


## Alabama Course of Study: Science Correlation to *PhD Science*™

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 Blue indicates that *PhD Science* covers the standard but in a different grade level.






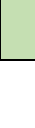
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**Key:** Module (M), Lesson (L)





### *PhD Science* Level 3

The Grade 3 *Alabama Course of Study: Science* is almost entirely covered by the Level 3 *PhD Science* curriculum: Standards 5 and 12 are partially covered but not in the detail specified. A detailed analysis of alignment appears in the table below.

Grade 3 Standards		Aligned <i>PhD Science</i> Lessons
<b>Motion and Stability: Forces and Interactions</b>		
1	Plan and carry out an experiment to determine the effects of balanced and unbalanced forces on the motion of an object using one variable at a time, including number, size, direction, speed, position, friction, or air resistance, and communicate these findings graphically.	 Level 3 M4 L10–L17 Level 3 M4 L28–L30
2	Investigate, measure, and communicate in a graphical format how an observed pattern of motion can be used to predict the future motion of an object.	 Level 3 M4 L1–L9 Level 3 M4 L28–L30
3	Explore objects that can be manipulated in order to determine cause-and-effect relationships of electric interactions between two objects not in contact with one another or magnetic interactions between two objects not in contact with one another.	 Level 3 M4 L18–L21 Level 3 M4 L28–L30
4	Apply scientific ideas about magnets to solve a problem through an engineering design project.	 Level 3 M4 L22–L30
<b>From Molecules to Organisms: Structures and Processes</b>		
5	Obtain and combine information to describe that organisms are classified as living things, rather than nonliving things, based on their ability to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.	 Level 3 M2 L1–L28
6	Create representations to explain the unique and diverse life cycles of organisms other than humans, including commonalities such as birth, growth, reproduction, and death.	 Level 3 M3 L7–L8 Level 3 M3 L23–L28

<b>Heredity: Inheritance and Variation of Traits</b>		
7	Examine data to provide evidence that plants and animals, excluding humans, have traits inherited from parents and that variations of these traits exist in groups of similar organisms.	Level 3 M3 L1–L6 Level 3 M3 L14–L18 Level 3 M3 L26–L28
8	Engage in argument from evidence to justify that traits can be influenced by the environment.	Level 3 M3 L9–L13 Level 3 M3 L19–L20 Level 3 M3 L26–L28
<b>Unity and Diversity</b>		
9	Analyze and interpret data from fossils to provide evidence of organisms and the environments in which they lived long ago.	Level 3 M2 L1–L8 Level 3 M2 L26–L28
10	Investigate how variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.	Level 3 M3 L21–L28
11	Construct an argument from evidence to explain the likelihood of an organism’s ability to survive when compared to the resources in a certain habitat. <ul style="list-style-type: none"> <li>a. Construct explanations that forming groups helps some organisms survive.</li> <li>b. Create models that illustrate how organisms and their habitats make up a system in which the parts depend on each other.</li> <li>c. Categorize resources in various habitats as basic materials, produced materials, or as nonmaterial.</li> </ul>	Level 3 M2 L1–L2 Level 3 M2 L9–L19 Level 3 M2 L22–L28
12	Evaluate engineered solutions to a problem created by environmental changes and any resulting impacts on the types and density of plant and animal populations living in the environment.	Level 3 M1 L21–L26 Level 3 M2 L22–L25
<b>Earth’s Systems</b>		
13	Display data graphically and in tables to describe typical weather conditions expected during a particular season.	Level 3 M1 L1–L15 Level 3 M1 L19–L20 Level 3 M1 L27–L29
14	Collect information from a variety of sources to describe climates in different regions of the world.	Level 3 M1 L11–L15 Level 3 M1 L27–L29
<b>Earth and Human Activity</b>		
15	Evaluate a design solution that reduces the impact of a weather-related hazard.	Level 3 M1 L1–L3 Level 3 M1 L16–L29

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### PhD Science Level 4

The Grade 4 *Alabama Course of Study: Science* is almost entirely covered by the Level 4 *PhD Science* curriculum: Standard 10 is not covered as body systems focus on animals but not humans, and Standard 13 is not covered as soil testing is not performed. A detailed analysis of alignment appears in the table below.

Grade 4 Standards		Aligned PhD Science Lessons
<b>Energy</b>		
1	Use evidence to explain the relationship of the speed of an object to the energy of that object.	Level 4 M2 L6–L7 Level 4 M2 L24–L26
2	Plan and carry out investigations that explain transference of energy from place to place by sound, light, heat, and electric currents. <ul style="list-style-type: none"> <li>a. Provide evidence that heat can be produced in many ways and can move from one object to another by conduction.</li> <li>b. Demonstrate that different objects can absorb, reflect, and/or conduct energy.</li> <li>c. Demonstrate that electric circuits require a complete loop through which an electric current can pass.</li> </ul>	Level 4 M2 L1–L5 Level 4 M2 L10–L11 Level 4 M2 L24–L26
3	Investigate to determine changes in energy resulting from increases or decreases in speed that occur when objects collide.	Level 4 M2 L8–L9 Level 4 M2 L24–L26
4	Design, construct, and test a device that changes energy from one form to another.	Level 4 M2 L12–L26
5	Compile information to describe how the use of energy derived from natural renewable and nonrenewable resources affects the environment.	Level 4 M1 L12–L17 Level 4 M1 L21–L27
<b>Waves and Their Applications in Technologies for Information Transfer</b>		
6	Develop a model of waves to describe patterns in terms of amplitude and wavelength, and including that waves can cause objects to move.	Level 4 M3 L7–L14 Level 4 M3 L29–L31
7	Develop and use models to show multiple solutions in which patterns are used to transfer information.	Level 4 M4 L14–L19 Level 4 M4 L24–L26
8	Construct a model to explain that an object can be seen when light reflected from its surface enters the eyes.	Level 4 M4 L1–L13 Level 4 M4 L20–L26

<b>From Molecules to Organisms: Structure and Processes</b>		
9	Examine evidence to support an argument that the internal and external structures of plants and animals function to support survival, growth, behavior, and reproduction.	Level 4 M3 L1–L6 Level 4 M3 L20 Level 4 M3 L26–L31
10	Obtain and communicate information explaining that humans have systems that interact with one another for digestion, respiration, circulation, excretion, movement, control, coordination, and protection from disease.	
11	Investigate different ways animals receive information through the senses, process that information, and respond to it in different ways.	Level 4 M3 L1–L6 Level 4 M3 L15– L25 Level 4 M3 L29–L31
<b>Earth's Systems</b>		
12	Construct explanations by citing evidence found in patterns of rock formations and fossils in rock layers that Earth changes over time through both slow and rapid processes.	Level 4 M1 L1–L5 Level 4 M1 L19–L20 Level 4 M1 L25–L27
13	Plan and carry out investigations to examine properties of soils and soil types.	
14	Explore information to support the claim that landforms are the result of a combination of constructive forces, including crustal deformation, volcanic eruptions, and sediment deposition as well as a result of destructive forces, including erosion and weathering.	Level 4 M1 L18–L20 Level 4 M1 L25–L27
15	Analyze and interpret data to determine effects of weathering and rate of erosion by water, ice, wind, and vegetation using one single form of weathering or erosion at a time.	Level 4 M1 L6–L11 Level 4 M1 L25–L27
16	Describe patterns of Earth's features on land and in the ocean using data from maps.	Level 4 M1 L18–L20 Level 4 M1 L25–L27
17	Formulate and evaluate solutions to limit the effects of natural Earth processes on humans.	Level 4 M1 L12–L17

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




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### PhD Science Level 5

The Grade 5 *Alabama Course of Study: Science* is almost entirely covered by the Level 5 *PhD Science* curriculum: Standard 5 is not covered as density is not supported by grade-level mathematics standards, and Standards 7 and 17 are partially covered but not in the detail specified. A detailed analysis of alignment appears in the table below.

Grade 5 Standards		Aligned PhD Science Lessons
<b>Matter and Its Interactions</b>		
1	Plan and carry out investigations to provide evidence that matter is made of particles too small to be seen.	 Level 5 M1 L5–L10 Level 5 M1 L23–L26
2	Investigate matter to provide mathematical evidence, including graphs, to show that regardless of the type of reaction or change that occurs when heating, cooling, or mixing substances, the total weight of the matter is conserved.	 Level 5 M1 L9–L17 Level 5 M1 L23–L26
3	Examine matter through observations and measurements to identify materials based on their properties.	 Level 5 M1 L1–L4 Level 5 M1 L11–L17 Level 5 M1 L23–L26
4	Investigate whether the missing of two or more substances results in new substances.	 Level 5 M1 L1–L2 Level 5 M1 L13–L26
5	Construct explanations from observations to determine how the density of an object affects whether the object sinks or floats when placed in a liquid.	
<b>Motion and Stability: Forces and Interactions</b>		
6	Construct an explanation from evidence to illustrate that the gravitational force exerted by Earth on objects is directed downward towards the center of Earth.	 Level 5 M4 L3–L4 Level 5 M4 L25–L27
7	Design and conduct a test to modify the speed of a falling object due to gravity.	 Level 5 M3 L3–L4
<b>Ecosystems: Interactions, Energy, and Dynamics</b>		
8	Defend the position that plants obtain materials needed for growth primarily from air and water.	 Level 5 M2 L3–L5 Level 5 M2 L20–L26
9	Construct an illustration to explain how plants use light energy to convert carbon dioxide and water into a storable fuel, carbohydrates, and a waste product, oxygen, during the process of photosynthesis.	 Level 5 M2 L15–L19

10	Construct and interpret models to explain that energy in animals' food is used for body repair, growth, motion, and maintenance of body warmth and was once energy from the sun.	Level 5 M2 L15–L19 Level 5 M2 L24–L26
11	Create a model to illustrate the transfer of matter among producers; consumers, including scavengers and decomposers; and the environment.	Level 5 M2 L1–L2 Level 5 M2 L6–L14 Level 5 M2 L24–L26
<b>Earth's Place in the Universe</b>		
12	Defend the claim that one factor determining the apparent brightness of the sun compared to other stars is the relative distance from Earth.	Level 5 M4 L19–L20 Level 5 M4 L25–L27
13	Analyze data and represent with graphs to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.	Level 5 M4 L1–L2 Level 5 M4 L5–L18 Level 5 M4 L21–L27
<b>Earth's Systems</b>		
14	Use a model to represent how any two systems, specifically the atmosphere, biosphere, geosphere, and/or hydrosphere, interact and support life.	Level 5 M3 L1–L3 Level 5 M3 L6–L13 Level 5 M3 L19–L27
15	Identify the distribution of freshwater and salt water on Earth and construct a graphical representation depicting the amounts and percentages found in different reservoirs.	Level 5 M3 L4–L5 Level 5 M3 L19–L27
<b>Earth and Human Activity</b>		
16	Collect and organize scientific ideas that individuals and communities can use to protect Earth's natural resources and its environment.	Level 5 M3 L14–L18 Level 5 M4 L24–L27
17	Design solutions, test, and revise a process for cleaning a polluted environment.	Level 5 M1 L18–L22 Level 5 M2 L21–L23 Level 5 M3 L19–L23