Depth of Knowledge (DOK)

Kentucky Department of Education

Depth of Knowledge (DOK)
• Adapted from the model used by Norman Webb, University of Wisconsin, to align standards with assessments
• Used by the Council of Chief State School Officers (CCSSO) for assessment alignment in more than ten states

Depth of Knowledge
• Focuses on content standard in order to successfully complete an assessment/standard task.
• Descriptive, not a taxonomy
• Not the same as difficulty

Why Depth of Knowledge?
• No Child Left Behind (NCLB) requires assessments to measure the depth and breadth of the state academic content standards for a given grade level (U.S. Department of Education, 2003, p. 12)

Why Depth of Knowledge?
• Mechanism to ensure that the intent of the standard and the level of student demonstration required by that standard matches the assessment items (required under NCLB)
• Provides cognitive processing ceiling (highest level students can be assessed) for item development

Depth of Knowledge
Webb’s Depth of Knowledge levels:
  Recall and Reproduction: Level 1
  Skills & Concepts: Level 2
  Strategic Thinking: Level 3
  Extended Thinking: Level 4
Recall and Reproduction: Level 1

DOK 1 requires recall of information, such as a fact, definition, term, or performance of a simple process or procedure. Answering a Level 1 item can involve following a simple, well-known procedure or formula. Simple skills and abilities or recall characterize DOK 1.

DOK Level 1 Examples
- List animals that survive by eating other animals.
- Locate or recall facts explicitly found in text
- Describe physical features of places
- Determine the perimeter or area of rectangles given a drawing or labels
- Identify elements of music using musical terminology
- Identify basic rules for participating in simple games and activities

Skills/Concepts: Level 2

DOK 2 includes the engagement of some mental processing beyond recalling or reproducing a response. Items require students to make some decisions as to how to approach the question or problem. These actions imply more than one mental or cognitive process/step.

DOK Level 2 Examples
- Compare desert and tropical environments
- Identify and summarize the major events, problem, solution, conflicts in literary text
- Explain the cause-effect of historical events
- Predict a logical outcome based on information in a reading selection
- Explain how good work habits are important at home, school, and on the job.
- Classify plane and three dimensional figures
- Describe various styles of music

Strategic Thinking: Level 3

DOK 3 requires deep understanding as exhibited through planning, using evidence, and more demanding cognitive reasoning. The cognitive demands at Level 3 are complex and abstract. An assessment item that has more than one possible answer and requires students to justify the response they give would most likely be a Level 3.

DOK Level 3 Examples
- Compare consumer actions and analyze how these actions impact the environment
- Analyze or evaluate the effectiveness of literary elements (e.g. characterization, setting, point of view, conflict and resolution, plot structures)
- Solve a multiple-step problem and provide support with a mathematical explanation that justifies the answer
DOK Level 3 Examples
- Develop a scientific model for a complex idea
- Propose and evaluate solutions for an economic problem
- Explain, generalize or connect ideas, using supporting evidence from a text or source
- Create a dance that represents the characteristics of a culture

Extended Thinking: Level 4
DOK 4 requires high cognitive demand and is very complex. Students are expected to make connections—relate ideas within the content or among content areas—and have to select or devise one approach among many alternatives on how the situation can be solved.
Due to the complexity of cognitive demand, DOK 4 often requires an extended period of time.

However, extended time alone is not the distinguishing factor.

<table>
<thead>
<tr>
<th>Task</th>
<th>Thinking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collecting data samples over several months</td>
<td>Recall</td>
</tr>
<tr>
<td>Organizing the data in a chart</td>
<td>Skills/concepts</td>
</tr>
<tr>
<td>Using this chart to make and justify predictions</td>
<td>Strategic Thinking</td>
</tr>
<tr>
<td>Developing a generalized model from this data and applying it to a new situation</td>
<td>Extending Thinking</td>
</tr>
</tbody>
</table>

Extended Reasoning/Thinking Examples: Level 4
- Gather, analyze, organize, and interpret information from multiple (print and non print sources) to draft a reasoned report
- Analyzing author’s craft (e.g., style, bias, literary techniques, point of view)
- Create an exercise plan applying the “FITT (Frequency, Intensity, Time, Type) Principle”

Extended Reasoning/Thinking Examples: Level 4
- Analyze and explain multiple perspectives or issues within or across time periods, events, or cultures
- Specify a problem, identify solution paths, solve the problem, and report the results
- Write and produce an original play

The Depth of Knowledge is NOT determined by the verb, but the context in which the verb is used and the depth of thinking required.
• **DOK 3** - *Describe* a model that you might use to represent the relationships that exist within the rock cycle. (requires deep understanding of rock cycle and a determination of how best to represent it)

• **DOK 2** - *Describe* the difference between metamorphic and igneous rocks. (requires cognitive processing to determine the differences in the two rock types)

• **DOK 1** - *Describe* three characteristics of metamorphic rocks. (simple recall)

Same verb—three DOK levels

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**Determining DOK: Science Example**

<table>
<thead>
<tr>
<th>Sample Science Assessment Limit (based on Webb)</th>
<th>DOK Level</th>
<th>Potential DOK Levels for Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example A: Perform a simple science process or a set procedure to gather data</td>
<td>1</td>
<td>Measure temperature of water</td>
</tr>
<tr>
<td>Example B: Represent data collected over a period time, making comparisons and interpretations</td>
<td>2</td>
<td>Measure temperature of water at different times/places</td>
</tr>
<tr>
<td>Example C: Interpret data collected for a scientific problem related to your environment</td>
<td>3</td>
<td>Measure temperature of water at different times/places</td>
</tr>
</tbody>
</table>

**DOK levels can be cumulative**

An item/standard written to DOK 3 often contains DOK 1 and DOK 2 level demands

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**Remember...**

• **Depth of Knowledge (DOK)** is a scale of cognitive demand.

• DOK requires looking at the assessment item/standard—not student work—in order to determine the level. DOK is about the item/standard—not the student.

• The context of the assessment item/standard must be considered to determine the DOK—not just a look at what verb was chosen.