

Grade 8 Mathematics Example

This is an excerpt of a Grade 8 mathematics lesson plan revision. The teacher valued the conceptual soundness of the lesson, but wanted to insert additional elements of formative assessment, such as adding tasks that allowed students to provide feedback to each other.

Lesson Title Introduction to Functions by The Illinois State Board of Education

Main Purpose of Lesson

The purpose of this lesson is for students to understand and identify when contexts, equations, tables, and graphs represent a function. This lesson will prepare students to address the objectives of Standard 8.F.5 (Describing and Sketching Functional relationships) and 8.F.3 (Linear Functions).

Context

Functions and lines represent foundational ideas that prepare students to model real world events and are crucial to understanding calculus. For my students, based on assessments and observations, this is the next appropriate standard in the year's scope and sequence. This lesson plan was found on the EQuIP website and endorsed by our math department.

Focus Standard

8.F.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of function is the set of ordered pairs consisting of an input and the corresponding output.

Supporting Standards

6.NS.8; 6.EE.9; 7.EE.4.a; 7.RP.1; 8.F.5; 8.EE.2; 8.EE. 7; 8.EE.8,b.

Building Block 1

Recognize that contexts in which one "input" is associated with only one output (not necessarily unique) for each input is a function.

Building Block 2

Recognize mathematical representations (equations, tables, and graphs) which yield only one output (not necessarily unique) for each input are functions.

Learning Goal 1a

Understand why functions are important (predictability).

Learning Goal 1b

Understand that a function describes a relationship and that for every input there is exactly one output.

Learning Goal 2a

Understand how to calculate an output (y) when given an equation and an input (x).

Learning Goal 2b

Understand how to arrange input / output (x,y) pairs in a "T" table.

Learning Goal 2c

Understand how to graph input / output (x,y) pairs in a "T" Table on a Cartesian plane.

Learning Goal 2d

Understand that not all equations represent functions (e.g., $x = \text{any number}$, $y^2 = x$ or $x^2 + y^2 = 4$).

Success Criteria & Tasks	Evidence-Gathering Opportunities	Pedagogical Actions
<p>SC 1a. Correctly explain that functions are important because they allow exactly one output (y) to be predicted for each input (x).</p> <p>TASK Function Machine activity</p>	<p>1a. Students should explain that functions allow us to predict one outcome with certainty when an input value is known or given. Students should include an explanation of why predictability is important in the Function Mapping activity.</p>	<p>1a. If students are confused at “new” mapping representation, stress that the purpose of this representation is to see how many outputs (y) result when a single value (x) is input.</p>
<p>SC 1b. Correctly identify contexts that are or are not functions.</p> <p>TASK Function Mapping activity</p>	<p>1b. Explain why each example is or is not a function in the Function Mapping Activity (whole group).</p>	<p>1b. If students state Example 3 is not a function, explain that a function does not require that outputs be unique (such a requirement is called a one-to-one).</p>

Evidence-Gathering Opportunities

		Classroom Talk	Student Work	Peer and Self-Assessment
Participant Structure	Independent		Pre-test Graphing Function Machine Summing Up	“Is it a function?” Sort Function Identification
	Pair	Graphing Functions “Is it a function?” Sort		Summing Up
	Small Group			
	Whole Class	Introductory Activity Function Machine Activity Function Mapping Activity		“Is it a function?” Sort Summing Up

Teacher commentary

This lesson is well designed and conceptually sound. It addressed many common student misconceptions about functions. I decided to modify or add tasks so that all Success Criteria had at least one corresponding task. I also added some peer assessment tasks.

Source information

Original lesson: <http://www.livebinders.com/play/play?present=true&id=1163320>

EQulP review: http://www.achieve.org/files/EQulP%20Feedback%20Unit%204%20-%20Functions_0_0.pdf