Example Math Descriptors for Depth of Knowledge Levels 1 to 4

D.O.K. Level 1: Recall & Reproduction	D.O.K. Level 2: Basic Skills & Concepts
• There is usually a right answer • Recall or recognize a fact, definition, term or property • Apply/commute a well-known algorithm or formula (i.e. sum, quotient, etc.) • Perform a specified or routine procedure • Solve a one-step word problem • Retrieve information from a graph or table • Make conversions between and among representations or numbers (fractions, decimals, percent) or within and between customary metric measures • Locate points on a coordinate grid • Determine the area or perimeter of rectangles or triangles given a drawing a labels. • Identify shapes and figures • Identify a pattern • Teacher's Roles: Tells, Shows, Demonstrates, Directs • Student's Roles: Memorizes, Restates, Absorbs, Remembers, Repeats	• There is usually a right answer • Classify shapes and figures • Interpret information from a simple graph • Solve a routine problem that require multiple steps/decision points or the application of multiple concepts • Provide justification for steps in a solution process • Use models or diagrams to represent and explain mathematical concepts • Make and explain estimates • Make basic inferences or logical predictions from data/observations • Organize or order data • Choose an appropriate graph type and organize and display data • Extend/continue a pattern • Retrieve information from a table, graph, or figure and use it to solve a problem requiring multiple steps • Specify and explain relationships between facts, terms, properties, or operations • Teacher's Roles: Shows, Evaluates, Questions, Observes, Organizes, Facilitates • Student's Roles: Solves Problems, Calculates, Illustrates, Compiles, Demonstrates Use of knowledge

D.O.K. Level 3: Strategic Thinking/Reasoning	D.O.K. Level 4: Extended Thinking
• May be more than one right answer and/or more than one way to get there • Use concepts to solve non-routine problems • Explain your reasoning *when more than one response is possible* • Having to plan a strategy and decide how to approach a math task *when more than one approach is possible* • Generalize a pattern • Write your own problem, given a situation • Find all the possible answers • Describe, compare, contrast different solution methods • Use evidence to develop logical arguments for a concept • Draw conclusions from observations/data, citing evidence • Interpreting information from a complex graph • Make and/or justify conjectures • Perform procedure with multiple steps and multiple decision points • Solve a multi-step problem and provide support with a mathematical explanation that justifies the answer • Interpret data from a complex graph • Verify the reasonableness of results • Teacher's Roles: Probes, Observes, Organizes, Guides, Evaluates, Frames, Questions • Student's Roles: Discusses, Questions, Debates, Examines, Judges, Justifies, Reasons, Decides, Tests, Compares	• Relate math concepts to other content areas • Relate math concepts to real-world applications *in new situations* • Conduct a project that specifies a problem, identifies solution paths, solves the problem and reports results • Conduct an investigation to solve a real-world problem with unpredictable outcomes • Design a mathematical model to inform and solve a practical or abstract situation • Apply understanding in a novel way, providing an argument/justification for the application • Teacher's Roles: Facilitates, Evaluates, Extends, Analyses • Student's Roles: Designs, Proposes, Formulates, Modifies, Creates, Plans