

## Points of Emphasis in M102

Whereas a typical instructional unit on linear functions might begin with a focus on students independently performing computations or manipulating linear expressions disconnected from real-world contexts, in M102, students should:

- regularly encounter real-world tasks involving two quantities whose measures vary such that the rate of change between the two is constant, and that require them to employ models and predict values. Common settings having constant rate of change include startup costs, constant speed, wages and salaries, manufacturing costs, fundraising, and rental charges (LP 1).
- engage with multiple parts of the modeling cycle (see above), especially naming their own assumptions and variables and defending their choice of model as much as possible (LP 1).
- be able to choose tasks that are organized around different scientific, social, or other topics, allowing students to have agency in their learning (LP 4).
- frequently collaborate and share their solution methods (LP 2).

Spending time computing or manually completing tables with linear expressions should not be a focus of this badge. In fact, the opposite is true. In M102, students should:

- regularly engage with tasks that do not require any computation, but instead focus on understanding and reasoning with models as well as leverage tools to help solve problems. For example, students should:
  - explain the real-world meaning of a linear model.
  - explore and compare multiple different linear models.
  - explain the relationship between parameters in a linear model and features of its graph.
  - use a linear model to justify a claim about a real-world context.
  - justify the selection of a linear model over other models (LP 3).
- have frequent opportunities to use reasoning to relate the algebraic form of a linear function to its graph (LP 3).
- have opportunities to share their reasoning with partners or in groups, allowing for practice sharing, critiquing, and revising their arguments and including social interaction as part of the learning process (LP 2).

Instead of focusing only on the applications typically thought of as associated with linear functions, students should also be given opportunities to understand and reflect on the ways that linear modeling can authentically involve real-world situations (LP 6). Some contexts to consider include:

- personal income growth.
- cost of living impacts on business.
- analysis of pay differences.

Often, coursework with linear functions is focused on performing computations by hand. Instead, students should be given frequent opportunities to:

- use spreadsheets and graphing software to allow for focus on understanding, rather than computation or symbolic manipulation. Students should write spreadsheet formulas to model phenomena that exhibit a linear model (LP 7).
- use motion detectors to measure distance vs. time (LP 7).