**Advanced AMG Curriculum (SCI 335/ 336)**

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| **Date** |  | Hobbs Science Standards11th- 12th Grade | **NM Standards & Benchmarks** | **Resources**Basic text is Tarbuck Earth Science |
|  |  | **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 |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **1** | **Reading Standards for Literacy**I. Key Ideas and Details A. Cite specific textual evidence to support analysis of science and technical  texts, attending to important distinctions the author makes and to any gaps  or inconsistencies in the account. B. Determine the central ideas or conclusions of a text; summarize complex  concepts, processes, or information presented in a text by paraphrasing them  in simpler but still accurate terms. C. Follow precisely a multistep procedure when carrying out experiments,  taking measurements, or performing technical tasks; analyze the specific  results based on explanations in the text.II. Craft and Structure A. Determine the meaning of symbols, key terms, and other domain-specific  words and phrases as they are used in a specific scientific or technical  context relevant to grades 11-12 texts and topics. B. Analyze how the text structures information or ideas into categories or  hierarchies, demonstrating understand on the information or ideas. C. Analyze the author’s purpose in providing an explanation, describing a  procedure, or discussing an experiment in a text; identifying important  issues that remain unresolved.III. Integration of Knowledge and Ideas A. Integrate and evaluate multiple sources of information presented in diverse  formats and media (e.g., quantitative data, video, multimedia) in order to  address a question or solve a problem. B. Evaluate the hypotheses, data, analysis, and conclusions in a science or  technical text, verifying the data when possible and corroborating or  challenging conclusions with other sources of information. C. Synthesize information from a range of sources (e.g., texts, experiments,  simulations) into a coherent understanding of a process, phenomenon, or  concept, resolving conflicting information when possible.IV. Range of Reading and Level of Text Complexity A. By the end of grade 12, read and comprehend science/technical texts in the  grades 11- CCR text complexity band independently and proficiently. |  |  |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **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** | 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** | 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** | 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 |  |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **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 |  |

**Advanced AMG Curriculum (SCI 335/ 336)**

(1st 9 weeks- 1st 4 ½ weeks)

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| **Date** |  | Hobbs Science Standards11th- 12th Grade | **NM Standards & Benchmarks** | **Resources**Basic text is Tarbuck Earth Science |
|  |  | **Students will be able to:** | Strand, Standards, Benchmarks, & Performance Standards | Supplemental books, labs, videos, projects, digital curriculum |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **9** | **Introduction to the Cosmos**1. Change: naturally and intentionally caused
* Define change as it applies to the cosmos.
* Describe the nature of spontaneous or naturally occurring changes in the cosmos.
* Explain the effects of naturally occurring change within the cosmos.
* Describe sources of intentionally caused change within the cosmos.
* Explain the effects of intentionally occurring changes within the cosmos.
1. Importance of observation
* Describe different techniques for making observations in different elements of the cosmos.
* Describe the types of information which can be gained from making observations in the cosmos.
* Use data from different sources to draw conclusions based on cosmic observations.
* Determine if conclusions based on cosmic observations reflect natural or intentional change.
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.
* Predict mass, volume, and density based on previous observations and measurements.
1. Forces causing change: rapid and slow change
* Identify forces which could cause rapid change within the cosmos.
* Identify forces which could cause slow change in the cosmos.
* Give examples of rapid and slow change in the cosmos.
* Predict the impact of rapid and slow change in the cosmos.
1. Models
* Describe historical and contemporary models of the cosmos.
* Explain the origins of historical and contemporary models of the cosmos.
* Describe the development/evolution of cosmic models.
1. Predictability
* Describe the elements of the cosmos which are predictable.
* Define the cosmos as a predictable entity.
* Identify elements or events of the cosmos which have been unpredictable.
 | I, I, I, 5I, I, II, 2I, I, I, 1I, I, I, 5I, I, I, 5I, I, I, 5 |  |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **10** | **Energy and the Water Cycle**1. Composition of the atmosphere
* Define the atmosphere in terms of its composition.
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. 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.
* Describe the transition of cloud types caused by changes in environmental conditions.
1. Potential and kinetic energy
* Differentiate potential and kinetic energy.
* Explain the sources/uses of potential and kinetic energy.
* Describe the roles of potential and kinetic energy in the environment.
* Describe the roles of potential and kinetic energy in the cycling of water.
1. Three methods of energy production
* Describe three methods of energy formation.
* Explain the factors which favor one method of energy formation over another.
* Describe the advantages and disadvantages of each method of energy formation.
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 properties of water molecules which result from hydrogen bonding.
* Describe the different physical states of water.
* Explain the factors which cause changes in the physical state of water.
* Describe the impact on the environment of the physical 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.
 | II, III, II, 1II, III, II, 1II, III, II, 9II, III, II, 8II, III, II, 8II, III, II, 12II, I, I, 2II, I, I, 4II, III, II, 12 | **APEX**Core Earth Science Sem. 1- Units 3,4&5Honors Earth Science Sem. 1- Units 3,4&5 |

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(1st 9 weeks- 2nd 4 ½ weeks)

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| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **11** | **Energy and the Water Cycle**1. Adiabatic lapse rates
* Define adiabatic lapse.
* Describe factors which could alter rates of adiabatic lapse.
* Describe methods of measuring adiabatic lapse.
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.
* Describe the impact of precipitation on associated environmental factors.
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.
* Develop strategies for increasing or decreasing rates of solar insolation.
 | II, III, II, 12II, III, II, 8II, III, II, 8 | **APEX**Core Earth Science Sem. 1- Units 3 & 5Honors Earth Science Sem. 1- Units 3& 5 |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **12** | **Weather and Climate**1. Interpreting isothermal maps
* Define isothermal maps and explain their use.
* Use isothermal maps to interpret changes in weather and climate.
* Construct an isothermal map using currently available data.
* Differentiate weather and climate conditions using two or more different isothermal maps.
1. Reading weather maps
* Use scales and charts to read weather maps.
* Identify different weather and climate conditions using weather maps from different sources.
* Construct a weather map using currently available data.
1. Coriolis effect on wind patterns
* Define the Coriolis effect.
* Explain the relationship between the Coriolis effect and wind patterns.
* Predict wind patterns based on knowledge of the Coriolis effect.
1. High and low pressure cells, fronts
* Define high and low pressure cells.
* Define an atmospheric front.
* Describe the environmental conditions which lead to the formation of high and low pressure cells and fronts.
* Predict the formation of high and low pressure cells and fronts using historic atmospheric data.
 | II, III, II, 8I, I, III, 2II, III, II, 8II, III, II, 8 | **APEX**Core Earth Science Sem. 1- Unit 5Honors Earth Science Sem. 1- Unit 5 |

**Advanced AMG Curriculum (SCI 335/ 336)**

(2nd 9 weeks- 3rd 4 ½ weeks)

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| \_\_\_\_\_\_\_\_\_\_\_\_ | **13** | **Weather and Climate**1. Storms: tornados, hurricanes, thunderstorms
* Differentiate tornados, hurricanes and thunderstorms.
* Describe the atmospheric and environmental conditions which cause tornados, hurricanes and thunderstorms.
* Predict the occurrence of different storm systems based on knowledge of their environmental causes.
1. Regions of air mass formation, general movement
* Describe the formation of regions of air mass.
* Explain the factors which cause the formation of air masses.
* Describe the movement of air masses.
* Explain the factors which cause the movement of air masses.
1. Climatic regions, their characteristics and locations in North America
* Differentiate each of the climatic regions of North America.
* Describe the characteristic weather and climatic changes in each climatic region of North America.
* Explain the impact of environmental change on climatic regions and their characteristics.
 | II, III, II, 8II, III, II, 8II, III, II, 8 | **APEX**Core Earth Science Sem. 1- Unit 5Honors Earth Science Sem. 1- Unit 5 |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **14** | **Water and Climate**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.
* Describe the impact of environmental change on the quality of surface and ground fresh water.
1. Infiltration processes, capillary water,
* Define the process of infiltration.
* Define capillary water.
* Describe the formation of capillary water through infiltration.
* Describe factors which affect the rate and quality of capillary water formation.
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.
* Design a system which would permit different rates of water movement based on particle size.
* Describe factors, other than particle size, which could impact rates of water movement.
1. Runoff, precipitation, intensity, ground recharge
* Define runoff.
* Define precipitation intensity.
* Define ground recharge.
* Describe factors which impact rates of runoff, degrees of precipitation intensity, and quality of ground recharge.
1. Evaporation and transpiration rates
* Define evaporation.
* Define 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. Water budget graphs, water shortages, excesses
* Explain the use of water budget graphs to demonstrate water shortages and excesses.
* Design water budget graphs which demonstrate water shortages and water excesses.
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.
 | II, III, II, 9II, III, II, 12II, III, II, 9II, III, II, 12II, III, II, 12II, III, II, 12II, III, II, 9II, III, II, 12I, I, III, 2II, III, II, 6 | **APEX**Core Earth Science Sem. 1- Unit 3Honors Earth Science Sem. 1- Unit 3 |

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(2nd 9 weeks- 4th 4 ½ weeks)

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| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **15** | **Earth in Space**1. Testing of 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.
* Predict the impact of major environmental or galactic factors on models of the Earth and solar system.
1. Eratosthenes and Earth’s circumference
* Explain Eratosthenes’ method for calculating the circumference of the Earth.
* Use Eratosthenes’ method for calculating the circumference of another planet given proper data.
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.
* 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 which affect physical laws.
 | II, III, I, 3II, III, I, 3II, I, III, 7II, I, III, 8II, I, III, 7II, I, III, 8 |  |
| \_\_\_\_\_\_\_\_\_\_\_\_ | **16** | **Galaxies and Universe**1. Scope and components 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. Principle of universality and universe origin
* Define the principle of universality.
* Describe the major theories on the origin of the universe.
* Explain the rationale behind each of the theories on the origin of the universe.
1. Milky Way galaxy and other galaxies
* 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.
* Describe methods for measuring the size of galaxies and distances between galaxies.
 | II, III, I, 1II, III, I, 3II, III, I, 3II, III, I, 1II, III, I, 3 | **APEX**Core Earth Science Sem. 1- Unit 2Honors Earth Science Sem. 1- Unit 2 |

**Advanced AMG Curriculum (SCI 335/ 336)**

(3rd 9 weeks- 5th 4 ½ weeks)

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| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **17** | **Galaxies and Universe**1. Pulsars and quasars
* Define a pulsar.
* Define a quasar.
* Describe the origins for pulsars and quasars.
* Describe methods for observing and quantifying pulsars and quasars.
* Describe the impact of pulsars and 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. Relativity, space time tubes, gravity
* Define relativity and explain its importance in understanding the origin and expansion of the universe.
* Describe a space time tube and explain its role within the universe.
* Explain the effect of gravity on the expansion of the universe.
1. Plausibility of UFO’s
* Explain theories which would validate the existence of UFO’s.
* Explain theories which would deny the existence of UFO’s .
* Describe scientific viewpoints regarding UFO’s.
 | II, III, I, 1II, III, I, 3II, III, I, 3II, III, I, 3II, III, I, 3 | **APEX**Core Earth Science Sem. 1- Unit 2Honors Earth Science Sem. 1- Unit 2 |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **18** | **The Moon of Earth**1. General properties and geology of the moon
* 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 on the origin of the moon.
* Provide evidence which supports and invalidates theories on 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. Sun, moon and tides: their effects on the moon
* Describe the gravitational fields of the sun and moon.
* Explain the effect of gravitational pull on the oceans of the 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.
* Design a model using the sun, Earth and moon which explains the phases of the moon as seen from the Earth.
1. Lunar and solar eclipses
* Define an eclipse.
* 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 2Honors Earth Science Sem. 1- Unit 2 |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **19** | **The Solar System**1. Astronomical units: measurement of planetary sizes and distances
* Define typical units of astronomical measurement.
* Use astronomical units to determine the sizes of the planets of the solar system.
* Use astronomical units to determine the distances between planets of the solar system.
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. Planetary characteristics and motions
* Describe the characteristics and appearances of the individual planets of the solar system.
* Hypothesize the composition of the planets of the solar system 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. Importance of the work of Brahe and Kepler
* Explain the scientific investigations of Brahe as they apply to the solar system.
* Explain the scientific investigations of Kepler as they apply to the solar system.
* Describe alternate theories to the work of Brahe and Kepler and why they are invalid.
1. Comets and meteors
* Differentiate comets and meteors.
* Explain the origins of comets and meteors.
* Describe the structure and composition of meteors and comets.
* Define the period of a comet.
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. Satellites, manual 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 2Honors Earth Science Sem. 1- Unit 2 |

**Advanced AMG Curriculum (SCI 335/ 336)**

(3rd 9 weeks- 6th 4 ½ weeks)

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| **Date** |  | Hobbs Science Standards11th- 12th Grade | **NM Standards & Benchmarks** | **Resources**Basic text is Tarbuck Earth Science |
|  |  | **Students will be able to:** | Strand, Standards, Benchmarks, & Performance Standards | Supplemental books, labs, videos, projects, digital curriculum |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **20** | **The Stars**1. The sun: size and characteristics
* Describe the sun in terms of its size 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: spectrograms
* Describe how analysis of light emitted from stars can be used to determine the composition of stars.
* Differentiate between bright line and dark line spectrograms by explaining their use to determine the composition of stars.
1. Life cycles of stars
* Describe the life cycles of stars.
* Explain how light emission and color can be used to determine the stage of star’s life cycle.
1. Understanding celestial sphere
* Explain the inter-relatedness of the parts of the universe and solar system.
1. Telescope astronomy
* Describe the different types of telescopes and explain their different uses.
* Using images obtained by different telescopes, describe the type of telescope from which it was obtained.
 | II, III, I, 5II, III, I, 6II, III, I, 1II, III, I, 3II, III, I, 5II, III, I, 6II, III, I, 5II, III, I, 6II, III, I, 5II, III, I, 6II, III, I, 6II, III, I, 1II, III, I, 3 | **APEX**Core Earth Science Sem. 1- Unit 2Honors Earth Science Sem. 1- Unit 2 |

**Advanced AMG Curriculum (SCI 335/ 336)**

(4th 9 weeks- 7th 4 ½ weeks)

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| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **21** | **Motivation and Stimulation**1. New Mexico population
* Describe the population of New Mexico in terms of the different cultures and ethnicities represented.
1. Agriculture in New Mexico
* Describe the primary agricultural industries found in New Mexico.
* Explain how the agricultural industries of New Mexico are impacted by the climate and geology of New Mexico.
1. Lea County and its water resources
* Describe the availability of ground and surface water in Lea County.
* Correlate the variety of industries in Lea County with their need for water.
1. Topography and geology in New Mexico
* Describe the use of topographical studies to define New Mexico.
* Describe the major geological characteristics of different regions of New Mexico.
* Describe the geologic history of New Mexico.
1. Industry in New Mexico: petroleum and natural gas
* Describe the major industries located throughout New Mexico.
* Explain the geologic suitability of New Mexico for petroleum and natural gas supplies.
* Describe procedures used in the location and procurement of petroleum and natural gas.
1. Carlsbad Caverns and Karst regions
* Locate Carlsbad Caverns and the Karst regions of New Mexico.
* Describe the geologic activity which led to the formation of Carlsbad Caverns and the Karst region.
* Describe the impact of environmental variables on Carlsbad Caverns and the Karst region.
 | II, III, II, 9II, III, II, 10II, III, II, 9II, III, II, 12II, III, II, 9II, III, II, 12II, III, II, 10II, III, II, 10 |  |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **22** | **Relationship Between Geology, Meteorology, Hydrology, Ecology, and Oceanography**1. Definitions and examples
* Define each of the scientific disciplines used in studying the elements of the universe.
* Describe at least one scientific principle derived from each of these scientific disciplines.
1. Lithosphere
* Define the lithosphere.
* Describe the structures of the core, mantle, and crust of the Earth.
* Differentiate the components of the lithosphere based on their composition and origin.
* Describe the inter-relatedness of the components of the lithosphere.
1. Continental drift and tectonics
* Define continental drift.
* Describe tectonics.
* Explain the inter-relatedness of continental drift and tectonics.
* Define paleomagnetism and explain its role in defining the characteristics of the Earth.
 | II, III, I, 1II, III, II, 3II, III, II, 5II, III, II, 7 | **APEX**Core Earth Science Sem. 2- Unit 1Honors Earth Science Sem. 2- Unit 1 |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **23** | **Components of the Lithosphere**1. Elements, atoms, compounds, and mixtures
* Define: atoms, elements, compounds, mixtures
* Give an example of each of the stages of matter.
1. Minerals
* Define a geologic mineral.
* Give examples of the major geologic minerals.
* Explain the origins and uses of geologic minerals.
* Identify the major geologic minerals.
1. Rocks
* Describe the significant different types of rock.
* Describe methods for classifying rocks.
* Describe the geologic origins of different types of rocks.
* Describe the chemical composition of different types of rocks.
1. Soil
* Describe the significant types of soil.
* Describe methods for classifying soils.
* Describe the geologic origins of different types of soils.
* Describe the chemical composition of different types of soils.
 | II, I, I, 1II, III, II, 10II, III, II, 10II, III, II, 10 | **APEX**Core Earth Science Sem. 2- Units 1 & 3Honors Earth Science Sem. 2- Units 1 & 3 |

**Advanced AMG Curriculum (SCI 335/ 336)**

(4th 9 weeks- 8th 4 ½ weeks)

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| **Date** |  | Hobbs Science Standards11th- 12th Grade | **NM Standards & Benchmarks** | **Resources**Basic text is Tarbuck Earth Science |
|  |  | **Students will be able to:** | Strand, Standards, Benchmarks, & Performance Standards | Supplemental books, labs, videos, projects, digital curriculum |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **24** | **Geologic Time Scale**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. Radioactive dating
* Explain the characteristics of isotopes.
* Define half-life.
* 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 radioactive dating.
1. The Grand Canyon
* Describe the formation of the Grand Canyon.
* Describe how observation of the Grand Canyon’s strata mirrors 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 a fossil.
* Describe the distinctive fossils of the geological eras and periods.
* Describe the paleo fauna and flora of the major collecting areas of New Mexico.
* Define geomorphology.
* Describe the physiographic system of classification.
* Describe the four major physiographic provinces of New Mexico according to their characteristics and classification.
 | II, III, I, 1II, III, II, 4II, III, II, 2II, III, II, 4II, III, II, 2II, III, II, 4II, III, II, 4II, III, II, 4II, III, II, 6II, III, II, 7 | **APEX**Core Earth Science Sem. 2- Unit 4Honors Earth Science Sem. 2- Unit 4 |
| \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **25** | **Maps and Map Reading**1. Map types
* Describe the different types of maps and their specialized uses.
* Use different maps to locate specific sites 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.
1. Geologic maps
* Differentiate topographic and geologic maps.
* Use a geologic map to identify the characteristics of a given area.
 | I, I, III, 2I, I, III, 2I, I, III, 2I, I, III, 2 |  |