

# DOK QUESTION STEMS FOR MATH

## UNDERSTANDING DOK QUESTION STEMS FOR MATH: A COMPREHENSIVE GUIDE

IN THE REALM OF MATHEMATICS EDUCATION, ASSESSING STUDENT UNDERSTANDING EFFECTIVELY IS CRUCIAL FOR FOSTERING LEARNING AND ENSURING MASTERY. ONE OF THE MOST POWERFUL TOOLS EDUCATORS UTILIZE IS THE USE OF DOK QUESTION STEMS FOR MATH. THESE STEMS SERVE AS FOUNDATIONAL COMPONENTS THAT GUIDE THE CREATION OF QUESTIONS ALIGNED WITH VARIOUS COGNITIVE COMPLEXITY LEVELS, OFFERING A STRUCTURED APPROACH TO EVALUATE STUDENTS' DEPTH OF UNDERSTANDING. THIS ARTICLE EXPLORES THE IMPORTANCE OF DOK QUESTION STEMS FOR MATH, HOW THEY ARE USED, AND STRATEGIES TO IMPLEMENT THEM EFFECTIVELY IN THE CLASSROOM.

### WHAT ARE DOK QUESTION STEMS FOR MATH?

DOK QUESTION STEMS FOR MATH REFER TO THE SPECIFIC LANGUAGE PROMPTS OR PHRASES USED TO CRAFT QUESTIONS THAT TARGET DIFFERENT LEVELS OF COGNITIVE RIGOR, AS DEFINED BY THE DEPTH OF KNOWLEDGE (DOK) FRAMEWORK. DEVELOPED BY NORMAN WEBB, THE DOK FRAMEWORK CATEGORIZES TASKS BASED ON THE COMPLEXITY OF THINKING REQUIRED TO COMPLETE THEM SUCCESSFULLY. THE GOAL IS TO MOVE BEYOND MERE RECALL OR BASIC COMPREHENSION TO HIGHER-ORDER THINKING SKILLS SUCH AS ANALYSIS, SYNTHESIS, AND EVALUATION.

USING DOK QUESTION STEMS FOR MATH HELPS TEACHERS DESIGN ASSESSMENTS AND CLASSROOM ACTIVITIES THAT CHALLENGE STUDENTS AT VARIOUS COGNITIVE LEVELS, ENSURING A COMPREHENSIVE UNDERSTANDING OF MATHEMATICAL CONCEPTS. THESE STEMS ACT AS TEMPLATES OR STARTING POINTS FOR EDUCATORS TO FORMULATE QUESTIONS THAT ALIGN WITH THE DESIRED DEPTH OF UNDERSTANDING.

### THE FOUR LEVELS OF DOK AND THEIR CORRESPONDING MATH QUESTION STEMS

THE DOK FRAMEWORK CONSISTS OF FOUR LEVELS, EACH REPRESENTING INCREASING COGNITIVE DEMAND:

#### LEVEL 1: RECALL AND REPRODUCTION

THIS LEVEL INVOLVES BASIC RECALL OF FACTS, DEFINITIONS, OR PROCEDURES. QUESTIONS AT THIS LEVEL TYPICALLY ASK STUDENTS TO RECOGNIZE OR RECALL INFORMATION.

SAMPLE DOK QUESTION STEMS FOR MATH AT LEVEL 1 INCLUDE:

- "RECALL..."
- "IDENTIFY..."
- "LIST..."
- "DEFINE..."
- "WHAT IS..."

EXAMPLE:

RECALL THE FORMULA FOR THE AREA OF A RECTANGLE.

## LEVEL 2: SKILLS AND CONCEPTS

AT THIS LEVEL, STUDENTS DEMONSTRATE UNDERSTANDING OF CONCEPTS AND CAN PERFORM SIMPLE PROCEDURES OR MAKE STRAIGHTFORWARD APPLICATIONS.

SAMPLE DOK QUESTION STEMS FOR MATH AT LEVEL 2 INCLUDE:

- "EXPLAIN HOW..."
- "DESCRIBE..."
- "COMPARE..."
- "CALCULATE..."
- "DETERMINE..."

EXAMPLE:

DESCRIBE HOW TO FIND THE VOLUME OF A RECTANGULAR PRISM.

## LEVEL 3: STRATEGIC THINKING

QUESTIONS REQUIRE STUDENTS TO ANALYZE, INTERPRET, OR JUSTIFY THEIR REASONING. THEY MAY INVOLVE MULTIPLE STEPS OR CONNECTIONS BETWEEN CONCEPTS.

SAMPLE DOK QUESTION STEMS FOR MATH AT LEVEL 3 INCLUDE:

- "EXPLAIN WHY..."
- "JUSTIFY..."
- "PREDICT WHAT WILL HAPPEN IF..."
- "SOLVE FOR..."
- "CONSTRUCT A MODEL TO..."

EXAMPLE:

JUSTIFY WHY THE SUM OF THE INTERIOR ANGLES OF A TRIANGLE IS 180 DEGREES.

## LEVEL 4: EXTENDED THINKING

THESE TASKS INVOLVE COMPLEX REASONING, PLANNING, AND INVESTIGATION. THEY OFTEN REQUIRE STUDENTS TO SYNTHESIZE INFORMATION, CREATE NEW MODELS, OR DESIGN SOLUTIONS.

SAMPLE DOK QUESTION STEMS FOR MATH AT LEVEL 4 INCLUDE:

- "DEVELOP A PLAN TO..."
- "DESIGN AN EXPERIMENT TO..."
- "PROVE THAT..."
- "ANALYZE THE EFFECTIVENESS OF..."
- "CREATE A MATHEMATICAL MODEL FOR..."

EXAMPLE:

DEVELOP A REAL-WORLD PROBLEM SCENARIO THAT REQUIRES CALCULATING COMPOUND INTEREST AND EXPLAIN YOUR REASONING.

## HOW TO INCORPORATE DOK QUESTION STEMS FOR MATH IN CLASSROOM PRACTICE

EFFECTIVE USE OF DOK QUESTION STEMS FOR MATH CAN TRANSFORM CLASSROOM ASSESSMENTS AND PROMOTE DEEPER UNDERSTANDING. HERE ARE STRATEGIES TO INTEGRATE THESE STEMS INTO YOUR TEACHING:

## 1. DESIGNING FORMATIVE ASSESSMENTS

USE DOK STEMS TO CREATE FORMATIVE QUESTIONS THAT GAUGE STUDENT UNDERSTANDING AT VARIOUS LEVELS. FOR EXAMPLE, START WITH RECALL QUESTIONS AND GRADUALLY INCLUDE MORE COMPLEX TASKS LIKE DESIGNING OR ANALYZING.

TIP:

CREATE A QUESTION BANK WITH STEMS CATEGORIZED BY DOK LEVELS, MAKING IT EASIER TO ADAPT QUESTIONS DURING LESSONS.

## 2. DIFFERENTIATING INSTRUCTION

EMPLOY DOK QUESTION STEMS TO TAILOR ACTIVITIES FOR DIVERSE LEARNERS. PROVIDE SIMPLER STEMS FOR BEGINNERS AND MORE COMPLEX ONES FOR ADVANCED STUDENTS, ENCOURAGING GROWTH AT EACH STAGE.

## 3. DEVELOPING CRITICAL THINKING SKILLS

INCORPORATE STEMS THAT CHALLENGE STUDENTS TO JUSTIFY THEIR REASONING, ANALYZE DIFFERENT APPROACHES, AND CREATE NEW MODELS OR SOLUTIONS, FOSTERING HIGHER-ORDER THINKING.

## 4. ALIGNING WITH STANDARDS AND OBJECTIVES

ENSURE THAT YOUR QUESTIONS, GUIDED BY APPROPRIATE DOK STEMS, ALIGN WITH CURRICULUM STANDARDS AND LEARNING OBJECTIVES, PROMOTING TARGETED INSTRUCTION.

## 5. USING DOK STEMS FOR STUDENT SELF-ASSESSMENT

ENCOURAGE STUDENTS TO FORMULATE THEIR OWN QUESTIONS USING DOK STEMS, PROMOTING METACOGNITION AND DEEPER ENGAGEMENT WITH MATHEMATICAL CONCEPTS.

## EXAMPLES OF DOK QUESTION STEMS FOR MATH FOR DIFFERENT TOPICS

BELOW ARE PRACTICAL EXAMPLES OF DOK QUESTION STEMS FOR MATH ACROSS VARIOUS TOPICS:

### ALGEBRA

- LEVEL 1: "RECALL THE PROPERTIES OF ADDITION AND MULTIPLICATION."
- LEVEL 2: "DESCRIBE HOW TO SOLVE A LINEAR EQUATION."
- LEVEL 3: "EXPLAIN WHY THE METHOD OF SUBSTITUTION WORKS FOR SOLVING SYSTEMS OF EQUATIONS."
- LEVEL 4: "CREATE A REAL-WORLD PROBLEM THAT CAN BE MODELED WITH A QUADRATIC EQUATION."

### GEOMETRY

- LEVEL 1: "IDENTIFY THE TYPES OF TRIANGLES BASED ON SIDE LENGTHS."
- LEVEL 2: "CALCULATE THE AREA OF A TRIANGLE GIVEN BASE AND HEIGHT."
- LEVEL 3: "JUSTIFY WHY THE SUM OF INTERIOR ANGLES IN A POLYGON EQUALS  $(n-2) \times 180^\circ$ ."
- LEVEL 4: "DESIGN A SCALE MODEL OF A BUILDING USING GEOMETRIC PRINCIPLES."

## STATISTICS AND PROBABILITY

- LEVEL 1: "LIST DIFFERENT TYPES OF DATA DISPLAYS."
- LEVEL 2: "CALCULATE THE MEAN AND MEDIAN OF A DATA SET."
- LEVEL 3: "EXPLAIN HOW OUTLIERS AFFECT THE MEAN."
- LEVEL 4: "ANALYZE THE PROBABILITY OF MULTIPLE EVENTS OCCURRING AND DEVELOP A SIMULATION TO DEMONSTRATE IT."

## BENEFITS OF USING DOK QUESTION STEMS FOR MATH

IMPLEMENTING DOK QUESTION STEMS FOR MATH OFFERS NUMEROUS ADVANTAGES:

- PROMOTES HIGHER-ORDER THINKING: BY DESIGNING QUESTIONS AT HIGHER DOK LEVELS, STUDENTS DEVELOP CRITICAL THINKING, PROBLEM-SOLVING, AND REASONING SKILLS.
- ALIGNS ASSESSMENT WITH LEARNING GOALS: DOK STEMS ENSURE QUESTIONS TARGET SPECIFIC COGNITIVE SKILLS, MAKING ASSESSMENTS MORE PURPOSEFUL.
- DIFFERENTIATES INSTRUCTION: THE VARIETY OF STEMS ALLOWS TEACHERS TO TAILOR QUESTIONS BASED ON STUDENT READINESS.
- PROVIDES CLEAR EXPECTATIONS: QUESTION STEMS CLARIFY WHAT STUDENTS NEED TO DO, GUIDING THEIR THINKING PROCESS.
- PREPARES STUDENTS FOR STANDARDIZED TESTS: MANY ASSESSMENTS EMPHASIZE HIGHER-ORDER QUESTIONS; FAMILIARIZATION WITH DOK STEMS ENHANCES TEST READINESS.

## TIPS FOR CREATING EFFECTIVE DOK QUESTION STEMS FOR MATH

TO MAXIMIZE THE EFFECTIVENESS OF DOK QUESTION STEMS FOR MATH, CONSIDER THE FOLLOWING TIPS:

- BE CLEAR AND CONCISE: ENSURE STEMS ARE STRAIGHTFORWARD TO AVOID CONFUSION.
- USE REAL-WORLD CONTEXTS: INCORPORATE REAL-LIFE SCENARIOS TO MAKE QUESTIONS MEANINGFUL.
- ENCOURAGE EXPLANATION AND JUSTIFICATION: ESPECIALLY AT HIGHER DOK LEVELS, PROMPTS SHOULD ASK STUDENTS TO EXPLAIN THEIR REASONING.
- VARY QUESTION TYPES: MIX DIFFERENT STEMS ACROSS DOK LEVELS TO PROMOTE A BALANCED COGNITIVE CHALLENGE.
- ALIGN WITH INSTRUCTION: USE STEMS THAT REINFORCE WHAT HAS BEEN TAUGHT AND PUSH STUDENTS TO APPLY THEIR KNOWLEDGE.

## CONCLUSION: MASTERING DOK QUESTION STEMS FOR MATH

MASTERING DOK QUESTION STEMS FOR MATH IS ESSENTIAL FOR EDUCATORS AIMING TO DESIGN ASSESSMENTS AND ACTIVITIES THAT FOSTER DEEP UNDERSTANDING AND CRITICAL THINKING. BY UNDERSTANDING THE FOUR LEVELS—RECALL, SKILLS/CONCEPTS, STRATEGIC THINKING, AND EXTENDED THINKING—AND APPLYING APPROPRIATE STEMS, TEACHERS CAN EFFECTIVELY CHALLENGE STUDENTS AT EACH STAGE OF THEIR MATHEMATICAL DEVELOPMENT. INCORPORATING THESE STEMS INTO DAILY INSTRUCTION NOT ONLY ENHANCES ASSESSMENT QUALITY BUT ALSO PROMOTES A CLASSROOM CULTURE OF INQUIRY, REASONING, AND PROBLEM-SOLVING. ULTIMATELY, LEVERAGING DOK QUESTION STEMS FOR MATH PREPARES STUDENTS FOR SUCCESS BEYOND THE CLASSROOM, EQUIPPING THEM WITH ESSENTIAL SKILLS FOR HIGHER-LEVEL MATHEMATICS AND REAL-WORLD PROBLEM-SOLVING.

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KEYWORDS: DOK QUESTION STEMS FOR MATH, MATH ASSESSMENT, COGNITIVE LEVELS IN MATH, HIGHER-ORDER THINKING IN MATH, MATH QUESTION TEMPLATES, FORMATIVE ASSESSMENT IN MATH, TEACHING STRATEGIES FOR MATH, MATH EDUCATION RESOURCES

# FREQUENTLY ASKED QUESTIONS

## WHAT ARE DOK QUESTION STEMS IN MATH, AND WHY ARE THEY IMPORTANT?

DOK QUESTION STEMS IN MATH REFER TO PROMPTS THAT ALIGN WITH DEPTH OF KNOWLEDGE LEVELS, HELPING EDUCATORS CRAFT QUESTIONS THAT ASSESS DIFFERENT COGNITIVE SKILLS. THEY ARE IMPORTANT BECAUSE THEY ENSURE STUDENTS ARE CHALLENGED APPROPRIATELY AND DEMONSTRATE A RANGE OF UNDERSTANDING FROM BASIC RECALL TO COMPLEX REASONING.

## CAN YOU GIVE EXAMPLES OF DOK LEVEL 1 QUESTION STEMS FOR MATH?

YES, EXAMPLES INCLUDE 'WHAT IS THE DEFINITION OF...', 'RECALL THE FORMULA FOR...', AND 'IDENTIFY THE...'. THESE QUESTIONS FOCUS ON RECALL AND BASIC UNDERSTANDING.

## HOW DO DOK QUESTION STEMS DIFFER ACROSS LEVELS 1 TO 4 IN MATH?

DOK LEVEL 1 QUESTIONS FOCUS ON RECALL AND BASIC SKILLS, LEVEL 2 INVOLVES SKILL/CONCEPT APPLICATIONS, LEVEL 3 REQUIRES STRATEGIC THINKING AND REASONING, AND LEVEL 4 INVOLVES EXTENDED COMPLEX TASKS AND REAL-WORLD PROBLEM SOLVING.

## WHAT ARE SOME EFFECTIVE DOK QUESTION STEMS FOR PROMOTING HIGHER-ORDER THINKING IN MATH?

EFFECTIVE STEMS INCLUDE 'EXPLAIN HOW YOU...', 'JUSTIFY YOUR ANSWER BY...', 'COMPARE AND CONTRAST...', AND 'DESIGN A PROBLEM THAT...' WHICH ENCOURAGE REASONING, ANALYSIS, AND SYNTHESIS.

## HOW CAN TEACHERS CREATE THEIR OWN DOK QUESTION STEMS FOR MATH LESSONS?

TEACHERS CAN BASE STEMS ON THE COGNITIVE LEVEL THEY AIM TO ASSESS, USING BLOOM'S TAXONOMY AS A GUIDE. FOR HIGHER LEVELS, THEY CAN INCLUDE PROMPTS LIKE 'FORMULATE A HYPOTHESIS...' OR 'EVALUATE THE EFFECTIVENESS OF...'. TAILORING STEMS TO MATCH LEARNING OBJECTIVES ENSURES APPROPRIATE COGNITIVE CHALLENGE.

## ARE THERE RESOURCES OR TEMPLATES AVAILABLE FOR DEVELOPING DOK QUESTION STEMS IN MATH?

YES, MANY EDUCATORS USE RESOURCES LIKE WEBB'S DOK QUESTION STEM CHARTS, CURRICULUM GUIDES, AND ONLINE TEMPLATES TO HELP DEVELOP APPROPRIATE QUESTION STEMS ALIGNED WITH EACH DOK LEVEL. THESE TOOLS FACILITATE CONSISTENT AND PURPOSEFUL QUESTION DESIGN.

## ADDITIONAL RESOURCES

DOK QUESTION STEMS FOR MATH ARE AN ESSENTIAL COMPONENT OF STANDARDIZED ASSESSMENTS, ESPECIALLY WITHIN THE CONTEXT OF THE DIGITAL OLSON-KLEIN (DOK) FRAMEWORK. THESE QUESTION STEMS SERVE AS THE FOUNDATION FOR CONSTRUCTING TASKS THAT ACCURATELY GAUGE A STUDENT'S DEPTH OF UNDERSTANDING, REASONING ABILITY, AND PROBLEM-SOLVING SKILLS IN MATHEMATICS. UNDERSTANDING HOW TO CRAFT, INTERPRET, AND UTILIZE DOK QUESTION STEMS IS VITAL FOR EDUCATORS AIMING TO DESIGN ASSESSMENTS THAT ARE BOTH RIGOROUS AND ALIGNED WITH LEARNING GOALS. IN THIS COMPREHENSIVE GUIDE, WE WILL EXPLORE THE NUANCES OF DOK QUESTION STEMS FOR MATH, OFFERING INSIGHTS INTO THEIR STRUCTURE, PURPOSE, AND PRACTICAL APPLICATION IN CLASSROOM ASSESSMENT DESIGN.

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### WHAT ARE DOK QUESTION STEMS IN MATH?

BEFORE DELVING INTO THE SPECIFICS OF QUESTION STEMS, IT'S IMPORTANT TO CLARIFY WHAT DOK (DEPTH OF KNOWLEDGE)

LEVELS ENTAIL. DEVELOPED BY NORMAN WEBB, THE DOK FRAMEWORK CATEGORIZES TASKS BASED ON THE COMPLEXITY OF THINKING REQUIRED:

- LEVEL 1 (RECALL AND REPRODUCTION): TASKS THAT REQUIRE RECALL OF FACTS, DEFINITIONS, OR PROCEDURES.
- LEVEL 2 (SKILLS AND CONCEPTS): TASKS INVOLVING SOME MENTAL PROCESSING BEYOND RECALL, SUCH AS CLASSIFYING, ORGANIZING, OR COMPARING.
- LEVEL 3 (STRATEGIC THINKING): TASKS THAT DEMAND REASONING, PLANNING, OR USING EVIDENCE.
- LEVEL 4 (EXTENDED THINKING): TASKS THAT INVOLVE COMPLEX REASONING, CONNECTIONS, OR EXTENDED RESEARCH.

DOK QUESTION STEMS FOR MATH ARE THE INTRODUCTORY PHRASES OR PROMPTS USED TO DEVELOP QUESTIONS THAT TARGET THESE LEVELS. THEY ACT AS SCAFFOLDS, GUIDING EDUCATORS AND TEST WRITERS IN CONSTRUCTING ITEMS THAT REQUIRE THE DESIRED DEPTH OF UNDERSTANDING.

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## THE IMPORTANCE OF WELL-DESIGNED DOK QUESTION STEMS

EFFECTIVE DOK QUESTION STEMS FOR MATH ENSURE ASSESSMENTS ACCURATELY MEASURE WHAT STUDENTS KNOW AND CAN DO. THEY HELP DIFFERENTIATE BETWEEN SUPERFICIAL RECALL AND DEEP CONCEPTUAL UNDERSTANDING, WHICH IS CRUCIAL FOR:

- IDENTIFYING STUDENTS' ANALYTICAL AND REASONING SKILLS.
- INFORMING INSTRUCTION TAILORED TO STUDENT NEEDS.
- ENSURING ASSESSMENTS ARE ALIGNED WITH CURRICULUM STANDARDS.
- PROVIDING MEANINGFUL DATA TO GUIDE CLASSROOM INSTRUCTION AND INTERVENTION.

IN ESSENCE, STRONG QUESTION STEMS SERVE AS THE STARTING POINT FOR TASKS THAT CHALLENGE STUDENTS TO THINK CRITICALLY AND DEMONSTRATE MATHEMATICAL REASONING.

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## TYPES OF DOK QUESTION STEMS FOR MATH

DIFFERENT LEVELS OF COGNITIVE DEMAND REQUIRE DIFFERENT TYPES OF QUESTION STEMS. BELOW, WE EXPLORE COMMON STEMS ASSOCIATED WITH EACH DOK LEVEL, ALONG WITH EXAMPLES TAILORED FOR MATHEMATICS.

### DOK LEVEL 1: RECALL AND REPRODUCTION

QUESTION STEMS IN THIS CATEGORY FOCUS ON BASIC FACTS, DEFINITIONS, OR PROCEDURES.

- "WHAT IS THE VALUE OF..."
- "RECALL THE FORMULA FOR..."
- "IDENTIFY THE... FROM THE OPTIONS BELOW."
- "NAME THE... THAT SATISFIES..."
- "DEFINE THE TERM..."

EXAMPLE:

WHAT IS THE SUM OF 8 AND 5?

### DOK LEVEL 2: SKILLS AND CONCEPTS

QUESTION STEMS HERE REQUIRE STUDENTS TO COMPARE, CLASSIFY, OR INTERPRET DATA.

- "COMPARE THE SHAPES BASED ON..."
- "CLASSIFY THE FOLLOWING AS..."
- "EXPLAIN HOW THE PROCESS OF... IS SIMILAR TO..."
- "ESTIMATE THE... AND JUSTIFY YOUR REASONING."
- "DESCRIBE THE RELATIONSHIP BETWEEN..."

EXAMPLE:

EXPLAIN HOW THE PROPERTIES OF PARALLEL LINES DIFFER FROM THOSE OF PERPENDICULAR LINES.

### DOK LEVEL 3: STRATEGIC THINKING

QUESTION STEMS CHALLENGE STUDENTS TO ANALYZE, JUSTIFY, OR PLAN THEIR SOLUTION.

- "DETERMINE THE BEST METHOD TO SOLVE..."
- "JUSTIFY YOUR ANSWER FOR..."
- "PREDICT WHAT WILL HAPPEN IF..."
- "CONSTRUCT A POSSIBLE EXAMPLE OF..."
- "EXPLAIN THE REASONING BEHIND..."

EXAMPLE:

SOLVE THE EQUATION AND EXPLAIN EACH STEP OF YOUR SOLUTION.

### DOK LEVEL 4: EXTENDED THINKING

QUESTION STEMS INVOLVE COMPLEX REASONING, CONNECTIONS, OR MULTI-STEP PROCESSES.

- "DESIGN A PLAN TO PROVE..."
- "DEVELOP A MATHEMATICAL MODEL TO REPRESENT..."
- "INVESTIGATE THE PATTERN AND EXPLAIN YOUR FINDINGS..."
- "CREATE A REAL-WORLD PROBLEM THAT INVOLVES..."
- "ANALYZE HOW CHANGING THE VARIABLES AFFECTS..."

EXAMPLE:

CREATE A PROBLEM INVOLVING RATIOS THAT COULD BE USED TO MODEL A REAL-WORLD SITUATION AND EXPLAIN YOUR REASONING.

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## CRAFTING EFFECTIVE DOK QUESTION STEMS FOR MATH

CREATING DOK QUESTION STEMS FOR MATH THAT ACCURATELY TARGET DIFFERENT COGNITIVE LEVELS INVOLVES STRATEGIC WORDING AND CLARITY. HERE ARE KEY CONSIDERATIONS:

### 1. CLARIFY THE TASK'S PURPOSE

ENSURE THE STEM CLEARLY INDICATES WHAT STUDENTS ARE EXPECTED TO DO—WHETHER IT'S RECALLING FACTS, COMPARING CONCEPTS, OR ANALYZING DATA.

### 2. USE PRECISE LANGUAGE

AVOID AMBIGUOUS PHRASING. USE SPECIFIC TERMS SUCH AS "EXPLAIN," "JUSTIFY," "PREDICT," OR "DESIGN" TO SIGNAL THE COGNITIVE DEMAND.

### 3. SCAFFOLD THE TASK

ESPECIALLY FOR HIGHER DOK LEVELS, PROVIDE GUIDANCE WITHIN THE STEM TO HELP STUDENTS UNDERSTAND THE COMPLEXITY WITHOUT GIVING AWAY THE ANSWER.

### 4. INCORPORATE REAL-WORLD CONTEXTS

AUTHENTIC CONTEXTS OFTEN ENCOURAGE DEEPER ENGAGEMENT AND STRATEGIC THINKING, ESPECIALLY AT DOK LEVELS 3 AND 4.

### 5. VARY THE STRUCTURE

USE DIFFERENT QUESTION FORMATS—MULTIPLE-CHOICE, OPEN-ENDED, MATCHING, OR PROBLEM-BASED—TO ASSESS VARIOUS SKILLS ACROSS DOK LEVELS.

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## PRACTICAL EXAMPLES OF DOK QUESTION STEMS IN MATH

BELOW ARE SAMPLE STEMS ALIGNED WITH EACH DOK LEVEL, ILLUSTRATING HOW TO CRAFT QUESTIONS FOR DIVERSE MATHEMATICAL CONCEPTS.

### EXAMPLES AT DOK LEVEL 1

- "RECALL THE DEFINITION OF A PRIME NUMBER."
- "IDENTIFY THE NEXT NUMBER IN THE SEQUENCE: 2, 4, 8, 16, \_\_\_\_."
- "WHAT IS THE AREA OF A RECTANGLE WITH LENGTH 5 UNITS AND WIDTH 3 UNITS?"

### EXAMPLES AT DOK LEVEL 2

- "COMPARE THE GRAPHS OF  $y = 2x + 3$  AND  $y = -x + 1$ ."
- "CLASSIFY THE FOLLOWING TRIANGLES AS ACUTE, RIGHT, OR OBTUSE."
- "ESTIMATE THE SUM OF 149 AND 276 AND EXPLAIN YOUR REASONING."

### EXAMPLES AT DOK LEVEL 3

- "SOLVE FOR  $x$  IN THE EQUATION  $2x + 5 = 15$  AND EXPLAIN YOUR STEPS."
- "DETERMINE WHICH METHOD IS MOST EFFICIENT FOR SOLVING QUADRATIC EQUATIONS AND JUSTIFY YOUR CHOICE."
- "PREDICT HOW CHANGING THE SLOPE OF A LINE AFFECTS ITS GRAPH."

### EXAMPLES AT DOK LEVEL 4

- "DESIGN AN INVESTIGATION TO EXPLORE THE RELATIONSHIP BETWEEN THE SURFACE AREA AND VOLUME OF RECTANGULAR PRISMS."
- "DEVELOP A MATHEMATICAL MODEL TO PREDICT THE TOTAL COST OF ITEMS BASED ON VARIABLE QUANTITIES."
- "CREATE A REAL-WORLD PROBLEM INVOLVING PROPORTIONAL RELATIONSHIPS THAT COULD BE SOLVED USING RATIOS."

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## TIPS FOR EDUCATORS USING DOK QUESTION STEMS FOR MATH

- ALIGN STEMS WITH LEARNING OBJECTIVES: MAKE SURE THE QUESTION STEM DIRECTLY SUPPORTS THE SPECIFIC SKILL OR CONCEPT BEING TARGETED.
- DIFFERENTIATE TASKS: USE VARIED STEMS TO CHALLENGE STUDENTS AT DIFFERENT LEVELS OF UNDERSTANDING.
- ENCOURAGE HIGHER-ORDER THINKING: INCORPORATE STEMS THAT PROMPT ANALYSIS, SYNTHESIS, AND EVALUATION, MOVING BEYOND ROTE PROCEDURES.
- USE SCAFFOLDING: FOR COMPLEX TASKS, BREAK DOWN THE QUESTION STEM INTO MANAGEABLE PARTS OR PROVIDE GUIDING PROMPTS.
- ASSESS REASONING, NOT JUST ANSWERS: DESIGN STEMS THAT REQUIRE EXPLANATION AND JUSTIFICATION, NOT MERELY CORRECT ANSWERS.

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## CONCLUSION

MASTERING DOK QUESTION STEMS FOR MATH IS A POWERFUL STRATEGY TO ENHANCE ASSESSMENT DESIGN, INSTRUCTIONAL PLANNING, AND STUDENT LEARNING. BY UNDERSTANDING THE CHARACTERISTICS OF EACH DOK LEVEL AND CRAFTING PRECISE, PURPOSEFUL STEMS, EDUCATORS CAN CREATE TASKS THAT NOT ONLY EVALUATE STUDENTS' KNOWLEDGE BUT ALSO PROMOTE CRITICAL THINKING AND DEEP UNDERSTANDING. WHETHER YOU'RE DEVELOPING A QUICK RECALL QUIZ OR DESIGNING AN EXTENDED PROJECT, THOUGHTFUL QUESTION STEMS ARE THE KEY TO UNLOCKING MEANINGFUL MATHEMATICAL ENGAGEMENT AND ACCURATE ASSESSMENT OF STUDENT SKILLS.

REMEMBER, EFFECTIVE ASSESSMENT BEGINS WITH THE RIGHT QUESTIONS. USE THESE INSIGHTS TO CRAFT DOK QUESTION STEMS FOR MATH THAT INSPIRE STUDENTS TO THINK DEEPLY, REASON CRITICALLY, AND DEMONSTRATE THEIR MATHEMATICAL

## **Dok Question Stems For Math**

**dok question stems for math:** *Guided Math Lessons in Second Grade* Nicki Newton, 2021-07-15 *Guided Math Lessons in Second Grade* provides detailed lessons to help you bring guided math groups to life. Based on the bestselling *Guided Math in Action*, this practical book offers 16 lessons, taught in a round of 3—concrete, pictorial, and abstract. The lessons are based on the priority standards and cover fluency, word problems, operations and algebraic thinking, and place value. Author Dr. Nicki Newton shows you the content as well as the practices and processes that should be worked on in the lessons, so that students not only learn the content but also how to solve problems, reason, communicate their thinking, model, use tools, use precise language, and see structure and patterns. Throughout the book, you'll find tools, templates, and blackline masters so that you can instantly adapt the lesson to your specific needs and use it right away. With the easy-to-follow plans in this book, students can work more effectively in small guided math groups—and have loads of fun along the way!

**dok question stems for math:** *Rigor by Design, Not Chance* Karin Hess, 2023-01-18 A practical and systematic approach to deepening student engagement, promoting a growth mindset, and building a classroom culture that truly supports thinking and learning. Every student deserves access to deep and rigorous learning. Still, some persistent myths about rigor can get in the way—such as the belief that it means more or harder work for everyone, rather than challenging and advancing students' thinking. So how can teachers get more clarity on rigor and foster more meaningful learning in their classrooms In *Rigor by Design, Not Chance*, veteran educator Karin Hess offers not only a clear vision of what makes learning deep and rigorous but also a systematic and equitable approach for engaging students of all ages in rich learning tasks. To that end, she outlines five essential teacher moves that foster thinking and learning: 1. Ask a series of probing questions of increasing complexity. 2. Build schemas in each content area. 3. Consider ways to strategically scaffold learning. 4. Design complex tasks that emphasize transfer and evidence-based solutions. 5. Engage students in metacognition and reflection throughout the learning process. From there, Hess details how to create an actionable assessment cycle that will drive learning forward in any classroom. This book offers a treasure trove of strategies, student look-for behaviors, and templates to guide teachers in their work as well as an array of rich performance-based assessments to engage and challenge students. School leaders and instructional coaches can also benefit from the variety of teacher-friendly supports to foster rigorous learning in their schools. Ultimately, *Rigor by Design, Not Chance* helps educators empower students to take greater ownership of their own learning.

**dok question stems for math: Leveled Text-Dependent Question Stems: Mathematics Problem Solving** Lisa M. Sill, Jodene Smith, 2017-02-01 Help boost kindergarten through twelfth grade students' critical-thinking and comprehension skills with *Leveled Text-Dependent Question Stems: Mathematics*. This book includes a variety of high-interest mathematics texts as well as specific text-dependent questions that are provided at four different levels to meet the needs of all students. With this easy-to-use resource, teachers will learn strategies to effectively guide students in analyzing informational text and mathematical problems to build their comprehension skills and use evidence to justify their responses.

**dok question stems for math: Webster's New International Dictionary of the English Language: M-Z**, 1950

**dok question stems for math:** *Bibliography of Agriculture*, 1953

**dok question stems for math:** *Bibliography of Agriculture*, 1979

**dok question stems for math:** *Bibliography of Agriculture with Subject Index* , 1979

**dok question stems for math:** **The Compact Edition of the Oxford English Dictionary** Sir James Augustus Henry Murray, 1971 Micrographic reproduction of the 13 volume Oxford English dictionary published in 1933.

**dok question stems for math:** Leveled Text-Dependent Question Stems: Understanding Main Idea and Theme Debra J. Housel, 2015-02-01 Build student understanding of main idea and theme through leveled text-dependent question stems. Engage each student at their level with these dynamic questions!

**dok question stems for math:** Now You Know Edward Zaccaro, 2012-06-04

**dok question stems for math:** 53 Ways to Ask Questions in Mathematics and Statistics Ruth Hubbard, 1995

**dok question stems for math:** **Achieving Your Best on Math Tests** Charles P. Kost II, 2013-08-21 Students who apply these techniques will score better on mathematics assessments. In the current world of high-stakes testing, these strategies are essential in maximizing test scores and developing skills that can be used in other disciplines and beyond. - Back cover.

**dok question stems for math:** Open-Ended Questions Amy Collins, 2008-09-01 NY Math Problem Solving; Open-Ended Questions, Level D, 30-pack

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