

**STRAND 1: FOUNDATIONS OF FUNCTIONS****TOPIC 1.2: INDEPENDENT AND DEPENDENT****Topic Notes****Mathematical focus**

Traditional teaching of functions has focused on a mathematical approach. For students to be successful in working with functions, a deeper understanding of the relationships included in functions must be developed. The idea of independent and dependent variables will be introduced through every day situations. The relationship and application of the terms independent and dependent will be approached through graphs, tables, and verbal descriptions.

**Topic overview**

Students will be presented with various representations of functions and will be asked to determine the independent and dependent quantities.

Six tasks are included in this topic.

- Task 1.2.1: Definition of Function
- Task 1.2.2: Independent and Dependent Statements
- Task 1.2.3: Mathematical Definition of Functions
- Task 1.2.4: Exploring Dependent and Independent
- Task 1.2.5: The A, B, Cs of Walking!
- Task 1.2.6: Cage the Cats

**TEXES standards focus**

**TEXES Standard II.005 Patterns and algebra.** The teacher understands attributes of functions, relations, and their graphs. The beginning teacher:

- (B) Identifies the mathematical domain and range of functions and relations and determines reasonable domains for given situations.
- (C) Understands that a function represents a dependence of one quantity on another and can be represented in a variety of ways (e.g., concrete models, tables, graphs, diagrams, verbal descriptions, symbols).

**TEXES Standard II.006 Patterns and algebra.** The teacher understands linear and quadratic functions, analyzes their algebraic and graphical properties, and uses them to model and solve problems. The beginning teacher:

- (A) Understands the concept of slope as a rate of change and interprets the meaning of slope and intercept in a variety of situations.

**TEKS/TAKS focus**

**TEKS A.1 Foundations for functions.** The student understands that a function represents a dependence of one quantity on another and can be described in a variety of ways. The student is expected to:

- (A) describe independent and dependent quantities in functional relationships;
- (B) gather and record data and use data sets to determine functional relationships between quantities;
- (D) represent relationships among quantities using concrete models, tables, graphs, diagrams, verbal description, equations, and inequalities; and
- (E) interpret and make decisions, predictions, and critical judgments from functional relationships.

High School TAKS Objective 1: The student will describe functional relationships in a variety of ways.

**TEKS A.2 Foundations for functions.** The student uses the properties and attributes of functions.

High School TAKS Objective 2: The student will demonstrate an understanding of the properties and attributes of functions.

**Materials**

Task	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6
Graphing calculator			x	x	x	x
Motion detector				x		
Copies of task	x	x	x	x	x	x

**Procedures**

Participants should be in groups of 3-4. Complete each task. At the end of each task, bring the groups together for a summarizing discussion.

**Summary**

The foundation of functions is understanding the relationships between two variables, the dependency of those variables on each other, and how that dependency is symbolically represented.

**Extensions**

The following activities from the Dana Center publication *Algebra I Assessments* (2002) can be used as extension activities or as assessment for foundations:

- Mosaics
- The 600-Meter Race
- Swimming Pools

*Algebra I: Strand 1. Foundations of Functions; Topic 2. Independent and Dependent; Topic Notes*

**Assessment/Transition to the classroom**

Participants should complete the Teacher's Journal, recording their responses and making any modifications necessary to make the tasks completely classroom ready.