"Unwrapping" Standards

Grade Level 8 Content Area Earth Science

Standard(s) and/or Benchmark(s):
8.1.1.2.1
Use logical reasoning and imagination to develop descriptions, explanations, predictions and models based on evidence.

Concepts			**Skills**
Students need to know about:			*Students need to be able to do:*
Logical Reasoning			Develop
Imagination			Propose
Descriptions			Investigate
Explanations			*Describe
Predictions			*Predict
Models			*Model
Evidence			
Natural World			

*Terms added

Overarching Questions: (*focused on enduring ideas for a concept/unit*)

- Depends on science content being taught concurrently.

Guiding Questions: (*Teacher's guiding questions for a lesson*)

- Depends on science content being taught concurrently.

Teaching Ideas: (*How would this look at YOUR school? Topic for future PLC discussion…*)

"Unwrapping" Standards

Grade Level 8 Content Area Earth Science

Standard(s) and/or Benchmark(s):
8.1.3.2.1
Describe examples of important contributions to the advancement of science, engineering and technology made by individuals representing different groups and cultures at different times in history.

Concepts			**Skills**
Students need to know about:			*Students need to be able to do:*
Science	Advancement		Describe
Engineering			*Research
Technology			*Construct
Cultures			*Create
History			*Cause and Effect
Minnesota American Indian tribes and communities			*Inquire
Design			
Inquiry			
Contribution			

*Terms Added

Overarching Questions: (*focused on enduring ideas for a concept/unit*)

- How have our lives been affected by advancements in engineering and science?

Guiding Questions: (*Teacher's guiding questions for a lesson*)

- How have men and women of different cultures contributed to the advancements in our understanding of astronomy? Plate tectonics? Geology? Meteorology? Other?

Teaching Ideas: (*How would this look at YOUR school? Topic for future PLC discussion…*)
Students research an astronomer in history and construct a "most wanted" poster. Posters are displayed on a time line.

This benchmark gets woven through science content.

"Unwrapping" Standards

Grade Level 8 Content Area Earth Science

Standard(s) and/or Benchmark(s):

8.1.3.3.1

Explain how scientific laws and engineering principles, as well as economic, political, social, and ethical expectations, must be taken into account in designing engineering solutions or conducting scientific investigations.

Concepts			**Skills**
Students need to know about:			*Students need to be able to do:*
Scientific Laws			Explain
Engineering Principles			*Cause and Effect
Economic Expectations			
Political Expectations			
Social Expectations			
Ethical Expectations			
Scientific Expectations			
Society			

*Terms added

Overarching Questions: (*focused on enduring ideas for a concept/unit*)

- What must scientists and engineers consider when engineering solutions and conducting scientific investigations?

Guiding Questions: (*Teacher's guiding questions for a lesson*)

- How do economic and political views impact decisions on engineering?
- How do social and ethical considerations impact decisions in engineering?

Teaching Ideas: (*How would this look at YOUR school? Topic for future PLC discussion…*)

- Could we and should we clone a human?
- Could we and should we take a field trip to another solar system?

"Unwrapping" Standards

Grade Level 8 Content Area Earth Science

Standard(s) and/or Benchmark(s):
8.1.3.4.1

Use maps, satellite images and other data sets to describe patterns and make predictions about local and global systems in Earth science contexts.

For example: Use data or satellite images to identify locations of earthquakes and volcanoes, ages of sea floor, ocean surface temperatures and ozone concentration in the stratosphere.

Concepts			**Skills**
Students need to know about:			*Students need to be able to do:*
Maps	*Models		Predict
Satellite	*Technologies		Describe
Satellite Images	*Systems		*Interpret
Data Sets			*Compare/Contrast
Patterns			
Predictions			
Local Systems			
Global Systems			

*Terms added

Overarching Questions: (*focused on enduring ideas for a concept/unit*)

- How is data collected and used to study the natural world around us?
- What type of data is collected?

Guiding Questions: (*Teacher's guiding questions for a lesson*)

1. How do tectonic plate movements shape the Earth over time?
2. How do we learn about atmospheric processes and climate change?
3. How does the movement of water shape the surface of the Earth?

Teaching Ideas: (*How would this look at YOUR school? Topic for future PLC discussion…*)

Using maps, satellite images, geological models, stream tables
Have students map the neighborhood

"Unwrapping" Standards

Grade Level 8 Content Area Earth Science

Standard(s) and/or Benchmark(s):

8.2.1.1.1
Distinguish between a mixture and a pure substance and use physical properties including color, solubility, density, melting point and boiling point to separate mixtures and identify pure substances.

Concepts			**Skills**
Students need to know about:			*Students need to be able to do:*
Mixture	Separate		Separate
Pure	Model		Identify
Substance	Matter		
Physical Properties	Particles		
Color	*Atoms		
Solubility	*Molecules		
Density			
Melting Point			
Boiling Point			

*Terms added

Overarching Questions: (*focused on enduring ideas for a concept/unit*)

- How can we separate a mixture into its different parts?
- How are physical properties used to identify substances?

Guiding Questions: (*Teacher's guiding questions for a lesson*)

- What is a mixture?
- What is a pure substance?
- How can you tell the difference between a mixture and a pure substance?
- How can you separate a solid from a liquid?
- How can you separate different matter in the same state?

Teaching Ideas: (*How would this look at YOUR school? Topic for future PLC discussion…*)

"Slug test" – iron filings, sand, salt, saw dust, water, food coloring, rubbing alcohol, oil, dish soap

3 Mixtures – solids (solubility), liquids (density), solids and liquids (density, solubility, magnetism, boiling point)

"Unwrapping" Standards

Grade Level 8 Content Area Earth Science

Standard(s) and/or Benchmark(s):
8.2.1.2.2
Distinguish between chemical and physical changes in matter.

Concepts			**Skills**
Students need to know about:			*Students need to be able to do:*
Matter	*Atomic model		Distinguish
Chemical Changes	*States of Matter		*Observe
Physical Changes			*Describe
Substance			*Interpret
Property			*Compare/Contrast
Closed System			
Mass			

*Terms added

Overarching Questions: (*focused on enduring ideas for a concept/unit*)

- How can we tell the difference between a chemical and physical change in matter?

Guiding Questions: (*Teacher's guiding questions for a lesson*)

- What are the basic building blocks of matter?
- In what ways can matter go through changes?

Teaching Ideas: (*How would this look at YOUR school? Topic for future PLC discussion…*)

Ice Cream Lab
Dissolving Salt in Water
Melting Ice Cubes
Gas Lab
Chemical Change Stations

"Unwrapping" Standards

Grade Level 8 Content Area Earth Science

Standard(s) and/or Benchmark(s):
8.3.1.1.3
Recognize that major geological events, such as earthquakes, volcanic eruptions and mountain building, result from the slow movement of tectonic plates.

Concepts			**Skills**
Students need to know about:			*Students need to be able to do:*
Structure	Geological Events		Recognize
Tectonic Plates	Earthquake		Describe
Lithosphere	Volcanic Eruptions		Identify
Mantle	Mountain Building		Model
Core			
Interactions			
Processes			
Movement			

Overarching Questions: (***focused on enduring ideas for a concept/unit***)

- How does the movement of tectonic plates cause earthquakes, volcanic eruptions, and mountain building?
- What causes earthquakes, mountains, and volcanoes?
- Why doesn't Minnesota have major earthquakes, mountains, and volcanoes TODAY?

Guiding Questions: (***Teacher's guiding questions for a lesson***)

- What moves the plates of the Earth?
- What evidence do we have to support plate tectonics?

Teaching Ideas: (***How would this look at YOUR school? Topic for future PLC discussion…***)

"Unwrapping" Standards

Grade Level 8th grade Content Area Earth Science

Standard(s) and/or Benchmark(s):
8.3.1.2.1 Explain how landforms result from the processes of crustal deformation, volcanic eruptions, weathering, erosion and deposition of sediment.

Concepts			**Skills**
Students need to know about:			*Students need to be able to do:*
Landforms	Combination		Comprehension
Constructive Forces			Application
Destructive Forces			Interpret
Volcanoes			Prediction
Crustal deformation			Infer
Weathering			Classify
Erosion			Compare/Contrast
Deposition			Model
Sediment			

Overarching Questions: (*focused on enduring ideas for a concept/unit*)

- How are landforms created (constructed) or destroyed (destructive)?

Guiding Questions: (*Teacher's guiding questions for a lesson*)

- What is a landform?
- What are constructive forces vs. destructive forces?
- How does crustal deformation and volcanic eruption construct landforms?
- What impact does weathering, erosion and deposition of sediment have on landforms?

Teaching Ideas: (*How would this look at YOUR school? Topic for future PLC discussion…*)

- Stream tables
- Crustal deformation using clay or candy bars
- Hot Spot Activity

"Unwrapping" Standards

Grade Level 8 Content Area Earth Science

Standard(s) and/or Benchmark(s):
8.3.1.3.1
Interpret successive layers of sedimentary rocks and their fossils to infer relative ages of rock sequences, past geologic events, changes in environmental conditions, and the appearance and extinction of life forms.

Concepts			**Skills**
Students need to know about:			*Students need to be able to do:*
Layers	*Geologic Time		Infer
Sedimentary Rocks	*Igneous Rocks		Interpret
Fossils	*Metamorphic Rocks		*Identify
Relative Ages	*Rock Cycle		*Classify
Rock Sequences			
Geologic Events			
Environmental Conditions			
Extinction			
Life Forms			

*Terms Added

Overarching Questions: (*focused on enduring ideas for a concept/unit*)

- How has Earth, and life on Earth, changed over time?

Guiding Questions: (*Teacher's guiding questions for a lesson*)

- How do scientists know the age of rocks?
- What can fossils tell us about how life has changed over time?
- What can rocks and fossils tell us about how the environment has changed over time?
- What environments create sedimentary rocks and fossils?

Teaching Ideas: (*How would this look at YOUR school? Topic for future PLC discussion…*)
Use books and objects to model layers
Use rock samples/shells to create layers and interpret relative age
Use sample cross section to interpret layers and histories
Lilydale field trip - discuss MN history through rock layers' fossil evidence

"Unwrapping" Standards)

Grade Level 8th Content Area Earth Science

Standard(s) and/or Benchmark(s):

8.3.2.1.3 Explain how heating of the Earth's surface and atmosphere by the sun drives convection within the atmosphere and hydrosphere producing winds, ocean currents and the water cycle, as well as influencing global climate.

Concepts			**Skills**
Students need to know about:			*Students need to be able to do:*
Atmosphere	Convection		Explain
Conduction	Radiation		Cause and Effect
Carioles effect	Atmosphere		Compare and Contrast
Density	Hydrosphere		
Ocean current	Water cycle		
Global climate	Global wind pattern		
Atmospheric pressure			

Overarching Questions: (*focused on enduring ideas for a concept/unit*)

- How does energy from the sun affect the earth?
- How do global winds affect your local weather?

Guiding Questions: (*Teacher's guiding questions for a lesson*)

- What is convection?
- How is wind produced?
- What are ocean currents?
- How does energy from the sun affect ocean currents?

Teaching Ideas: (*How would this look at YOUR school? Topic for future PLC discussion…*)

"Unwrapping" Standards

Grade Level 8th Grade Content Area Earth Science

Standard(s) and/or Benchmark(s):
8.3.2.2.1 Describe how the composition and structure of the Earth's atmosphere affects energy absorption, climate, and the distribution of particulates and gases. For example: Certain gases contribute to the greenhouse effect.

Concepts			**Skills**
Students need to know about:			*Students need to be able to do:*
Energy absorptions			Describe
Global climates			Interprete
Composition of atmosphere			Cause and effect
Gases of atmosphere			
Temp of layers			
Air pollution			
Greenhouse effect			

Overarching Questions: (*focused on enduring ideas for a concept/unit*)

- How does movement within eth atmosphere effect global climate and the local weather?

Guiding Questions: (*Teacher's guiding questions for a lesson*)

- What gases make up the atmosphere?
- What does it feel like when you move up in the atmosphere?
- How do humans effect the atmosphere and global climates?

Teaching Ideas: (*How would this look at YOUR school? Topic for future PLC discussion…*)

- Environment – How does human activity and gases affect the Earth's atmosphere?
- Human ingenuity – Why did excel energy switch to the 7th st. power plan from coal to natural gas?

"Unwrapping" Standards

Grade Level 8th Grade Content Area Earth Science

Standard(s) and/or Benchmark(s):
8.3.2.2.2 Analyze changes in wind direction, temperature, humidity and air pressure and relate them to fronts and pressure systems.

Concepts			**Skills**
Students need to know about:			*Students need to be able to do:*
Wind	Atmosphere		Analyze
Temperature	Climate		Relate
Humidity	Coriolis effect		Cause and effect
Air pressure	High pressure / Low pressure		Measurement
Fronts	Dew Point		Recognizing patters
Pressure systems			Infer
Weather			Interpret
Density			
Convection			

Overarching Questions: (*focused on enduring ideas for a concept/unit*)

- How do patterns of atmosphereic movement influence global climate and local weather?
- What causes changes in global climate and local weather?

Guiding Questions: (*Teacher's guiding questions for a lesson*)

- What cause wind?
- How des temperature and air pressure affect humidity?
- What causes fronts?
- What causes pressure systems?
- How do pressure systems change?
- How do front change?

Teaching Ideas: (*How would this look at YOUR school? Topic for future PLC discussion…*)

"Unwrapping" Standards

Grade Level 8th Grade Content Area Earth Science

Standard(s) and/or Benchmark(s):
8.3.2.3.2 Describe how the water cycle distributes materials and purifies water. For example: Dissolved gases in rain can change the chemical composition of substances on Earth.
Another example: Waterborne disease.

Concepts			**Skills**
Students need to know about:			*Students need to be able to do:*
Water	Distribution		Describe
Coverage	Materials		Recognize
Majority	Purification		Identify
Earth's Surface			Make a Model - Draw
Circulation			Analyze
Crust			Questioning – Concluding
Ocean			Classifying
Atmosphere			Compare – contrast
Water cycle			

Overarching Questions: (*focused on enduring ideas for a concept/unit*)

- How is Earth's water recycled?
- How is Earth's water distributed and purified?
- How does water move through the Earth and the atmosphere?

Guiding Questions: (*Teacher's guiding questions for a lesson*)

- How does water move though the atmosphere?
- What happened to precipitation that falls to the earth?
- How does water move though the biosphere?
- How does water move thought the lithosphere?
- How does the Earth's water transport various materials?

Teaching Ideas: (*How would this look at YOUR school? Topic for future PLC discussion…*)

1. Water Molecule journey
2. Water cycle lab
3. Videos
4. Drawing the water cycle
5. RAFT writing

"Unwrapping" Standards

Grade Level 8th grade Content Area Earth Science

Standard(s) and/or Benchmark(s):

8.3.3.1.2	***Describe how gravity and inertia keep most objects in the solar system in regular and predictable motion.***

Concepts			**Skills**
Students need to know about:			*Students need to be able to do:*
Gravity			Describe
Inertia			Understand
Celestial Objects			Modeling to describe
Solar System			Compare and Contrast
Regular and predictable			Calculations
Motion			
Mass			
Distance			
Units			

Overarching Questions: (*focused on enduring ideas for a concept/unit*)

- How does gravity and inertia influence motion in space?

Guiding Questions: (*Teacher's guiding questions for a lesson*)

- How does an objects mass affect hot it moves, in space?
- Why doe objects in spae always move in a predictable manner?
- Why do you weigh more on Jupiter than earth?
- How are gravity and inertia demonstrated in celestial objects

Teaching Ideas: (*How would this look at YOUR school? Topic for future PLC discussion…*)

"Unwrapping" Standards

Grade Level 8th grade Content Area Earth Science

Standard(s) and/or Benchmark(s):

8.3.3.1.5 Use the predictable motions of the Earth around its own axis and around the sun, and of the moon around the Earth, to explain day length, the phases of the moon, and eclipses.

Concepts			**Skills**
Students need to know about:			*Students need to be able to do:*
Motion	Rotation		Predict
Earth	Revolution		Explain
Axis	Seasons		
Sun	Tilt		
Moon	Umbra		
Day Length	Penumbra		
Phases of the Moon			
Eclipses			
Orbit			

Overarching Questions: (*focused on enduring ideas for a concept/unit*)

- What are the affects form the movement of the sun, earth and moon?
- What are the affects form the position of the sun, earth and moon?

Guiding Questions: (*Teacher's guiding questions for a lesson*)

1. What determines the length of a day?
2. Why does length of day light change?
3. Why does the moon appear to change shape?
4. Why do eclipses happen?
5. How does the earth move?
6. How does the moon move?
7. Why do the season change?

Teaching Ideas: (*How would this look at YOUR school? Topic for future PLC discussion…*)

"Unwrapping" Standards ~ *Template (1)*

Grade Level 8th Content Area Earth Science

Standard(s) and/or Benchmark(s):
8.3.4.1.2 Recognize that land and water use practices can affect natural processes and that natural processes interfere and interact with human systems.
For example: Levees change the natural flooding process of a river.
Another example: Agricultural runoff influences natural systems far from the source.

Concepts			**Skills**
Students need to know about:			*Students need to be able to do:*
Land use	Interfere		Recognize
Water use	Interact		Describe
Land/Water practices			Cause and effect
Natural processes			Predict
Human Systems			

Overarching Questions: (*focused on enduring ideas for a concept/unit*)

- What affects do human have when they use water soil in the natural world?

Guiding Questions: (*Teacher's guiding questions for a lesson*)

- How do farming practices affect soil erosion?
- How do river control/dams affect rivers?

Teaching Ideas: (*How would this look at YOUR school? Topic for future PLC discussion…*)