Depth of Knowledge Descriptors for Science

Level 1

Descriptions	Key Words	Criterion
Recall and Reproduction: – Recall of information, fact, definition, term, or a simple procedure – Performance of a simple process or procedure  	– Identify – Recall – Recognize – Use – Calculate – Measure – *Describe – *Explain **Could be classified at different levels, depending on what is to be described and explained*	– Must recall or recognize a fact, term, simple procedure (involves only one step), property or example – Must demonstrate a rote response – Must perform a simple process or procedure – Must use a well known a formula – Must follow a set procedure (like a recipe) – Must perform a clearly defined series of steps – Must represent in words or diagrams a scientific concept or relationship – Must provide or recognize a standard scientific representation for simple phenomenon – Must perform a routine procedure, such as measuring

Level 2

Descriptions	Key Words	Criterion
Skill/Concept: – Use information or conceptual knowledge. – More than one step – Includes the engagement of some mental processing beyond a recalling or reproducing a response	– Classify – Organize – Estimate – Make Observations – Collect and display data – Compare data – *Uses action verbs such as: explain, describe, and interpret **Could be classified at different levels depending on the object of the action*	– Must make decisions regarding the approach to the question or problem – Must compare data for purposes of identifying characteristics, grouping, or ordering – Must make observations and collect data – Must classify, organize, compare, and interpret data – Must organize and display data in tables, graphs, and charts – Must read and interpret information from a simple graphs, illustrations, tables, charts, and diagrams – Must specify and explain the relationship between facts, terms, properties, or variables – Must describe and explain examples and non-examples of science concepts – Must select a procedure according to specified criteria and perform it – Must formulate a routine problem, given data and conditions

Level 3

Descriptions	Key Words	Criterion
Strategic Thinking: Requires reasoning, planning, and the use of evidence. Involve more than one possible answer and require justification	– Reason – Plan – Develop – Sequence – Use evidence – Justify – Conclude – Develop logical arguments – Explain phenomena in terms of concepts	– Cognitive demands are complex and abstract – Must explain thinking to justify response – Must draw conclusions from observations and experimental data – Must cite evidence and develop a logical argument for concepts/ processes – Must explain phenomenon in terms of concepts – Must decide which concepts to apply in order to solve non-routine problems – Must identify research questions/ hypotheses – Must develop a scientific model for a complex situation – Must plan an investigation of a scientific problem – Must interpret complex graphs illustrations, tables, charts and diagram

Level 4

Descriptions	Key Words	Criterion
Extended Thinking: Requires complex reasoning, experimental design, and planning over an extended period of time applying conceptual understanding and higher-order thinking.	– Design – Conduct – Develop – Prove – Critique – Synthesize – Higher order thinking	– Must relate ideas within the content area or among content areas and select one approach among several alternatives – Must develop generalizations of the results obtained and the strategies used and apply them to new problem situations – Performance assessments and open-ended assessment activities that require significant thought – Based on data provided from a complex experiment that is novel, must deduct the fundamental relationship between several controlled variables – Must conduct an investigation, from specifying a problem to designing and carrying out an experiment, to analyzing its data and forming conclusions

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05/17/2011