

2.3 Defining the Specific Learning Targets for a Lesson in Four Steps

Instructional Objectives for the Lesson

- Students will explain how the element of chance leads to variability in a set of data.
- Students will represent variability using a graph.

Steps	Potential Learning Trajectory Considerations	Elements for the Lesson
<p>Step 1. Define the essential content (concepts and skills) for the lesson.</p>	<ul style="list-style-type: none"> • My students can create a simple bar graph given a set of data. • My students have a naïve idea about the concept of chance, and this lesson will deepen that understanding. • My students have a solid understanding of how to look for and represent a pattern. • My students already know that chance exists in games like bingo, dice, cards, etc., but do not understand that chance exists naturally in the everyday world. 	<p>Content:</p> <ul style="list-style-type: none"> • My students must learn that chance occurs naturally during everyday procedures—like when they make cookies. • My students must learn that chance causes the values in a data set to vary. • My students must learn that variation in data creates a pattern.
<p>Step 2. Define the reasoning processes essential for the lesson.</p>	<ul style="list-style-type: none"> • My students have little practice with mathematical prediction. • My students have experience with analysis. • My students can build on what they know about cause and effect. • My students know how to brainstorm. 	<p>Reasoning Processes:</p> <ul style="list-style-type: none"> • My students must learn to analyze an everyday procedure to recognize the elements of chance embedded in that procedure that might cause a data set to distribute itself randomly.

Steps	Potential Learning Trajectory Considerations	Elements for the Lesson
<p>Step 3. Design a strong performance of understanding that will develop student thinking and understanding and provide compelling evidence of student learning.</p>	<ul style="list-style-type: none"> • My students can observe and analyze a simple procedure. • My students need to demonstrate an understanding of cause-and-effect reasoning. • My students have practiced brainstorming reasons for common occurrences. 	<p>Performance of Understanding:</p> <ul style="list-style-type: none"> • My students must engage in a performance of understanding that simulates naturally occurring elements of chance in ways that require them to observe, graph, analyze, and explain the effect that chance has on data patterns. We will use data on the number of chips in chocolate chip cookies for these purposes.
<p>Step 4. State the learning target.</p> <ul style="list-style-type: none"> • We will be able to see a pattern in graphs we make about the number of chips in our cookies, and we will be able to explain what made that pattern. 		

do this in groups to share the work of breaking up the cookies, counting the chips, and constructing the graphs. The result will be five graphs, one from each group, and they will all be a little different. Students will look at the graphs and discuss their observations. The teacher will lead this discussion by using open-ended questions.

Now the teacher is ready to state the learning target for students:

- We will be able to see a pattern in graphs we make about the number of chips in our cookies, and we will be able to explain what made that pattern.

She will present this target to the students at the beginning of the lesson, refer to the target during students' work, and revisit the target at the end of the lesson. The students can use the target throughout to keep themselves on track, asking questions like

- Am I making a good graph about these chips?
- Can I see a pattern in my graph or in someone else's?
- What does the pattern show?