

MIDDLE GRADES EARTH SCIENCE CONTENT CATEGORIES AND CHOSEN CELLS FOR TESTS

Content Categories	Standards			KNOWLEDGE TYPES				
	S	T	A	Declarative	Science Inquiry	Schematic	Pedagogical	STS
1. Atmosphere/ Hydrosphere								
a. atmosphere composition	6	3	9	5 principal layers: troposphere.stratosphere.mesosphere.thermosphere. exosphere: convection currents confined to troposphere: ionic particles of thermosphere: Van Allen belts: aurora borealis: radiation: ozone layer	Atmospheric pressure- barometer: altimeter: soda straw and medicine dropper as applications of air pressure	heating and cooling of a container- air pressure with balloon on flask: crumpled napkin in glass in container of water:	Misconceptions: Aurora's are caused by solar wind particles: gravity increases with height.	
b. weather/weather hazards/ cloud formation	6 4	3 2	9 6	Air mass. types of air mass: tropical and polar: fronts: cold. warm, stationary: high and low pressure. tornadoes. thunder and lightning. cloud types. precipitation types	Making a weather station. Demo of frost. snow. sleet and glaze with can of salt and ice. make clouds b putting match in plastic bottle that has had hot water in it Reading weather maps. predicting weather from reading cloud types	explain real-world phenomena	Miscon: rain comes from holes in clouds or clouds sweating.	
c. climate & oceans	6	3	9	Climatologv. latitudes. land and water masses. winds. mountains. ocean currents. greenhouse effect. glaciers	design experiment, predict results. draw conclusions, make inferences	explain real-world phenomena. solve real-world problems		
d. water cycle	6	3	9	hydrological cycle, condensation. evaporation. Deposition	Model of hydrological cycle with boiling water and pail held over pot with ice on top. terrarium fog in bottle with hot water & ice cubes	explain real-world phenomena. solve real-world problems	Identify misconceptions. describe activities, give analogies	
2. Lithosphere								
a. Earth's layers	6	3	9	crust, mantle. inner core, outer core. moho. athenosphere. lithosphere. 5 main elements: oxvgen. Silicon, aluminum, iron, calcium		explain real-world phenomena. solve real-world problems	Miscon: earth is molten except for crust.	
b. rock/mineral cycle	6	3	9	rock/mineral cvcle.igneous. Metamorphic, sedimentary, recrystallization	Mineral test: Mohs' scale. cleavage, specific gravitv.crystal. streak color. magnetic. flame. etc.	Identification of products used everyday that contain various minerals	Misconep: Any crystal that scratches glass is a diamond. Rocks must be heavy.	
c. movements of plates/ earthquakes/volcanoes	5	3	8	movements of plates! earthquakes/volcanoes	Plate tectonics. subduction. fault. epicenter. seismic.	explain real-world phenomena. solve real-world problems	Misc: continents do not move.	
d. constructive/ destructive forces	5	3	8	glaciers	design experiment, predict results, draw conclusions, make inferences design experiment, predict results, draw conclusions, make inferences	explain real-world phenomena. solve real-world problems	Misc: soil must have always been in present form.	
e. soil structure	6	2	8	types of soil. soil formation	design experiment, predict results, draw conclusions, make inferences	explain real-world phenomena. solve real-world problems	Identify misconceptions. describe activities, give analogies	
3. History of Earth								

8/7/2006

a. Earth processes/geologic time/ uniformitarianism	5	3	8	origin of universe, geological time, uniformitarianism	design experiment, predict results, draw conclusions, make inferences	explain real-world phenomena. solve real-world problems	Identify misconceptions. describe activities, give analogies	
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b. fossils as evidence	4	3	7	fossil. stratigraphic fossils, index fossils, half-life	design experiment, predict results, draw conclusions, make inferences	explain real-world phenomena. solve real-world problems	Identify misconceptions. describe activities, give analogies	
c. catastrophic events	3	3	6	catastrophic event, earth	design experiment, predict results, draw conclusions, make inferences	explain real-world phenomena. solve real-world problems	Identify misconceptions. describe activities, give analogies	
4. Earth in the Solar System								
a. solar system	6	3	9	planets, asteroids, sun, solar system, universe, planet orbits, origin, comets, Meteoroids	design experiment, predict results, draw conclusions, make inferences	explain real-world phenomena. solve real-world problems	Identify misconceptions. describe activities, give analogies	
b. phases, motion and eclipses	6	3	9	position of sun, moon, earth, lunar eclipse, solar eclipse, phases of moon	design experiment, predict results, draw conclusions, make inferences	explain real-world phenomena. solve real-world problems	Identify misconceptions. describe activities, give analogies	
c. sun as energy and reason for seasons	6	2	8	seasons, earth rotation, earth orbit, Wien's law, emission, light color	design experiment, predict results, draw conclusions, make inferences	explain real-world phenomena. solve real-world problems	Identify misconceptions. describe activities, give analogies	
d. gravity and tides	3	3	6	moon's gravity, earth's gravity, Tides				

8/7/2006

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1. Atmosphere/ Hydrosphere							
a. atmosphere composition	6	3	9				
b. weather/weather hazards/ cloud formation	6 4	3 2	9 6				
c. climate & oceans	6	3	9				
d. water cycle	6	3	9				
2. Lithosphere							
a. Earth's layers	6	3	9				
b. rock/mineral cycle	6	3	9				
c. movements of plates/ earthquakes/volcanoes	5	3	8				
d. constructive/ destructive forces	5	3	8				
e. soil structure	6	2	8				
3. History of Earth							
a. Earth processes/geologic time/ uniformitarianism	5	3	8				
b. fossils as evidence	4	3	7				
c. catastrophic events	3	3	6				
4. Earth in the Solar System							
a. solar system	6	3	9				
b. phases, motion and eclipses	6	3	9				
c. sun as energy and reason for seasons	6	2	8				
d. gravity and tides	3	3	6				

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1. Atmosphere/ Hydrosphere								
a. atmosphere composition	6	3	9		1. id use of anemometers			
b. weather/weather hazards/ cloud formation	6 4	3 2	9 6			1. id condensation 2. id cause of fog 3. id cause of rain 4. id cause of steady rain 5. id effects of cold air density		
c. climate & oceans	6	3	9	1. define climate 2. identify effect of oceans on global climate 3. identify cause of unequal heating of the earth by the sun 4. identify effect of air density on air pressure 5. identify characteristics of jet stream 6. identify effect of CO ₂ on atmosphere 7. identify examples of climate 8. identify consequences of El Nino 9. identify location of rapid change in ocean water density				
d. water cycle	6	3	9				1. Correct misconception that groundwater is in streams,etc	
2. Lithosphere								
a. Earth's layers	6	3	9					
b. rock/mineral cycle	6	3	9		1. id tests for mineral identification			
c. movements of plates/ earthquakes/volcanoes	5	3	8					
d. constructive/ destructive forces	5	3	8	1. identify implications of plate tectonics 2. discriminate causes of erosion 3. define weathering 4. identify cause of origin of glaciers				
e. soil structure	6	2	8					

3. History of Earth								
a. Earth processes/geologic time/ uniformitarianism	5	3	8				1.describe metaphor for geological time	
b. fossils as evidence	4	3	7					
c. catastrophic events	3	3	6	1. id use of glacial core samples 2. define Ring of Fire 3. id cause of tsunamis 4. differentiate mass from background extinction				
4. Earth in the Solar System								
a. solar system	6	3	9	1. id correct order of planets 2. id characteristics of planets 3. id shape of planetary orbits				
b. phases, motion and eclipses	6	3	9			1.id reason for earth's limited view of the moon 2. id position of earth, sun and moon during full moon 3. id correct order of moon's phases		
c. sun as energy and reason for seasons	6	2	8			1. locate point on earth 2. determine season at point on earth 3. tell time of day at point on earth 4. id day of longest shadow in US 5. id reasons for low light level from moon 6. id reason for seasons 7. id reason for seasons 8. id effectw of decrease in ozone layer 9. id reason fo leap year 10. id cause of seasons		
d. gravits and tides	3	3	6					