

MIDDLE GRADES PHYSICAL SCIENCE ITEM SPECIFICATIONS FOR CHOSEN CELLS

Categories	Standards			KNOWLEDGE TYPES				
	S	T	A	Declarative	Science Inquiry	Schematic	Pedagogical	STS
1. Properties and changes of properties in matter							Correct misconception that	
a. Physical properties (den., boiling pt, solub.) & Mixtures	5	3	8	I-1a-4, recognize water freezing temperature on the Fahrenheit Scale I-1a-1, Identify definition of mixture.				
	5	3	8	I-1a-3, Identify alloy is solution.				
b. chemical reactions (& compounds)					II-1b-1 Control conditions of chemical reaction. II-1b-2 Demonstrate temperature effect on reaction rate. II-1b-3 Change chemical reaction by changing surface area. II-1b-4 Design chemical experiment. II-1b-5 Balance a double replacement reaction. Pr-4		IV-1b-1 dissolving and chemical reaction are same. IV-1b-2 boiling converts water to hydrogen and oxygen.	
i. conservation of mass	5	3	8					
ii. chemical families	5	3	8					
c. elements & atomic structure	5 4	3 3	8 7					
d. states of matter, kinetic theory, and gas laws						III-1d-1 Understand melting result of heat absorption. III-1d-2 Understand water boiling via vaporization and condensation.		
	4	3	7					
2. Motions and forces								
a. position and direction of moving things				I-2a-1 Identify effect of inertia on speed.				
i. speed	5	3	8					
ii. graphical representation of motion	5	2	7					
	5	3	8					
b. force and acceleration (includes friction, weight, & $a=F/m$)				I-2b-1 Identify friction definition. I-2b-2 Identify net force causes acceleration	II-2b-1 Calculate acceleration.	III-2b-1 Explain effect of gravity on momentum and acceleration of ball. III-2b-2 Explain the effect of weight on acceleration and momentum. III-2b-3 Explain the effect of density on weight, momentum, and force. III-2b-4 Explain weight and gravity. III-2b-5 Explain relationships of horizontal force, gravity, acceleration and speed.		
e. gravity	5	3	8					
	5	3	8					
c. Newton's First Law of Motion(inertia)							IV-2c-1 a ball stops rolling without another force acting on it. IV-2c-2 centrifugal force makes an object move in a curved path.	
	5	3	8					
d. addition of forces, unbalanced forces and balanced forces.	5	3	8					

Categories	Standards			KNOWLEDGE TYPES			
	S	T	A	Declarative	Science Inquiry	Schematic	Pedagogical
3. Types of Energy							
a. Energy (ability to do work/change), Mechanical energy (KE & PE)	5	3	8				
b. light (reraction, absorption, scattering, reflection, color, and vision, EM spectrum, and sunlight)							
c. Electricity (static), Magnetic properties							
d. Heat, Temperature and scales	5	3	8				
e. Chemical, Nuclear (radioactivity, fusion, fission)	5 3	3 3	8 6				
4. Transfer of Energy							
a. Energy transfer (systems, conservation), Mechanical motion, Simple machines	5 2	3 2	8 4				
b. Waves, Sound, Electromagnetic radiation	5	3	8				IV-4b-1 sound travels in space. IV-4b-2 sound travels through air faster than through earth.
c. Electric current (circuits), Magnetism, Electromagnetism	5	3	8		II-4c-1 Design electrical conductivity experiment controls. II-4c-2 Identify independent variable in electrical experiment. II-4c-3 Connect electrical circuit.		
d. Thermodynamics (movement of heat energy)	5	3	8		II-4d-1 Identify independent variables in themal conductivity experiment. II-4b-2 Identify uncontrolled conditions. II-4d-3 Identify temperature as dependent variable.	see 1d	

* Heat was included in count with thermodynamics so has the same numbers.

MIDDLE GRADES PHYSICAL SCIENCE CONTENT CATEGORIES AND CHOSEN CELLS FOR TESTS

Categories	Standards			KNOWLEDGE TYPES				
				Declarative	Science Inquiry	Schematic	Pedagogical	STS
1. Properties and changes of properties in matter								
a. Physical properties (den., boiling pt, solub.) & Mixtures	5	3	8	N-2, recognize water freezing temperature on the Fahrenheit Scale Pr-1, Pa-1, Identify definition of mixture. N-1, Identify alloy is solution		1-10, 1-4b	Pr-10, Pa-10	
b. chemical reactions (& compounds)	5	3	8	1-1, pa-1, Pr-4, Pr-1	Pa-7, Pr-8, 1-7, 3-7, 2-7, Pr-4	1-4b, 1-4a	Pr-10, Pa-10	
i. conservation of mass	5	3	8	Pa-5				
ii. chemical families	5	3	8					
c. elements & atomic structure	5	3	8	Pr-1, Pa-1, N-1, 2-1				
	4	3	7	1-9				
d. states of matter, kinetic theory, and gas laws								
	4	3	7	N-4		N-3, N-4	Pa-10	
2. Motions and forces								
a. position and direction of moving things								
i. speed	5	3	8				3-11, Pa-11	
ii. graphical representation of motion	5	2	7					
	5	3	8					
b. force and acceleration (includes friction, weight, & $a=F/m$)	5	3	8		Pa-4	Pr-7, Pa-8, 2-5, Pa-2, 2-9		
e. gravity	5	3	8	Pr-2, 3-2, Pr-5				
c. Newton's First Law of Motion (inertia)								
	5	3	8	1-5, 3-2, Pr-5			Pa-11	
d. addition of forces, unbalanced forces and balanced forces.	5	3	8					
3. Types of Energy								
a. Energy (ability to do work/change), Mechanical energy (KE & PE)	5	3	8			Pa-8, 2-5		
b. light (reflection, absorption, scattering, reflection, color, and vision, EM spectrum, and sunlight)								
c. Electricity (static), Magnetic properties								
d. Heat, Temperature and scales	5	3	8	N-2				
e. Chemical, Nuclear (radioactivity, fusion, fission)	5	3	8	1-4b		1-4a		
	3	3	6					

4. Transfer of Energy								
a. Energy transfer (systems, conservation), Mechanical motion, Simple machines	5 2	3 2	8 4			N-3		
b. Waves, Sound, Electromagnetic radiation	5	3	8	Pr-3, Pa2	Pa-2		Pa-12, Pr-12	
c. Electric current (circuits), Magnetism, Electromagnetism	5	3	8		Pa-9,	Pr-6	3-9	
d. Thermodynamics (movement of heat energy)	5	3	8		Pr-9	N-4, N-3		

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MIDDLE GRADES PHYSICAL SCIENCE CONTENT CATEGORIES, KNOWLEDGE TYPES, AND CHOSEN CELLS FOR TESTS

Content Categories	Standards			KNOWLEDGE TYPES				
	S	T	A	Declarative	Science Inquiry	Schematic	Pedagogical	STS
1. Properties and changes of properties in matter								
a. Physical properties (den., boiling pt, solub.) & Mixtures	5 5	3 3	8 8					
b. chemical reactions (& compounds)	5	3	8					
i. conservation of mass	5	3	8					
ii. chemical families	5	3	8					
c. elements & atomic structure	5 4	3 3	8 7					
d. states of matter, kinetic theory, and gas laws	4	3	7					
2. Motions and forces								
a. position and direction of moving things								
i. speed	5	3	8					
ii. graphical representation of motion	5	2	7					
b. force and acceleration (includes friction, weight, & a=F/m)	5	3	8					
e. gravity	5	3	8					
c. Newton's First Law of Motion(inertia)	5	3	8					
d. addition of forces, unbalanced forces and balanced forces.	5	3	8					
3. Types of Energy								
a. Energy (ability to do work/change), Mechanical energy (KE & PE)	5	3	8					
b. light (reraction, absorption, scattering, reflection, color, and vision, EM spectrum, and sunlight								
c. Electricity (static), Magnetic properties								
d. Heat, Temperature and scales	5	3	8					
e. Chemical, Nuclear (radioactivity, fusion, fission)	5 3	3 3	8 6					
4. Transfer of Energy								
a. Energy transfer (systems, conservation), Mechanical motion, Simple machines	5 2	3 2	8 4					
b. Waves, Sound, Electromagnetic radiation	5	3	8					
c. Electric current (circuits), Magnetism, Electromagnetism	5	3	8					
d. Thermodynamics (movement of heat energy)	5	3	8					

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