

Introduction to the **Revised Mathematics TEKS**

MATHEMATICAL PROCESS STANDARDS JOURNAL GRADES 9-12





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Mathematical Process Standard	Summarized
The student is expected to apply mathematics to problems arising in everyday life, society, and the workplace.	
The student is expected to use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.	1.
The student is expected to select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.	
The student is expected to communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.	2.
The student is expected to create and use representations to organize, record, and communicate mathematical ideas.	
The student is expected to analyze mathematical relationships to connect and communicate mathematical ideas.	3.
The student is expected to display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.	

How might the new mathematical process standards support learning in your classroom?

Vocabulary Notes

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ELPS	Cross-Disciplinary Instruction	Multiple Entry Points	Levels of Cognitive Demand
The English Language Proficiency Standards (ELPS) outline the instruction school districts must provide to English language learners in order for them to have full to learn English and academically. The ELPS are to be implemented as an integral part of the instruction in each and subject of the TEKS. Effective instruction and second language acquisition involves giving English language learners opportunities to listen, speak, read, or write at theirlevel of English language development in 	This term refers to skills and processes that cut across disciplines (English/language arts, reading, math, science, and social studies). Related standards are found in the CCRS The CCRS (College and Career Readiness Standards) includes the and Standards and is a resource designed to help students, parents, teachers, and counselors understand the specific skills necessary for college and career readiness. The cross-disciplinary standards are organized into two major areas: Key Skills and Skills.	Tasks with entry points are those which have varying degrees of within the task, or provide students with varied, , and to actively participate in the task.	Tasks that command engagement with the concepts and that encourage students to make connections leading to different opportunities for student thinking, such as tasks, procedures connections tasks, procedures connections tasks, and mathematics tasks.

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The Mathematical Process Standards – My Understanding



Examining Amplified Instructional Task 1

Task: _____

		Communication	Reasoning, Generalizing, and Problem Solving	Modeling, Using Tools, and Connecting Representations	Analysis
Instructional Strategies	English Language Proficiency Standards				
	Multiple Entry Points				
CCRS	Cross- Disciplinary				

Mark your perceived level of cognitive demand for this task on the continuum below:

. Low High

6



Amplifying Instructional Tasks – Algebra I Example

		Considerations for Brainstorming		
	Consider the revised TEKS in the Original Task	Consider the related SEs	Consider the Context	Consider the Student
Guiding Questions	What main concepts and/or skills are involved in this task? What are related concepts and/or skills?	 What else might be explored or applied? Additional mathematical ideas from related student expectations Process standards Grade level connections 	Real-World Context What else could be explored within this context? What related ideas could be added? Is there a real-world context for this idea? Mathematical Context Are there different starting points for the problem? How else could the material be presented?	 What Tier I differentiation may be needed to reach the student who is struggling, learning English, and/or advanced?
Brainstorming	Main Concepts and/or Skills Identify key attributes of a quadratic function A(7)(A)	 Process Standards Process standards A(1)(A)-(G) Content Standards 	 Context How does the student thinking differ if the graph is presented first? Or the table? What is the meaning of the points of a quadratic function when 	 Struggling Model the use of additional tools (hands-on, pictures). Model the use of a table to look for a pattern.
	Related Concepts and/or Skills Everyday life A(1)(A)	 write quadratic functions using technology and make predictions A(8)(B) Write quadratic functions given real solutions and graphs of related equations A(6)(C) Write domain and range of quadratic functions using inequalities A(6)(A) 	 What are the reasonable domain values when given a context? 	 Learning English Provide sentence stems and frames. Provide opportunities to speak. Pre-teach vocabulary. Advanced Explore how parameter changes would affect the profit.



Considerations for Brainstorming Consider the revised **TEKS in the Original** Consider the related SEs **Consider the Context Consider the Student** Task What else might be explored or What Tier I differentiation may be What main concepts **Real-World Context** and/or skills are What else could be explored within this needed to reach the student who is applied? involved in this task? context? What related ideas could be Additional mathematical ideas struggling. Questions • from related student learning English, and/or added? expectations advanced? What are related Process standards concepts and/or Is there a real-world context for this Grade level connections skills? idea? Guiding Mathematical Context Are there different starting points for the problem? How else could the material be presented? Main Concepts **Process Standards** Struggling Context and/or Skills Process standards G(1)(A)-(G) Model the use of additional tools How can area be used to (hands-on, pictures). Find area of regular determine dimensions? Model the use of a table to look polygons G(11)(A) • Content Standards • How could triangle properties be for a pattern. Apply the relationships in special • <u>Brainstorming</u> used to find lengths needed to right triangles 30°-60°-90° and Learning English calculate area? 45°-45°-90° and the Pythagorean Provide sentence stems and • theorem, including Pythagorean • How do you determine the amount **Related Concepts** frames. triples, to solve problems. G(9)(B)of material needed for and/or Skills Provide opportunities to speak. Determine the area of composite construction? Everyday life G(1)(A) Pre-teach vocabulary. • two-dimensional figures comprised of a combination of triangles, parallelograms, Advanced trapezoids, kites, regular Explore different pricing. polygons, or sectors of circles to Explore how a change in amount solve problems using appropriate of material affects the dimensions units of measure. G(11)(B) of the stage.



Amplifying Instructional Tasks – Algebra II Example

	Considerations for Brainstorming		
Consider the revis TEKS in the Origin Task	ed Consider the related SEs	Consider the Context	Consider the Student
What main concepts and/or skills are involve in this task? What are related concepts and/or skills?	 What else might be explored or applied? Additional mathematical ideas from related student expectations Process standards Grade level connections 	Real-World ContextWhat else could be explored within this context? What related ideas could be added?Is there a real-world context for this idea?Mathematical Context Are there different starting points for the problem?How else could the material be presented?	 What Tier I differentiation may be needed to reach the student who is struggling, learning English, and/or advanced?
Main Concepts and/or Skills Graph and write the inverse of a function using notation such as f ⁻¹ (x) 2A(2)(B) Related Concept and/or Skills Multiple representations 2A(1)(D)	 Process Standards Process standards 2A(1)(A)-(G) Content Standards Describe and analyze the relationship between a function and its inverse (quadratic and square root, logarithmic and exponential), including the restriction(s) on domain, which will restrict its range. 2A(2)(C) Use the composition of two functions, including the necessary restrictions on the domain, to determine if the functions are inverses of each other. 2A(2)(D) Write the quadratic function given three specified points in the plane. 2A(4)(A) Determine the effect on the graph of f(x) = √x when f(x) is replaced by af(x), f(x) + d, f(bx), and f(x - c) for specific positive and negative values of a, b, c, and d. 2A(4)(C) 	 Context How does the student thinking differ if the graph is presented first? Or the table? How do transformations of a function affect the inverse of that function? What restricts the domain of the inverse of a function? 	 Struggling Model the use of additional tools (hands-on, pictures). Model the use of a graph and transformations to determine key attributes of a function. Learning English Provide sentence stems and frames. Provide opportunities to speak. Pre-teach vocabulary. Advanced What does it mean for f(x)=f⁻¹(x)?



Exploring the Project Share Gateway

TEKS	Type of Activities	What evidence do you see of the mathematical process standards? Justify the connections that you noted.	Notes

My Reflections:	
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Amplifying Instructional Tasks Template - _____

			Considerations for Brainstorming	
	Consider the 2012 TEKS in the Original Task	Consider the Content Strands	Consider the Context	Consider the Student
Guiding Questions	What main concepts and/or skills are involved in this task? What are related concepts and/or skills?	 What else might be explored or applied? Additional mathematical ideas from related student expectations Grade level connections Process Standards 	What else could be explored within this context? What related ideas could be added to this context? What connections could be made to other content areas?	 What Tier I differentiation may be needed to reach the student who is struggling, learning English, and/or advanced?
orming	Main Concepts and/or Skills	Standards	Context	Struggling
Brainst	Related Concepts and/or Skills			Learning English
				Advanced

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