Classroom Questioning Environment

In today's classroom, students should not be passive participants in the learning process. Instead they need to be actively learning, engaging their minds, and solving real-life problems. This usually happens when good questioning strategies are being implemented. It is important that the questions being asked build new knowledge upon the foundation that students already have, therefore developing deep conceptual understanding. Students should always be challenged to "justify" and "explain why" when completing problems and participating in discussions. Questions should interconnect and build on one another, but also provide students the opportunity to explore concepts beyond the scope of the lesson. Various cognitive complexity levels of questions from memorization and recall to application and creation should be regularly embedded within lessons. Webb's Depth of Knowledge (DOK) has four levels of performance indicators that measure the complexity of thinking skills that tasks require.

- **DOK Level 1: Recall/Reproduction –** Recall a fact, information, or procedure; process information on a low level
- **DOK Level 2: Skill/Concept –** Use information or conceptual knowledge beyond habitual response; requires two or more steps
- **DOK Level 3: Strategic Thinking –** Requires reasoning, developing a plan or a sequence of steps, some complexity, more than one possibly approach and/or answer
- **DOK Level 4: Extended Thinking –** Requires investigation, connections and extensions, high cognitive demands, complex reasoning, planning and developing; may occur over a period of time

Effective Learning Environment

Teachers should:

- Vary the cognitive levels and types of questions
- Allow appropriate wait time for students to process and respond
- Use questioning strategies that engage ***all*** learners
- Allow students to collaborate when necessary
- Focus on the mathematical ***process***
- Challenge students to think critically and problem solve
- Provide positive and effective feedback
- Let students hear alternative solutions and reasoning from peers

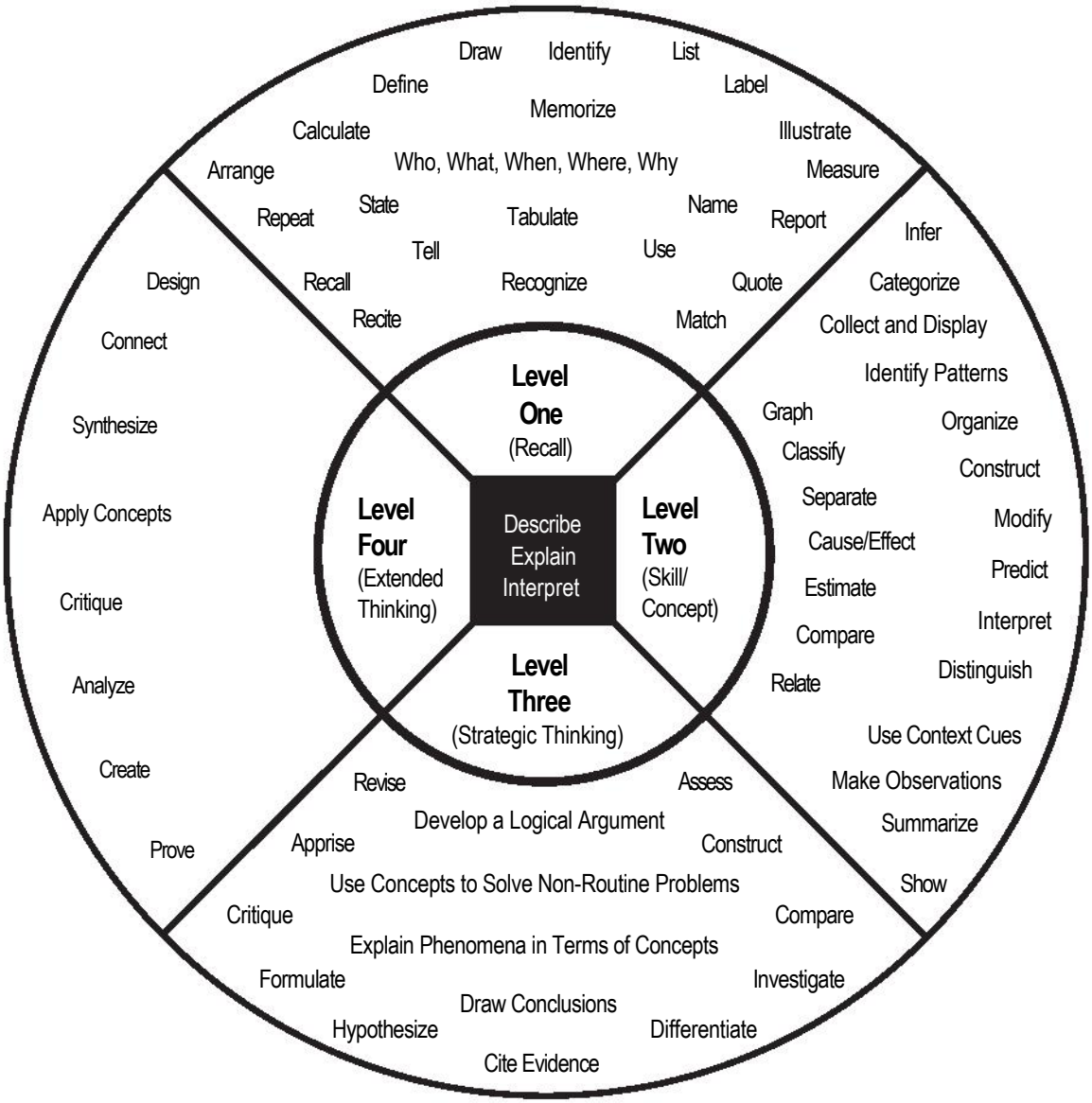
Questions should:

- Keep students dynamically engaged in the lesson
- Allow multiple entry points
- Provide students with many opportunities to practice
- Motivate their individual learning of mathematical concepts
- Allow students to think on various levels
- Build upon one another
- Be meaningful, relevant, and purposeful
- Connect prior knowledge to newly learned content
- Deepen conceptual understanding

Students should:

- Be actively engaged in answering questions
- Think critically and problem solve
- Communicate reasons precisely and effectively
- Collaborate efficiently and effectively
- Explore outside the context of the lesson, for example, " think outside the box"
- Ask clarifying questions
- Apply new learning to prior knowledge
- "Practice makes perfect"
- Take ownership and reflect on their learning

Depth of Knowledge (DOK) Levels



Level One Activities	Level Two Activities	Level Three Activities	Level Four Activities
Recall elements and details of story structure, such as sequence of events, character, plot and setting. Conduct basic mathematical calculations. Label locations on a map. Represent in words or diagrams a scientific concept or relationship. Perform routine procedures like measuring length or using punctuation marks correctly. Describe the features of a place or people.	Identify and summarize the major events in a narrative. Use context cues to identify the meaning of unfamiliar words. Solve routine multiple-step problems. Describe the cause/effect of a particular event. Identify patterns in events or behavior. Formulate a routine problem given data and conditions. Organize, represent and interpret data.	Support ideas with details and examples. Use voice appropriate to the purpose and audience. Identify research questions and design investigations for a scientific problem. Develop a scientific model for a complex situation. Determine the author's purpose and describe how it affects the interpretation of a reading selection. Apply a concept in other contexts.	Conduct a project that requires specifying a problem, designing and conducting an experiment, analyzing its data, and reporting results/ solutions. Apply mathematical model to illuminate a problem or situation. Analyze and synthesize information from multiple sources. Describe and illustrate how common themes are found across texts from different cultures. Design a mathematical model to inform and solve a practical or abstract situation.

Webb, Norman L. and others. "Web Alignment Tool" 24 July 2005. Wisconsin Center of Educational Research. University of Wisconsin-Madison. 2 Feb. 2006. <http://www.wcer.wisc.edu/WAT/index.aspx>.