope as a measure of rate of change” (Lobato & Thanheiser, 2002)

- Focused on **slope as rate of change** throughout the unit
  - Original unit focused on 3 different meanings for slope
- Used **Context of Running Races** as main story / context for most problems in the unit
  - Original unit had more than 12 problem contexts in 3 sections

# Changes Linked to Design Principles

Emma's Walk: Introducing Distance-Time Graphs

<p><b>Mathematical Goals</b></p> <ul style="list-style-type: none"> <li>Identify meaning of variables on a graph to distance-time relationships.</li> <li>Start plotting the measurement of space and duration with the intention of time-relationships on distance-time graphs.</li> <li>Use the equation for straight-line distance-time graphs.</li> <li>Interpret the equation with a constant velocity.</li> </ul>	<p><b>CCSS-M: Science</b></p> <ul style="list-style-type: none"> <li>Use graphs to represent the function relationships between two quantities. Analyze a graph to see how one quantity changes as the other changes and how the relationship is described algebraically.</li> <li>Interpret the function in terms of a situation; graph key features of the function; and interpret the meaning of the features of the graph.</li> </ul> <p><b>CCSS-M: Math</b></p> <ul style="list-style-type: none"> <li>HS-M-1-4: Interpreting, Analyzing, and Generating Data</li> <li>HS-M-2-6: Reason and Proofs</li> </ul>
<p><b>Mathematical Language Goals</b></p> <ul style="list-style-type: none"> <li>Use terminology and language to describe and generate data. Equations representing distance-time relationships. For example, <math>d = vt</math> or <math>v = \frac{d}{t}</math> and provide context. Graphs using equations.</li> <li>Describe relationships and patterns using their distance-time graphs. For example, a regular slope indicates moving at a constant velocity. A horizontal line indicates no movement.</li> <li>Justify answers using language of quantitative features of graphs.</li> </ul>	<p><b>W.1.1: Support Language Goals</b></p> <ul style="list-style-type: none"> <li>W.1.1-1: Read and comprehend</li> <li>W.1.1-2: Write for a range of media</li> <li>W.1.1-3: Present information</li> </ul>
<p><b>Student Task Statements</b></p> <ul style="list-style-type: none"> <li>Use a distance-time graph and identify speed.</li> <li>Use equations to describe a situation, graph, and data.</li> </ul>	

## Mathematical Practices

2. Integrating mathematical language-practice goals linked to the conceptual focus

- Each lesson included detailed goals for mathematics, **language**, and practices
- Specific activities / problems linked to specific **language** goals
  - E.g., explain prompts

# Changes Linked to Design Principles

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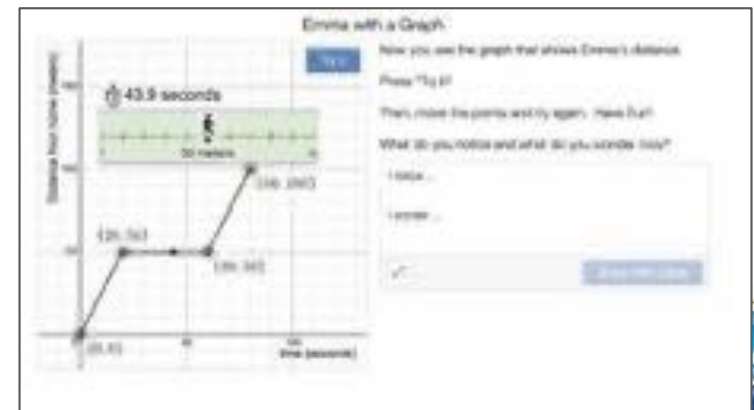
# Changes Linked to Design Principles

- Each lesson included
  - **whole-class and small group work**
  - **Dynamic technology**, and
  - **mathematical language routines**



**Mathematical Discourse**

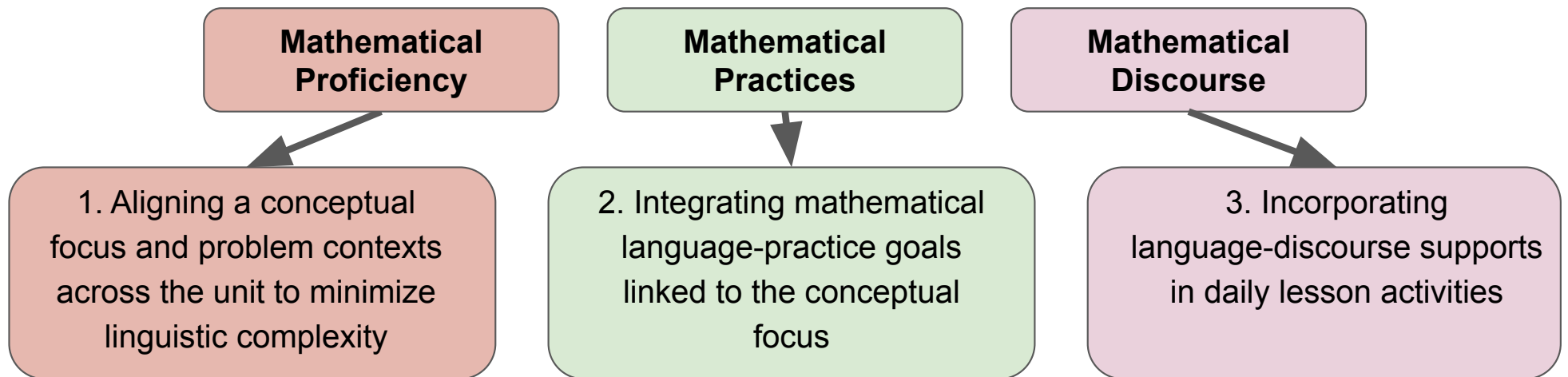
3. Incorporating language-discourse supports in daily lesson activities



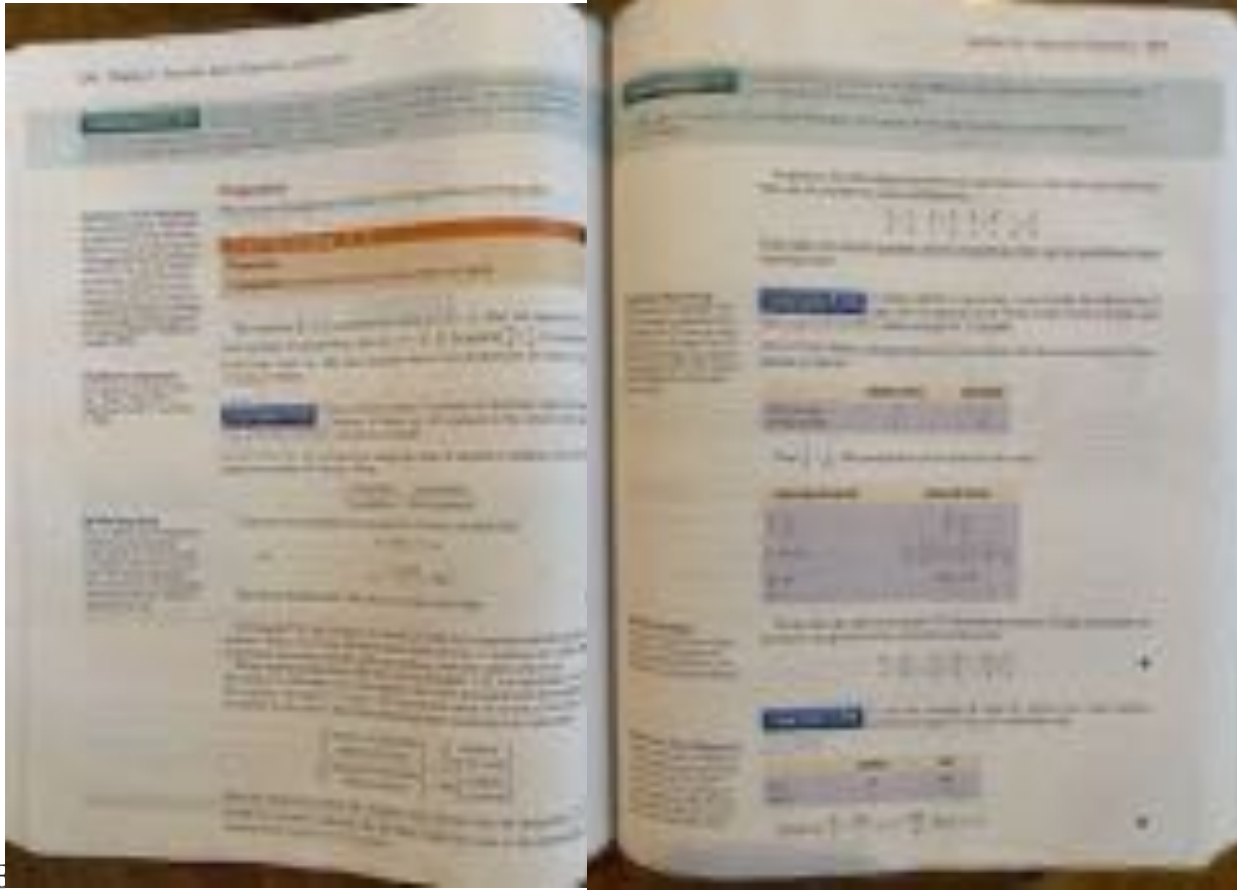
## *How does this Promote Equity?*



# How can you incorporate these design principles in mathematics classes for prospective teachers?



*How can we transform this to Promote Equity?*





<p>1. Aligning a conceptual focus and problem contexts across the unit to minimize linguistic complexity</p>	<p>2. Integrating mathematical language-practice goals linked to the conceptual focus</p>	<p>3. Incorporating language-discourse supports in daily lesson activities</p>