

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)

Three Content Categories and Their Subcategories		Depth of Knowledge			STS <sup>b</sup> (5 points possible)		
		Content Category Depths (25 points)				PCK (10 pts)	
		Declarative (5 points possible)	Inquiry (5 points possible)	Schematic (15 points possible)	Pedagogical <sup>a</sup> (10 points possible)		
Breadth of Knowledge (25 points in Content Knowledge; PCK = 10 additional pts.)	<b>1. Properties and changes of properties in matter</b> (6 content category points possible)						
	a.	physical properties (e.g. density, boiling point, solubility), mixtures, physical vs. chemical change.	<b>8</b>				
	b.	chemical reactions, conservation of mass, chemical families, compounds		<b>5</b>	<b>23a</b>	<b>23b</b>	
	c.	elements and atomic structure			<b>9</b>		
	d.	states of matter, kinetic theory, gas laws			<b>13, 16</b>		<b>16</b>
	<b>2. Motion and forces</b>						
	a.	position and direction of moving things, speed and velocity, graphical representation of motion	<b>7</b>				
	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)	<b>19</b>	<b>12</b>	<b>4, 20</b>		<b>20</b>
	c.	Newton's first law (inertia)			<b>21a</b>	<b>21b</b>	
	<b>3. Energy</b>						
	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	<b>18</b>		<b>10, 24a</b>	<b>24b</b>	<b>10</b>
	b.	waves, sound, light (refraction, absorption, scattering, reflection), color and vision, electromagnetic spectrum, sunlight		<b>17</b>	<b>3, 25a</b>	<b>25b</b>	
	c.	static electricity, electric current and circuits, magnetism, electromagnetism		<b>14</b>	<b>11, 22a</b>	<b>22b</b>	<b>11</b>
	d.	heat, temperature, temperature scales, thermodynamics		<b>15</b>	<b>1, 2</b>		<b>2</b>
	e.	chemical energy, nuclear energy (radioactivity, fusion, fission)	<b>6</b>				

<sup>a</sup> Open response part *b* are each scored on 2-point scale.

<sup>b</sup> 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)

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

<sup>a</sup> Open response part *b* are each scored on 2-point scale.

<sup>b</sup> 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 <sup>b</sup> (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 <sup>a</sup> (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	<b>12</b>	<b>13</b>	<b>11</b>	<b>12</b>
	b.	weather/weather hazards/cloud formation	<b>18</b>	<b>3, 5</b>		<b>3</b>
	c.	climate, oceans & water cycle			<b>14, 22a</b>	<b>22b</b>
	2. Lithosphere (11 content category points possible)					
	a.	rock/mineral/soil properties	<b>6, 9</b>	<b>20</b>		<b>9</b>
	b.	rock/mineral cycle & processes (weathering, erosion, glaciers)	<b>1</b>		<b>19</b>	
	c.	movements of plates/ earthquakes/volcanoes & Earth's layers	<b>2, 7</b>		<b>23a</b>	<b>23b</b> <b>7</b>
	d.	history of the Earth: geologic time/uniformitarianism, fossils as evidence		<b>17</b>	<b>15, 21a</b>	<b>21b</b>
	3. Earth in the Solar System (6 content category points possible)					
	a.	solar system	<b>16</b>			
	b.	moon phases, motion and eclipses		<b>10</b>	<b>25a</b>	<b>25b</b>
	c.	sun as energy source and reason for seasons			<b>4, 8</b>	<b>8</b>
	d.	gravity and tides			<b>24a</b>	<b>24b</b>

<sup>a</sup> Open response part *b* are each scored on 2-point scale.

<sup>b</sup> 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).