

Figure captions

Figure 1. Depth and Breadth Item Specification Grid for Each of Three Science Assessments - Targeted Cells for Individual Assessment Items

PHYSICAL SCIENCE ASSESSMENT (35 total points possible)		Depth of Knowledge				STS ^b (5 points possible)
		Content Category Depths (25 points)			PCK (10 pts)	
Three Content Categories and Their Subcategories		Declarative (5 points possible)	Inquiry (5 points possible)	Schematic (15 points possible)	Pedagogical ^a (10 points possible)	
Breadth of Knowledge (25 points in Content Knowledge; PCK = 10 additional pts.)	1. Properties and changes of properties in matter (6 content category points possible)					
	a. physical properties (e.g. density, boiling point, solubility), mixtures, physical vs. chemical change.	8				
	b. chemical reactions, conservation of mass, chemical families, compounds		5	23a	23b	
	c. elements and atomic structure			9		
	d. states of matter, kinetic theory, gas laws			13, 16		16
	2. Motion and forces					
	a. position and direction of moving things, speed and velocity, graphical representation of motion	7				
	b. forces & acceleration (includes friction, weight, Newton's second law, and gravity), addition of forces, balanced and unbalanced forces, momentum and impulse (includes Newton's third law)	19	12	4, 20		20
	c. Newton's first law (inertia)			21a	21b	
	3. Energy					
	a. energy as ability to do work/cause change, mechanical energy and energy transfer, simple machines, kinetic and potential energy, systems and conservation of energy	18		10, 24a	24b	10
	b. waves, sound, light (refraction, absorption, scattering, reflection), color and vision, electromagnetic spectrum, sunlight		17	3, 25a	25b	
	c. static electricity, electric current and circuits, magnetism, electromagnetism		14	11, 22a	22b	11
	d. heat, temperature, temperature scales, thermodynamics		15	1, 2		2
	e. chemical energy, nuclear energy (radioactivity, fusion, fission)	6				

^a Open response part *b* are each scored on 2-point scale.

^b These specific items additionally load onto the STS subscale as well as the two other dimensions (breadth & depth); thus these 5 STS points are already incorporated into the 35-point total elsewhere.

NOTE: Numbers in the cells are the assessment item numbers on *Physical Science Assessment (all versions)*

Figure 1.

LIFE SCIENCE ASSESSMENT (35 total points possible)		Depth of Knowledge				STS ^b (5 points possible)
		Content Category Depths (25 points)			PCK (10 pts)	
Four Content Categories and Their Subcategories		Declarative (7 points possible)	Inquiry (7 points possible)	Schematic (11 points possible)	Pedagogical ^a (10 points possible)	
Breadth of Knowledge (25 points in Content Knowledge; PCK = 10 additional)	1. Structure/Function of Living Systems (6 content category points possible)					
	a.	complimentary nature of structure and function, increase in complexity: cell-tissue-organ	7			
	b.	cells		3	5	5
	c.	animal organ systems	13		11	
	d.	plant organ systems			21a	21b
	2. Internal Regulation and Behavior (6 content category points possible)					
	a.	organisms convert energy (photosynthesis, respiration, metabolism)	1	2		
	b.	homeostasis; behavior from cellular to organ levels			22a	22b
	c.	cellular communication (hormones), immune system, and disease fighting	23a		14, 16	23b
	3. Reproduction and Heredity, Diversity and Adaptation of Organisms (7 content category points possible)					
	a.	plant and animal reproduction (sexual & asexual)		8, 10		10
	b.	genetics	12	9		9
	c.	fitness and survival (nature vs. nurture), adaptations, evolution (change over time), extinction	25a		15	25b
	d.	taxonomy		4		
	4. Interdependence of Organisms (Ecology, Populations) (6 content category points possible)					
	a.	organisms obtain and use resources (consumers, producers, parasitism, mutualism, etc.)	17			
b.	cycling of nature			6, 19, 24a	24b	
c.	populations/ biomes/ ecosystems		20	18		

^a Open response part *b* are each scored on 2-point scale.

^b These specific items additionally load onto the STS subscale as well as the two other dimensions (breadth & depth); thus these 5 STS points are already incorporated into the 35-point total elsewhere.

NOTE: Numbers in the cells are the assessment item numbers on *Life Science Assessment (all versions)*

Figure 1 (continued).

EARTH/SPACE SCIENCE ASSESSMENT (35 total points possible)		Depth of Knowledge				STS ^b (5 points possible)
		Content Category Depths (25 points)			PCK (10 pts)	
Three Content Categories and Their Subcategories		Declarative (8 points possible)	Inquiry (6 points possible)	Schematic (11 points possible)	Pedagogical ^a (10 points possible)	
Breadth of Knowledge (25 points in Content Knowledge; PCK = 10 additional pts.)	1. Atmosphere, Hydrosphere (8 content category points possible)					
	a.	atmosphere composition & properties	12	13	11	12
	b.	weather/weather hazards/cloud formation	18	3, 5		3
	c.	climate, oceans & water cycle			14, 22a	22b
	2. Lithosphere (11 content category points possible)					
	a.	rock/mineral/soil properties	6, 9	20		9
	b.	rock/mineral cycle & processes (weathering, erosion, glaciers)	1		19	
	c.	movements of plates/ earthquakes/volcanoes & Earth's layers	2, 7		23a	23b
	d.	history of the Earth: geologic time/uniformitarianism, fossils as evidence		17	15, 21a	21b
	3. Earth in the Solar System (6 content category points possible)					
	a.	solar system	16			
	b.	moon phases, motion and eclipses		10	25a	25b
	c.	sun as energy source and reason for seasons			4, 8	8
	d.	gravity and tides			24a	24b

^a Open response part *b* are each scored on 2-point scale.

^b These specific items additionally load onto the STS subscale as well as the two other dimensions (breadth & depth); thus these 5 STS points are already incorporated into the 35-point total elsewhere.

NOTE: Numbers in the cells are the assessment item numbers on *Earth Science Assessment Version 1.2.* (varies by version)

Figure 1 (continued).