**AMG Curriculum (SCI 333/ 334)**

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| **Date** | **Unit** | Hobbs Science Standards11th- 12th Grade | **NM Standards & Benchmarks** | **Resources**Basic text is Tarbuck Earth Science (2006) |
|  |  | **By being embedded throughout the curriculum, these Processing Skills will be addressed throughout the year.** |  |  |
|  |  | **Students will be able to:** | Strand, Standards, Benchmarks, & Performance Standards | Supplemental books, labs, videos, projects, digital curriculum |
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| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **2** | **Writing Standards for Literacy**I. Text Types and Purposes A. Write arguments focused on discipline-specific content. 1. Introduce precise, knowledgeable claim(s), establish the significance of  the claim(s), distinguish the claim(s) from alternate or opposing claims,  and create an organization that logically sequences the claim(s),  counterclaims, reasons, and evidence.  2. Develop claim(s) and counterclaims fairly and thoroughly, supplying the  most relevant data and evidence for each while pointing out the strengths  and limitations of both claim(s) and counterclaims in a discipline- appropriate form that anticipates the audience’s knowledge level,  concerns, values and possible biases.  3. Use words, phrases, and clauses as well as varied syntax to link the major  sections of the text, create cohesion, and clarify the relationships between  claim(s) and reasons, between reasons and evidence, and between  claim(s) and counterclaims.  4. Establish and maintain a formal style and objective tone while attending  to the norms and conventions of the discipline in which they are writing. 5. Provide a concluding statement or section that follows from and supports  the argument presented. B. Write informative/explanatory texts, including the narration of historical  events, scientific procedures/experiments, or technical processes. 1. Introduce a topic and organize complex ideas, concepts and information  so that each new element builds on that which precedes it to create a  unified whole; include formatting (e.g., headings), graphics (e.g., figures,  tables), and multimedia when useful to aiding comprehension. 2. Develop the topic thoroughly by selecting the most significant and  relevant facts, extended definitions, concrete details, quotations, or other  information and examples appropriate to the audience’s knowledge of the  topic. 3. Use varied transitions and sentence structures to link the major sections  of the text, create cohesion, and clarify the relationships among complex  ideas and concepts. 4. Use precise language, domain-specific vocabulary and techniques such as  metaphor, simile, and analogy to manage the complexity of the topic;  convey a knowledgeable stance in a style that responds to the discipline  and context as well as to the expertise of likely readers.  5.Provide a concluding statement or section that follows from and supports  the information or explanation provided (e.g., articulating implications or  the significance of the topic).II. Production and Distribution of Writing A. Produce clear and coherent writing in which the development, organization,  and style are appropriate to task, purpose, and audience. B. Develop and strengthen writing as needed by planning, revising, editing,  rewriting, or trying a new approach, focusing on addressing what is most  significant for a specific purpose and audience. C. Use technology, including the Internet, to produce, publish and update  individual or shared writing products in response to ongoing feedback,  including new arguments or information. III. Research to Build and Present Knowledge A. Conduct short as well as more sustained research projects to answer a  question (including a self-generated question) or solve a problem; narrow or  broaden the inquiry when appropriate; synthesize multiple sources on the  subject, demonstrating understanding of the subject under investigation.  B. Gather relevant information from multiple authoritative print and digital  sources, using advanced searches effectively; assess the strengths and  limitations of each source in terms of the specific task, purpose, and  audience; integrate information into the text selectively to maintain the flow  of ideas, avoiding plagiarism and overreliance on any one source and  following a standard format for citation.. C. Draw evidence from informational texts to support analysis, reflection and  research.IV. Range of Writing A. Write routinely over extended timeframes (time for reflection and revision)  and shorter time frames (a single sitting or a day or two) for a range of  discipline-specific tasks, purposes, and audiences. |  |  |
| \_\_\_\_\_\_\_\_\_\_\_\_ | **3** | **Scientific Processing Skills, Part 1**1. Describe the essential components of an investigation, including appropriate methodologies, proper equipment, and safety precautions.
2. Design and conduct scientific investigations that include:
* Testable hypotheses
* Controls and variables
* Methods to collect, analyze, and interpret data
* Results that address hypotheses being investigated
* Predictions based on results
* Re-evaluation of hypotheses and additional experimentation as necessary
* Error analysis.
1. Use appropriate technologies to collect, analyze, and communicate scientific data (e.g., computers, calculators, balances, microscopes).
2. Convey results of investigations using scientific concepts, methodologies, and expressions, including:
* Scientific language and symbols
* Diagrams, charts, and other data displays
* Mathematical expressions and processes (e.g., mean, median, slope, proportionality)
* Clear, logical, and concise communication
* Reasoned arguments.
1. Understand how scientific theories are used to explain and predict natural phenomena (e.g., plate tectonics, ocean currents, structure of atom).
 | I, I, I, 1I, I, I, 2I, I, I, 3I, I, I, 4I, I, I, 5 |  |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **4** | **Scientific Processing Skills, Part 2**1. Understand how scientific processes produce valid, reliable results, including:
* Consistency of explanations with data and observations
* Openness to peer review
* Full disclosure and examination of assumptions
* Testability of hypotheses
* Repeatability of experiments and reproducibility of results.
1. Use scientific reasoning and valid logic to recognize:
* Faulty logic
* Cause and effect
* The difference between observation and unsubstantiated inferences and conclusion
* Potential bias
1. Understand how new data and observations can result in new scientific knowledge.
2. Critically analyze an accepted explanation by reviewing current scientific knowledge.
3. Examine investigations of current interest in science (e.g., superconductivity, molecular machines, age of the universe).
4. Examine the scientific processes and logic used in investigations of past events (e.g., using data from crime scenes, fossils), investigations that can be planned in advance but are only done once (e.g., expensive or time-consuming experiments such as medical clinical trials), and investigations of phenomena that can be repeated easily and frequently.
 | I, I, II, 1I, I, II, 2I, I, II, 3I, I, II, 4I, I, II, 5I, I, II, 6 |  |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **5** | **Scientific Processing Skills, Part 3**1. Create multiple displays of data to analyze and explain the relationships in scientific investigations.
2. Use mathematical models to describe, explain, and predict natural phenomena.
3. Use technologies to quantify relationships in scientific hypotheses (e.g., calculators, computer spreadsheets and databases, graphing software, simulations, modeling).
4. Identify and apply measurement techniques and consider possible effects of measurement errors.
5. Use mathematics to express and establish scientific relationships (e.g., scientific notation, vectors, dimensional analysis).
 | I, I, III, 1I, I, III, 2I, I, III, 3I, I, III, 4I, I, III, 5 |  |
|  | **6** | **Science and Technology**1. Know how science enables technology but also constrains it, and recognize the difference between real technology and science fiction (e.g., rockets vs. antigravity machines; nuclear reactors vs. perpetual-motion machines; medical X-rays vs. Star-Trek tricorders).
2. Understand how advances in technology enable further advances in science (e.g., microscopes and cellular structure; telescopes and understanding of the universe).
3. Evaluate the influences of technology on society (e.g., communications petroleum, transportation, nuclear energy, computers, medicine, genetic engineering) including both desired and undesired effects, and including some historical examples (e.g., the wheel, the plow, the printing press, the lightning rod).
4. Understand the scientific foundations of common technologies (e.g., kitchen appliances, radio, television, aircraft, rockets, computers, medical X-rays, selective breeding, fertilizers and pesticides, agricultural equipment).
5. Analyze the impact of digital technologies on the availability, creation, and dissemination of information.
6. Examine the role that New Mexico research facilities play in current space exploration (e.g., Very Large Array, Goddard Space Center).
7. Describe uses of radioactivity (e.g. nuclear power, nuclear medicine, radiometric dating).
8. Understand how knowledge about the universe comes from evidence collected from advanced technology (e.g., telescopes, satellites, images, computer models).
9. Describe the key observations that led to the acceptance of the Big Bang theory and that the age of the universe is over 10 billion years.
 | III, I, I, 1III, I, I, 2III, I, I, 3III, I, I, 4III, I, I, 6III, I, I, 7III, I, I, 8II, III, I, 3II, III, I, 4 |  |
| \_\_\_\_\_\_\_\_\_\_\_\_ | **7** | **Science and Society**1. Describe how human activities have affected ozone in the upper atmosphere and how it affects health and the environment.
2. Describe how scientific knowledge helps decision makers with local, national, and global challenges (e.g., Waste Isolation Pilot Project [WIPP], mining, drought, population growth, alternative energy, climate change).
3. Describe major historical changes in scientific perspectives (e.g., atomic theory, germs, cosmology, relativity, plate tectonics, evolution) and the experimental observations that triggered them.
4. Know that societal factors can promote or constrain scientific discovery (e.g., government funding, laws and regulations about human cloning and genetically modified organisms, gender and ethnic bias, AIDS research, alternative-energy research).
5. Describe how environmental, economic, and political interests impact resource management and use in New Mexico.
 | III, I, I, 7III, I, I, 9III, I, I, 10III, I, I, 11III, I, I, 13 |  |

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| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **8** | **Science and Individuals**1. Describe New Mexico’s role in nuclear science (e.g., Manhattan Project, WIPP, national laboratories).
2. Identify how science has produced knowledge that is relevant to individual health and material prosperity.
3. Understand that reasonable people may disagree about some issues that are of interest to both science and religion (e.g., the origin of life on Earth, the cause of the Big Bang, the future of Earth).
4. Identify important questions that science cannot answer (e.g., questions that are beyond today’s science, decisions that science can only help to make, questions that are inherently outside the realm of science).
5. Understand that scientists have characteristics in common with other individuals (e.g., employment and career needs, curiosity, desire to perform public service, greed, preconceptions and biases, temptation to be unethical, core values, including honesty and openness).
6. Know that science plays a role in many different kinds of careers and activities (e.g., public service, volunteers, public office holders, researchers, teachers, doctors, nurses, technicians, farmers, ranchers).
 | III, I, I, 14III, I, I, 15III, I, I, 16III, I, I, 17III, I, I, 18III, I, I, 19 |  |

**AMG Curriculum (SCI 333/ 334)**

(1st 9 weeks- 1st 4 ½ weeks)

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| --- | --- | --- | --- | --- |
| **Date** | **Unit** | Hobbs Science Standards11th- 12th Grade | **NM Standards & Benchmarks** | **Resources**Basic text is Tarbuck Earth Science (2006) |
|  |  | **Students will be able to:** | Strand, Standards, Benchmarks, & Performance Standards | Supplemental books, labs, videos, projects, digital curriculum |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **9** | **Introduction to Earth Science: Astronomy, Meteorology, Geology**1. Characteristics and evolution of Earth
	* Describe the characteristics and evolution of Earth in terms of the geosphere, the hydrosphere, the atmosphere, and the biosphere.
	* Understand that Earth is a dynamic system
	* Identify processes which could cause slow and rapid changes within the geosphere, the hydrosphere, the atmosphere, and the biosphere
2. Importance of observation
* Describe different techniques for making observations in different elements of the universe.
* Describe the types of information which can be gained from making observations in the universe.
1. Measuring mass, volume, density
* Define and differentiate mass, volume, and density.
* Use different instruments to correctly measure mass, volume, and density of different objects.
* Be able to convert among metric measurements (e.g., millimeters to meters, kilograms to grams)
* Predict mass, volume, and density based on previous observations and measurements.
1. Models (physical, conceptual, or mathematical)
* Understand that scientists use models (physical, conceptual, or mathematical representations of real phenomena that are difficult to observe directly) to explain and predict the behavior of real objects or systems used in a variety of scientific disciplines
1. Map types
* Describe the different types of maps and their specialized uses (e.g., Mercator, thematic, topographic, geologic)
* Use different maps to locate specific sites/information associated with those maps.
1. Map symbols
* Identify the primary symbols used with different types of maps and explain their meanings.
1. Using and reading topographic maps
	* Use a topographic map to identify the characteristics of a given area.
 | II, III, II, 1I, I, II, 2I, I, I, 1I, I, I, 4I, I, III, 2I, I, III, 2I, I, III, 2I, I, III, 2 |  |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **10** | **Earth in Space**1. Historical development of theories about Earth’s place in the universe
* Explain the scientific theories of Aristotle and Ptolemy about the solar system.
* Explain the scientific investigations of Galileo, Copernicus, Brahe, Kepler, and Newton as they apply to the solar system.
1. Earth models and solar system models:
* Describe models of the Earth.
* Describe models of the solar system.
* Design methods for testing the accuracy of Earth and solar system models.
* Describe the role of the sun in models of the Earth and sun.
* Describe the role of gravity in models of the Earth and sun.
* Describe the fallacies of models of the Earth and the solar system which are no longer held accurate.
1. Eratosthenes and Earth’s circumference
* Explain Eratosthenes’ method for calculating the circumference of the Earth.
1. Newton’s Laws of Motion
* Describe each of Newton’s laws of motion.
* Explain how each of Newton’s laws is applied to the planetary properties of the Earth.
1. Earth’s motion
* Describe the movements of the Earth (rotation, revolution, precession).
* Explain how the movements of the Earth are affected by physical laws.
* Predict the impact on Earth’s movement of changes in the solar system.
 | II, III, I, 3II, III, I, 3II, I, III, 3II, I, III, 7II, I, III, 8II, I, III, 7II, I, III, 8 | **APEX**Core Earth Science Sem. 1- Units 2 |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **11** | **Luna: the Moon of Earth**1. General properties and geology of Earth’s moon, Luna.
* Describe the general properties of the moon.
* Describe the geological characteristics of the moon.
1. Hypotheses of the moon’s origin and history
* Describe the major theories of the origin of the moon.
* Provide evidence which supports and invalidates theories of the origin of the moon.
* Hypothesize events which could have led to the visible geologic formations on the moon.
* Describe information gathered from the analysis of moon rocks.
* Describe how the analysis of moon rocks validates theories on the origin and history of the moon.
1. Measuring the distance to the Earth
* Using accepted methodologies, calculate the distance from the Earth to the moon.
1. Moon, sun, and tides: the effects of the moon and sun on Earth’s oceans.
* Describe the gravitational fields of the sun, the Earth, and the moon.
* Explain the effect of the gravitational pull of the moon and the sun upon the oceans of Earth.
1. Phases of the moon
* Describe the different appearances of the moon as seen from the Earth.
* Explain how the moon is seen in different phases from the Earth.
1. Lunar and solar eclipses
* Define lunar and solar eclipses.
* Explain how lunar and solar eclipses occur.
 | II, III, I, 1II, III, I, 1II, III, I, 3II, III, I, 3II, III, I, 2II, III, I, 2II, III, I, 2 | **APEX**Core Earth Science Sem. 1- Unit 2 |

**AMG Curriculum (SCI 333/ 334)**

(1st 9 weeks-2nd 4 ½ weeks)

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| --- | --- | --- | --- | --- |
| **Date** | **Unit** | Hobbs Science Standards11th- 12th Grade | **NM Standards & Benchmarks** | **Resources**Basic text is Tarbuck Earth Science (2006) |
|  |  | **Students will be able to:** | Strand, Standards, Benchmarks, & Performance Standards | Supplemental books, labs, videos, projects, digital curriculum |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **12** | **The Solar System**1. Measurement of planetary sizes and distances
* Define typical units of astronomical measurement.
* Use earth radii to determine the scaled sizes of the planets of the solar system.
* Use astronomical units (AU) to determine the distances between planets of the solar system.
1. Theories of solar system formation
* Describe the major theories on the formation of the solar system.
* Correlate the major theories on the formation of the solar system with the formation and origin of the universe.
1. Planetary characteristics and motions
* Describe the characteristics and appearances of the individual planets of the solar system and their major moons.
* Hypothesize the composition of the planets of the solar system and their major moons based on observable data.
* Describe the motions and movements of the planets of the solar system.
* Differentiate the motions and movements of the planets from that of Earth.
1. Asteroids and their hypothetical formation
* Define an asteroid.
* Describe the major theories which explain the formation of asteroids.
* Describe the location of the asteroid belt and explain the significance of its location.
1. Outer solar system
	* Describe the location, major bodies of, and composition of the Kuiper Belt.
	* Describe the location and composition of the Oort Cloud.
2. Comets and meteors
* Differentiate comets and meteors.
* Describe the structure and composition of meteors and comets.
* Define the period of a comet.
* Explain the origins of comets and meteors.
1. Satellites, manned and robotic missions, and space probes
* Describe human efforts to explore the solar system and closer reaches of the universe.
 | II, III, I, 1II, III, I, 1II, III, I, 1II, III, I, 1II, III, I, 1II, III, I, 1II, III, I, 1II, III, I, 3 | **APEX**Core Earth Science Sem. 1- Unit 2 |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **13** | **The Stars**1. The sun: size, structure, and characteristics
* Describe the sun in terms of its size, structure, and characteristics.
* Describe the chemical composition of the sun.
1. Constellations and myths
* Name the major constellations found in the sky and explain their mythological origins.
* Identify the locations of the major constellations during different times of the year.
1. Measuring distances to the stars
* Describe methods for measurement of interstellar distances.
1. Magnitudes and luminosities
* Describe the use of magnitude to classify and identify stars.
* Describe the use of luminosity to classify and identify stars.
* Correlate information about magnitude and luminosity with hypotheses about star composition.
1. Electromagnetic Spectrum
* Explain the diffraction of light energy into the electromagnetic spectrum.
* Describe the use of the electromagnetic spectrum to determine characteristics of stars.
1. Star composition analysis: spectra
* Describe how analysis of light emitted from stars can be used to determine the composition of stars.
* Differentiate between emission and absorption spectra by explaining their use to determine the composition of stars.
1. Life cycles of stars
* Describe how stars are powered by nuclear fusion and how stellar processes create heavier, stable elements that are found throughout the universe
* Describe the life cycles of stars of different masses.
* Explain how light emission and color can be used to determine the stage of star’s life cycle.
1. Pulsars
* Define a pulsar.
* Describe the origins of pulsars.
* Describe methods for observing and quantifying pulsars.
1. Telescope astronomy
* Describe the different types of telescopes and explain their different uses (e.g., refractor, reflector, radio, x-ray)
* Using images obtained by different telescopes, describe the type of telescope from which it was obtained.
* Examine the role that New Mexico’s Very Large Array research facility plays in current space exploration
 | II, III, I, 5II, III, I, 6II, III, I, 1II, III, I, 3II, III, I, 3II, I, II, 7-8II, III, I, 5II, III, I, 6II, I, II, 7-8II, III, I, 5II, III, I, 6II, III, I, 5II, III, I, 6II, III, II, 5II, III, II, 6II, III, I, 3II, III, I, 7 | **APEX**Core Earth Science Sem. 1- Unit 2 |

**AMG Curriculum (SCI 333/ 334)**

 (2nd 9 weeks- 3rd 4 ½ weeks)

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| --- | --- | --- | --- | --- |
| **Date** | **Unit** | Hobbs Science Standards11th- 12th Grade | **NM Standards & Benchmarks** | **Resources**Basic text is Tarbuck Earth Science (2006) |
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| \_\_\_\_\_\_ | **14** | **Galaxies**1. Milky Way galaxy
* Define a galaxy.
* Describe the Milky Way galaxy and locate its relative position within the universe.
* Locate the solar system within the Milky Way galaxy.
1. Other galaxies
* Describe the types and characteristics of galaxies
* Describe methods for measuring the size of galaxies and distances between galaxies.
 | II, III, I, 1II, III, I, 3II, III, I, 1II, III, I, 3 | **APEX**Core Earth Science Sem. 1- Unit 2 |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **15** | **Cosmology: Universe**1. Scope and components of the universe
* Describe historical and contemporary models of the universe.
* Explain the origins of historical and contemporary models of the universe.
* Describe the scope of the universe.
* Name the components of the universe.
* Describe the inter-relatedness of the components of the universe.
* Describe methods for measurement of the scope of the universe.
1. Cosmological principle and universe origin
* Define the cosmological principle.
* Describe the major theories of the origin of the universe.
* Explain the rationale behind each of the theories of the origin of the universe.
* Describe the key observations that led to the acceptance of the Big Bang theory.
1. Quasars
* Define a quasar.
* Describe the origins of quasars.
* Describe methods for observing and quantifying quasars.
* Describe the impact of quasars on other galactic bodies.
1. Measuring motions of deep space objects
* Identify several deep space objects.
* Describe methods for measuring the motion of deep space objects.
1. Theory of expanding universe
* Describe the theory of an expanding universe.
* Explain methods for measuring the expansion of the universe.
* Describe the movement and motion of objects within an expanding universe.
1. General relativity and gravity
* Define general relativity and explain its importance in understanding the origin and expansion of the universe.
* Explain the effect of gravity on spacetime and the expansion of the universe.
 | II, III, I, 1II, III, I, 3II, III, I, 3II, III, I, 4II, III, I, 3II, III, I, 5II, III, I, 3II, III, I, 3II, III, I, 3 |  |

**AMG Curriculum (SCI 333/ 334)**

 (2nd 9 weeks- 4th 4 ½ weeks)

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| --- | --- | --- | --- | --- |
| **Date** | **Unit** | Hobbs Science Standards11th- 12th Grade | **NM Standards & Benchmarks** | **Resources**Basic text is Tarbuck Earth Science (2006) |
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|  | **16** | **Geology: Earth’s Structure**1. Earth’s structure
* Define the geosphere
* Describe Earth’s layers by their chemical properties (e.g., core, mantle, and crust of the Earth)
* Describe Earth’s layers by their physical properties (e.g., lithosphere, asthenosphere/upper mantle, lower mantle, outer core, inner core)
* Describe the inter-relatedness of the components of the geosphere.
 | II, III, II, 3 | **APEX**Core Earth Science Sem. 2- Unit 1 |
| \_\_\_\_\_\_ | **17** | **Geology: Plate Tectonics, Earthquakes, Volcanoes**1. Continental drift and plate tectonics
* Define continental drift and the historical development of the theory.
* Describe the development of and evidence to support the theory of plate tectonics (e.g., paleomagnetism)
* Define the theory of plate tectonics
* Explain the inter-relatedness of continental drift and plate tectonics.
* Describe and explain the three types of plate boundaries
* Describe and explain geological manifestations that occur at plate boundaries (e.g., earthquakes, volcanoes, mountain building)
* Describe the impact of plate motions on societies and the environment (e.g., earthquakes and volcanoes)
 | II, III, II, 5II, III, II, 7 | **APEX**Core Earth Science Sem. 2- Unit 1 |

**AMG Curriculum (SCI 333/ 334)**

(3rd 9 weeks- 5th 4 ½ weeks)

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| **Date** | **Unit** | Hobbs Science Standards11th- 12th Grade | **NM Standards & Benchmarks** | **Resources**Basic text is Tarbuck Earth Science (2006) |
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| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **18** | **Components of the Lithosphere/Geosphere**1. Elements, atoms, compounds, and mixtures
* Define: atoms, elements, compounds, mixtures
* Give an example of each of the states of matter.
1. Minerals
* Define a mineral.
* Define and give examples of the major mineral groups.
* Describe common minerals and their properties and uses.
1. Rocks
* Describe the rock cycle.
* Define and describe the major rock types (e.g., sedimentary, igneous, metamorphic).
* Describe the formation of the major rock types
* Describe methods for classifying rocks.
* Describe the chemical composition of different types of rocks.
1. Soils
* Describe the major soil types.
* Describe the formation and chemical composition of different soil types.
 | II, I, I, 1II, I, I, 7II, III, II, 10II, III, II, 9II, III, II, 10II, III, II, 10 | **APEX**Core Earth Science Sem. 2- Units 1 & 3 |

**AMG Curriculum (SCI 333/ 334)**

(3rd 9 weeks- 6th 4 ½ weeks)

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| --- | --- | --- | --- | --- |
| **Date** | **Unit** | **Hobbs Science Standards****11th- 12th Grade** | **NM Standards & Benchmark**s | **Resources**Basic text is Tarbuck Earth Science (2006) |
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| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **19** | **Geologic Time**1. Divisions and characteristics of time spans
* Describe the division of geologic time into segments according to common characteristics and events.
* Name and explain the division of geologic time into segments.
* Describe the significant biotic and abiotic events of each segment of geologic time.
1. Radiometric dating
* Define and explain the characteristics of isotopes.
* Define half-life of unstable isotopes.
* Describe the use of isotopes found in geologic formations and different rocks to determine geologic age.
1. Relative dating
* Define relative dating.
* Differentiate relative and radiometric dating.
* Describe how the sequence of the Grand Canyon’s strata characterizes the geologic time scale.
1. Paleontology
* Define paleontology.
* Describe the use of paleontology to determine the age of rocks.
* Describe the use of paleontology to hypothesize climatic changes and geological changes.
* Define a fossil.
* Describe the formation of fossils.
* Describe the distinctive fossils of the geological eras and periods.
* Describe the paleo fauna and flora of the major collecting areas of New Mexico.
 | II, III, I, 1II, III, II, 4II, III, II, 2II, III, II, 4II, III, II, 2II, III, II, 4II, III, II, 4 | **APEX**Core Earth Science Sem. 2- Unit 4PHET “Radioactive Dating Lab” |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **20** | **Water in the Environment**1. Fresh water sources: surface and below ground
* Differentiate fresh and marine water.
* Describe sources of surface fresh water.
* Describe sources of below ground fresh water (e.g., aquifers).
* Describe the availability of ground and surface water in Lea County.
* Describe the impact of environmental change on the quality of surface and ground fresh water.
1. Structure and properties of water
* Describe the structure of a water molecule.
* Describe the properties of water molecules which result from hydrogen bonding.
1. Infiltration processes and capillary water
* Define the process of infiltration.
* Define capillary water.
* Describe the formation of capillary water through infiltration.
1. Soil particle size and water movement
* Explain how soil is formed into different sized particles.
* Describe how particle size impacts the rate of water movement.
1. Runoff, rates of replenishment, ground recharge
* Define runoff, precipitation intensity, and ground recharge.
* Describe factors which impact rates of runoff, rates of replenishment, and quality of ground recharge.
1. Evaporation and transpiration rates
* Define evaporation and transpiration.
* Describe factors which affect the rate of water movement from surface water and plants.
* Describe the impact of changes in environmental conditions which increase or decrease rates of evaporation and transpiration.
1. Flood forecasts
* Describe the methods currently used to forecast floods.
* Hypothesize environmental and climatic conditions and changes which would result in floods.
* Design long-term and short-term strategies to limit the effect or control flooding.

8. Correlate the variety of industries in Lea County with their need for water. | II, III, II, 9II, III, II, 12II, I, I, 2II, I, I, 9II, III, II, 9II, III, II, 12II, III, II, 12II, III, II, 12II, III, II, 9II, III, II, 12I, III, II, 6II, III, II, 12 | **APEX**Core Earth Science Sem. 1- Unit 3 |

**AMG Curriculum (SCI 333/ 334)**

 (4th 9 weeks- 7th 4 ½ weeks)

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| --- | --- | --- | --- | --- |
| **Date** | **Unit** | Hobbs Science Standards11th- 12th Grade | NM Standards & Benchmarks | **Resources**Basic text is Tarbuck Earth Science (2006) |
|  |  | **Students will be able to:** | Strand, Standards, Benchmarks, & Performance Standards | Supplemental books, labs, videos, projects, digital curriculum |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **21** | **Energy in the Atmosphere**1. Composition of the atmosphere
* Define the atmosphere in terms of its composition.
* Describe human influence on atmospheric composition.
1. Height and structure of the atmosphere
* Describe characteristics of troposphere, stratosphere, mesosphere, thermosphere, and exosphere.
1. Describe how human activities have affected ozone in the upper atmosphere and how it affects health and the environment.
2. Forms of energy
* Differentiate potential, kinetic, thermal, and radiant energy.
* Explain the sources and roles of potential, kinetic, thermal, and radiant energy in the atmosphere.
1. Mechanisms of heat (thermal energy) transfer
* Describe three mechanisms of heat (thermal energy) transfer.
* Explain the factors which favor one mechanism of energy transfer in the atmosphere over another.
1. Solar insolation
* Define solar insolation.
* Describe the measurement of absorption of solar radiation.
* Describe mechanisms and factors which impact rates of solar insolation.
* Describe the effects of increased or decreased solar insolation.
* Describe factors that exert a strong influence on temperatures at Earth’s surface (temperature controls).
1. Interpreting isothermal maps
* Define isothermal maps and explain their use.
* Use isothermal maps to interpret changes in weather and climate.
* Differentiate weather and climate conditions using two or more different isothermal maps.
	1. Greenhouse effect
		+ Explain the greenhouse effect and its role in warming Earth’s lower atmosphere and surface
 | II, III, II, 1II, III, II, 1II, III, II, 11III, I, I, 7II, I, II, 1II, III, II, 6II, I, II, 4II, III, II, 8II, III, II, 8II, III, II, 8II, III, II, 8 | **APEX**Core Earth Science Sem. 1- Units 3,4&5 |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **22** | **Water in the Atmosphere**1. Hydrologic cycle
* Explain the importance of water.
* Describe the steps in the cycling of water through the atmosphere and the terrain.
* Describe the factors which impact the cycling of water.
1. Factors affecting evaporation
* Define evaporation.
* Define evaporation as a component of the hydrologic cycle.
* Name sources of evaporative water.
* Describe factors which influence rates of evaporation.
* Develop strategies for limiting and promoting evaporation.
1. The changing physical states of water
* Describe the structure of a water molecule.
* Describe the different physical states of water.
* Explain how atmospheric processes are affected by energy released or absorbed during phase changes of water.
1. Dew point and relative humidity
* Define dew point.
* Define relative humidity.
* Correlate dew point, relative humidity, and environmental temperature.
* Describe the impact of a changing relative humidity or temperature on dew point.
* Describe the effect of changes in environment on dew point and relative humidity.
1. Adiabatic lapse rates
* Define adiabatic lapse.
* Describe factors which could alter rates of adiabatic lapse.
* Describe methods of measuring adiabatic lapse.
	1. Cloud formation and cloud types
* Describe the process of cloud formation.
* Explain the role of clouds and cloud formation in the hydrologic cycle.
* Describe the environmental conditions which cause the formation of clouds.
* Differentiate cloud types based on appearance.
	1. Precipitation types
* Define precipitation as a component of the hydrologic cycle.
* Differentiate types of precipitation.
* Describe the environmental conditions which favor different types of precipitation.
 | II, III, II, 1II, III, II, 8II, III, II, 9II, III, II, 12II, III, II, 8II, I, I, 2II, I, I, 4II, III, II, 8II, III, II, 8II, III, II, 8II, III, II, 9II, III, II, 8II, III, II, 9 | **APEX**Core Earth Science Sem. 1- Units 3 & 5 |

**AMG Curriculum (SCI 333/ 334)**

(4th 9 weeks- 8th 4 ½ weeks)

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| **Date** | **Unit** | Hobbs Science Standards11th- 12th Grade | **NM Standards & Benchmarks** | **Resources**Basic text is Tarbuck Earth Science (2006) |
|  |  | **Students will be able to:** | Strand, Standards, Benchmarks, & Performance Standards | Supplemental books, labs, videos, projects, digital curriculum |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **23** | **Weather**1. Winds and Wind Patterns
* Describe factors that govern winds
* Define the Coriolis effect and its influence on global wind patterns
* Describe global wind patterns (trade winds, westerlies, polar easterlies)
* Describe jet streams.
* Describe seasonal changes in wind patterns (e.g., monsoons)
* Describe local winds patterns (e.g., sea/land breezes, mountain/valley breezes)
* Describe how wind is measured (speed, direction)
1. High and low pressure cells
* Define high and low pressure cells.
* Describe wind circulation into and out of high and low pressure cells.
* Describe the environmental conditions which lead to the formation of high and low pressure cells.
1. Air masses: formation, general movement, and fronts
* Explain the factors which cause the formation of air masses.
* Describe air masses by their regions of formation and properties.
* Describe the movement of air masses
* Define an atmospheric front
* Describe types and characteristics of atmospheric fronts
1. Reading weather maps
* Use scales and charts to read weather maps.
* Identify different weather conditions using weather maps from different sources.
* Construct a weather map from available data.
1. Storms: thunderstorms, tornadoes, hurricanes
* Differentiate thunderstorms, tornadoes, and hurricanes.
* Describe the atmospheric and environmental conditions which cause tornadoes, hurricanes and thunderstorms.
* Predict the occurrence of different storm systems based on knowledge of their environmental causes.
 | II, III, II, 8II, III, II, 8II, III, II, 8I, I, III, 2II, III, II, 8 | **APEX**Core Earth Science Sem. 1- Unit 5 |
| \_\_\_\_\_\_­­­­­\_\_\_\_\_\_ | **24** | **Climate: Regions and Variability**1. Climatic regions, their characteristics and locations
* Differentiate each of the climatic regions.
* Describe the characteristic weather and climatic changes in each climatic region.
* Explain the impact of environmental change on climatic regions and their characteristics.
1. Climate variability
* Describe the characteristics and locations of El Niño and La Niña climate cycles
* Describe how El Niño and La Niña episodes affect human economies and health.
* Describe natural causes of climate variability (e.g., Milankovich cycles, volcanoes)
* Describe human impacts on climate
1. Global warming
* Define global warming
* Describe projected effects of global warming in New Mexico and worldwide (e.g., drought, wildfires, rise in ocean levels, melting of permafrost)
 | II, III, II, 8II, III, II, 8II, III, II, 8 | **APEX**Core Earth Science Sem. 1- Unit 5 |