NATIONAL GEOGRAPHIC SCIENCE

Indiana's Academic Standards for Science Grades K-5

Correlated to

National Geographic Science

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Indiana's Academic Standards for Science Kindergarten	National Geographic Science Teacher's Edition Page References
Process Standard – The Nature of Science	
Students gain scientific knowledge by observing the natural and constructed world, performing and evaluating investigations and communicating their findings. These principles should guide student work and be integrated into the curriculum along with the content standards on a daily basis.	
Use a scientific notebook to record predictions, questions and observations about data with pictures, numbers or in words.	**National Geographic Science for Kindergarten** *Earth Science,* Teacher's Edition Pages: SN2-SN12, T5, T9, T9b, T13b, T15, T19, T21, T25b, TT13b, TT23b, TT23h, TT29b *Life Science,* Teacher's Edition Pages: SN2-SN12, T9b, T9g, T19b, T19g, T29a, T29b, T29e, TT1e-TT1f, TT5, TT11a, TT11b, TT11g, TT19, TT19b, TT21, TT29a *Physical Science,* Teacher's Edition Pages: SN2-SN12, T11, T15a, T17, T19, T21a, T29a, TT11, TT15, TT19, TT22, TT23b, TT25, TT29a
Conduct investigations that may happen over time as a class, in small groups, or independently.	**National Geographic Science for Kindergarten** *Earth Science,* Teacher's Edition Pages: T9e-T9h, T11, T21, TT1c-TT1d, TT1e-TT1h, TT7, TT17, TT29c-TT29f *Life Science,* Teacher's Edition Pages: T19e-T19h, T29c-T29f *Physical Science,* Teacher's Edition Pages: TT15, TT15e-TT15h, TT17, TT19, TT23e-TT23h , TT26-TT27
Generate questions and make observations about natural processes.	**National Geographic Science for Kindergarten** *Earth Science,* Teacher's Edition Pages: T1e-T1h, T9e-T9h, TT1e-TT1h, TT13e-TT13h, TT23e-TT23h, TT29c-TT29f *Life Science,* Teacher's Edition Pages: T19e-T19h, T29c-T29f
Make predictions based on observations.	**National Geographic Science for Kindergarten** *Earth Science,* Teacher's Edition Pages: T11, TT12-TT13 *Life Science,* Teacher's Edition Pages: T5, T19e-T19h, T21, T29c-T29f, TT23, TT28

Indiana's Academic Standards for Science Kindergarten	National Geographic Science Teacher's Edition Page References
continued from previous page Make predictions based on observations.	*Physical Science,* Teacher's Edition Pages: T15e-T15h, TT15e-TT15h, TT23e-TT23h, TT29c-TT29f
Discuss observations with peers and be able to support your conclusion with evidence.	**National Geographic Science for Kindergarten** *Earth Science,* Teacher's Edition Pages: T1e-T1h, T9, T9e-T9h, T13e-T13h, T15, TT1c-TT1d, TT1e-TT1h, TT23e-TT23h, TT29c-TT29f *Life Science,* Teacher's Edition Pages: T1e-T1h, T5, T9b, T9e-T9h, T19e-T19h, T29c-T29f, TT11b, TT11e-TT11h, TT25 *Physical Science,* Teacher's Edition Pages: T1g-T1j, T15e-T15h, T16, T21e-T21h, TT1c-TT1f, TT15e-TT15h
Make and use simple equipment and tools to gather data and extend the senses.	**National Geographic Science for Kindergarten** *Physical Science,* Teacher's Edition Pages: TT23e-TT23h
Recognize a fair test.	**National Geographic Science for Kindergarten** *Life Science,* Teacher's Edition Pages: T29c-T29f *Physical Science,* Teacher's Edition Pages: TT29c-TT29f

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Process Standard – The Design Process	
As citizens of the constructed world, students will participate in the design process. Students will learn to use materials and tools safely and employ the basic principles of the engineering design process in order to find solutions to problems.	
Identify a need or problem to be solved.	**National Geographic Science for Kindergarten** The opportunity to guide students through the design process is available. See, for example: *Life Science,* Teacher's Edition Pages: TT1c-TT1f *Physical Science,* Teacher's Edition Pages: T27, TT19, TT23e-TT23h, TT26
Brainstorm potential solutions.	
Document the design throughout the entire design process.	
Select a solution to the need or problem.	
Select the materials to develop a solution.	
Create the solution.	
Evaluate and test how well the solution meets the goal.	
Communicate the solution with drawings or prototypes.	
Communicate how to improve the solution.	
Standard 1: Physical Science	
Observe, manipulate, sort and generate questions about objects and their physical properties.	
K.1.1. Use all senses as appropriate to observe, sort and describe objects according to their composition and physical properties, such as size, color, and shape. Explain these choices to others and generate questions about the objects.	**National Geographic Science for Kindergarten** *Physical Science,* Teacher's Edition Pages: T1e-T1f, T1g-T1j, T2-T3, T4-T5, T7-T15b, T15e-T15h, T16-T21b, T21e-T21h, T23
K.1.2 Identify and explain possible uses for an object based on its properties and compare these uses with other students' ideas.	**National Geographic Science for Kindergarten** The opportunity to address this objective is available. See, for example: *Physical Science,* Teacher's Edition Pages: T23, T24-T27

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Standard 2: Earth and Space Science	
Observe, record, and recognize patterns and generate questions about night/day and seasons.	
K.2.1 Observe and record during each sunny day when the sun shines on different parts of the school building.	**National Geographic Science for Kindergarten** *Earth Science,* Teacher's Edition Pages: T9e-T9h
K.2.2 Describe and compare objects seen in the night sky and in the day sky.	**National Geographic Science for Kindergarten** *Earth Science,* Teacher's Edition Pages: T1e-T1h, T3a-t3b, T6-T9b, T13j-T13l, t14-T25b, T33-T35, T37-T39, T41-T43
K.2.3 Describe in words and pictures the changes in weather from month to month and over the seasons.	**National Geographic Science for Kindergarten** *Earth Science,* Teacher's Edition Pages: TT13e-TT13h, TT13j-TT13l, TT14-TT23b
Standard 3: Life Science	
Observe living organisms, compare and contrast their characteristics, and ask questions about them.	
K.3.1 Observe and draw physical features of common plants and animals.	**National Geographic Science for Kindergarten** *Life Science,* Teacher's Edition Pages: T9, T9e-T9h, T15, T17, T19b, T19e-T19h, T21, T29c-T29f, T48, TT5, TT11b, TT11e-TT11h, TT19b, TT19g-TT19j, TT29b, TT48, W7-W8
K.3.2 Describe and compare living animals in terms of shape, texture of body covering, size, weight, color, and the way they move.	**National Geographic Science for Kindergarten** *Life Science,* Teacher's Edition Pages: TT4-TT5, TT10-TT11b, TT11e-TT11h, TT11k-TT11l, TT12-TT19b, TT19g-TT19j, TT20-TT23, TT24-TT28, TT29a-TT29b, TT37-TT39, TT41-TT43, TT45-TT47
K.3.3. Describe and compare living plants in terms of growth, parts, shape, size, color, and texture.	**National Geographic Science for Kindergarten** *Life Science,* Teacher's Edition Pages: T4-T6, T9a-T9b, T9e-T9h, T9k-T9l, T10-T19b, T19e-T19h, T20-T23, T24-T29b, T37-T39, T41-T43, T45-T47

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Use a scientific notebook to record predictions, questions and observations about data with pictures, numbers or in words.	**National Geographic Science for Grades 1-2** Earth Science: *Land and Water* SN2-SN12, T1h, T5, T11, T15, T15d, T20-T21, T23, T27e-T27f, T27i, T33, T35, T37, T41, T41a, T41i Earth Science: *Rocks and Soil* SN2-SN12, T1h, T5, T10-T11, T15, T15d, T15j, T19, T21, T23, T25, T25c, T25h, T25n, T27, T33, T35, T37, T37a, T37i Life Science: *Habitats* SN2-SN12, T1h, T5, T9, T11, T13, T15, T15f, T19, T21, T23, T23e, T23j, T29, T31, T33, T35, T37, T37a Life Science: *Living Things* SN2-SN12, T1h, T5, T11, T15, T15c, T15h, T15n, T17, T19, T21, T23, T23d, T23j, T29, T35, T37, T37a, T37i Life Science: *Plants and Animals* SN2-SN12, T1h, T5, T8, T11, T12, T13, T13d, T15, T17, T21, T23, T25, T25c, T25h, T25n, T35, T37, T37a, T37i Physical Science: *Properties* SN2-SN12, T1h, T5, T8-T9, T11-T13, T17, T17d, T17i, T17p, T21, T23, T26, T27d, T27j, T31, T33, T37, T37a, T37i Physical Science: *Solids, Liquids, and Gases* SN2-SN12, T5, T9, T11, T15, T19, T25, T27, T29, T33, T37, T37a, T37i
Conduct investigations that may happen over time as a class, in small groups, or independently.	**National Geographic Science for Grades 1-2** Earth Science: *Land and Water* T15c-T15f, T20-T21, T23, T27e-T27f, T27g-T27j, T41a-T41f Earth Science: *Rocks and Soil* T15g-T15j, T25e-T25h, T37a-T37f

Indiana's Academic Standards for Science Grade 1	National Geographic Science Teacher's Edition Page References
Continued from previous page Conduct investigations that may happen over time as a class, in small groups, or independently.	**National Geographic Science for Grades 1-2** Life Science: *Habitats* T15c-T15f, T23g-T23j, T30-T31, T37a-T37f Life Science: *Living Things* T1e-T1h, T15e-T15h, T15k-T15n, T21, T23a-T23d, T23g-T23j, T37a-T37f Life Science: *Plants and Animals* T10-T11, T25k-T25n, T37a-T37f Physical Science: *Properties* T12-T13, T26-T27, T27a-T27d, T27g-T27j, T34, T37a-T37f Physical Science: *Solids, Liquids, and Gases* T27g-T27j, T37a-T37f, T37i-T37j
Generate questions and make observations about natural processes.	**National Geographic Science for Grades 1-2** Earth Science: *Land and Water* T15c-T15f, T20-T21, T23, T27e-T27f, T27g-T27j, T35, T37, T41a-T41f, T41i-T41j Earth Science: *Rocks and Soil* T15g-T15j, T19, T23, T25e-T25h, T37a-T37f Life Science: *Habitats* T15c-T15f, T21, T23g-T23j, T30-T31, T37a-T37f Life Science: *Living Things* T1e-T1h, T15e-T15h, T15k-T15n, T21, T23a-T23d, T23g-T23j, T37a-T37f, T37i-T37j Life Science: *Plants and Animals* T10-T11, T25k-T25n, T37a-T37f Physical Science: *Properties* T17a-T17d, T26-T27, T27a-T27d, T34, T37a-T37f
Make predictions based on observations.	**National Geographic Science for Grades 1-2** Earth Science: *Land and Water* T15c-T15f, T27e-T27f, T41a-T41f Earth Science: *Rocks and Soil* T15g-T15j, T25e-T25h, T25k-T25n, T37a-T37f Life Science: *Habitats* T15c-T15f, T23g-T23j, T37a-T37f Life Science: *Living Things* T15e-T15h, T23a-T23d, T37a-T37f

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Continued from previous page Make predictions based on observations.	**National Geographic Science for Grades 1-2** Life Science: *Plants and Animals* T7, T10-T11, T25e-T25h, T37a-T37f Physical Science: *Properties* T17a-T17d, T17k-T17n, T21, T27a-T27d, T34, T37a-T37f Physical Science: *Solids, Liquids, and Gases* T27g-T27j, T37a-T37f
Discuss observations with peers and be able to support your conclusion with evidence.	**National Geographic Science for Grades 1-2** Earth Science: *Land and Water* T1e-T1h, T15c-T15f, T20-T21, T27e-T27f, T27g-T27j, T41a-T41f Earth Science: *Rocks and Soil* T1e-T1h, T10-T11, T14, T15a-T15d, T15g-T15j, T19, T23, T25c-T25d, T25e-T25h, T25k-T25n, T34, T37a-T37f, T37j Life Science: *Habitats* T1e-T1h, T15c-T15f, T23g-T23j, T30-T31, T37a-T37f Life Science: *Living Things* T1e-T1h, T14-T15, T15e-T15h, T15k-T15n, T23a-T23d, T23g-T23j, T37a-T37f, T37i-T37j Life Science: *Plants and Animals* T1e-T1h, T10-T11, T13a-T13d, T13g-T13j, T25e-T25h, T25k-T25n, T37aT37f Physical Science: *Properties* T1e-T1h, T5, T9, T17a-T17d, T17k-T17n, T19, T27a-T27d, T27g-T27j, T37a-T37f, T37i-T37j Physical Science: *Solids, Liquids, and Gases* T1e-T1h, T13a-T13d, T13j, T13k-T13n, T17, T27a-T27d, T27g-T27j, T32-T34, T37a-T37f, T37j
Make and use simple equipment and tools to gather data and extend the senses.	**National Geographic Science for Grades 1-2** Earth Science: *Land and Water* T1e-T1h, T15c-T15f, T20-T21, T27g-T27j, T41a-T41f Earth Science: *Rocks and Soil* T25e-T25h, T25k-T25n Life Science: *Plants and Animals* T25k-T25n

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Continued from previous page Make and use simple equipment and tools to gather data and extend the senses.	**National Geographic Science for Grades 1-2** Physical Science: *Properties* T9, T12-T13, T17a-T17d, T17i-T17j, T17k-T17n, T23, T26-T27, T27a-T27d, T27g-T27j, T34, T37a-T37f, T37i-T37j Physical Science: *Solids, Liquids, and Gases* T37i-T37j
Recognize a fair test.	**National Geographic Science for Grades 1-2** Earth Science: *Rocks and Soil* T37a-T37f Life Science: *Habitats* T23g-T23j, T37a-T37f Life Science: *Living Things* T23a-T23d, T37a-T37f, T37i-T37j Life Science: *Plants and Animals* T25e-T25h Physical Science: *Solids, Liquids, and Gases* T27g-T27j, T37a-T37f, T37g-T37j
Process Standard – The Design Process	
As citizens of the constructed world, students will participate in the design process. Students will learn to use materials and tools safely and employ the basic principles of the engineering design process in order to find solutions to problems.	
Identify a need or problem to be solved.	**National Geographic Science for Grades 1-2** The opportunity to guide students through the design process is available. See, for example: Physical Science: *Solids, Liquids, and Gases* T37i-T37j Life Science: *Habitats* T37a-T37d
Brainstorm potential solutions.	
Document the design throughout the entire design process.	
Select a solution to the need or problem.	
Select the materials to develop a solution.	
Create the solution.	
Evaluate and test how well the solution meets the goal.	
Communicate the solution with drawings or prototypes.	
Communicate how to improve the solution.	

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Standard 1: Physical Science	
Describe objects in terms of the materials that compose them and their physical properties.	
1.1.1 Use all senses as appropriate to identify the component parts of objects and the materials from which they are made.	**National Geographic Science for Grades 1-2** Physical Science: *Properties* Students use all senses to identify properties of objects but not necessarily to indentify component parts. See, for example: T4-T5, T7-T17, T21-T25 Physical Science: *Solids, Liquids, and Gases* T8-T9
1.1.2 Characterize materials as solid or liquid, investigate their properties, record observations and explain the choices to others based on evidence (e.g. physical properties).	**National Geographic Science for Grades 1-2** Physical Science: *Properties* T27g-T27j, T27k-T27l, T28-T37, T48, T56, T62, T70, T76, T84, T97-T100 Physical Science: *Solids, Liquids, and Gases* T1b, T1e-T1h, T1i-T1j, T6-T13, T13a-T13d, T27g-T27j, T28-T37, T52, T66, T80
1.1.3 Predict the results of, and experiment with methods (e.g., sieving, evaporation) for separating solids and liquids based on their physical properties.	**National Geographic Science for Grades 1-2** The opportunity to address this objective is available. See, for example: Physical Science: *Solids, Liquids, and Gases* T1e-T1h, T27g-T27j, T32-T33 Physical Science: *Properties* Further opportunity is available in the *Open Inquiry: Do Your Own Investigation* section: T37a-T37f
Standard 2: Earth and Space Science	
Observe, describe, and ask questions about soil components and properties.	
1.2.1 Observe and compare properties of sand, clay, silt and organic matter. Look for evidence of sand, clay, silt and organic matter as components of soil samples.	**National Geographic Science for Grades 1-2** Earth Science: *Land and Water* T27g-T27j Earth Science: *Rocks and Soil* T25k-T25n, T25o-T25r, T26-T37, T37a-T37f, T37j
1.2.2 Choose, test, and use tools to separate soil samples into component parts.	**National Geographic Science for Grades 1-2** Earth Science: *Land and Water* T27g-T27j Earth Science: *Rocks and Soil* T25k-T25n, T37a-T37f, T37j

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1.2.3 Observe a variety of soil samples and describe in words and pictures the soil properties in terms of color, particle size and shape, texture, and recognizable living and nonliving items in the soil.	**National Geographic Science for Grades 1-2** Earth Science: *Land and Water* T27g-T27j Earth Science: *Rocks and Soil* T25k-T25n, T30-T31, T34, T37j
1.2.4 Observe over time the effect of organisms such as earthworms in the formation of soil from dead plants. Discuss the importance of earthworms in soil.	**National Geographic Science for Grades 1-2** Earth Science: *Rocks and Soil* T29 (Also see humus, bits of decayed plants and animals. Humus is discussed/addressed extensively throughout the text, including T25p, T28, T29, T33, T48, T58, T62, T72, T76, and T86.)
Standard 3: Life Science	
Observe, describe and ask questions about living things and their relationship to their environment.	
1.3.1 Classify living organisms according to variations in specific physical features, such as body coverings or appendages, and describe how those features may provide an advantage for survival in different environments.	**National Geographic Science for Grades 1-2** Life Science: *Habitats* T20-T23, T52, T67, T80-T81 Life Science: *Living Things* T16-T23, T34-T35, T57, T72, T86 Life Science: *Plants and Animals* T4-T13, T13a-T13d, T13g-T13j, T14-T25, T25a-T25d, T25e-T25h, T50-T53, T55-T56, T64-T67, T69-T70, T78-T81, T83-T85,
1.3.2 Observe organisms closely over a period of time in different habitats, such as terrariums, aquariums, lawns, and trees. Draw and write about observations.	**National Geographic Science for Grades 1-2** Life Science: *Habitats* T15c-T15f, T23g-T23j, T37a-T37f Life Science: *Living Things* T1e-T1h, T15e-T15h, T15k-T15n, T23a-T23d, T37a-T37f Life Science: *Plants and Animals* T25k-T25n
1.3.3 Observe and explain that plants and animals have basic needs for growth and survival: plants need to take in water and need light and animals need to take in water and food and have a way to dispose of waste.	**National Geographic Science for Grades 1-2** Life Science: *Habitats* T15g-T15h, T16-T19, T36-T37, T48-T49, T53-T54, T62-T63, T67-T70, T76-T77, T81-T83, T103 Life Science: *Living Things* T1e-T1h, T1j, T8-T11, T14-T15, T15e-T15h, T15k-T15n, T15o-T15p, T16-T17, T20-T23, T23a-T23d, T23k-T23l, T24-T33, T36-T37, T49, T51-T60, T63, T65-T74, T77, T79-T88, T102-T103

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Continued from previous page 1.3.3 Observe and explain that plants and animals have basic needs for growth and survival: plants need to take in water and need light and animals need to take in water and food and have a way to dispose of waste.	**National Geographic Science for Grades 1-2** Life Science: *Plants and Animals* T10-T13, T20-T21, T24-T25, T51-T52, T65-T66, T79-T80
1.3.4 Describe how animals' habitats, including plants, meet their needs for food, water, shelter, and an environment in which they can live.	**National Geographic Science for Grades 1-2** Life Science: *Habitats* T1i-T1j, T6-T15, T36-T37, T50-T56, T66-T74, T79-T88, T97-T100 Life Science: *Living Things* T28-T33, T59, T73, T87-T97-T100, T102
1.3.5 Observe and describe ways in which animals and plants depend on one another for survival.	**National Geographic Science for Grades 1-2** Life Science: *Habitats* T23k-T23l, T24-T35, T36-T37, T54-T60, T63, T68-T71, T77, T82-T85
Standard 4: Science, Engineering and Technology	
Determine properties of natural and man-made materials and their most important uses.	
1.4.1 Use all senses as appropriate to sort objects as being composed of materials that are naturally-occurring or human-made, or a combination of the two.	**National Geographic Science for Grades 1-2** Earth Science: *Land and Water* T7-T11 Life Science: *Living Things* T12, T13, T32, T33
1.4.2 Choose two animals that build shelters within their habitats and compare the shelters in terms of the materials and tools they use, and the type and purpose of shelter they provide.	**National Geographic Science for Grades 1-2** Life Science: *Habitats* T15h, T18-T19 Life Science: *Living Things* T23l, T25, T32-T33, T49, T53, T63, T69, T77, T84
1.4.3 Construct a simple shelter for an animal with natural and human-made materials taking care to use tools and materials safely and properly.	**National Geographic Science for Grades 1-2** The opportunity to address this objective is available. Students are asked to design their own investigations. One suggestion includes creating two different habitats and then observing which habitat is chosen by a critter. Teachers may expand on this shelter making activity. Please see: Life Science: *Habitats* T37a-T37d

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Use a scientific notebook to record predictions, questions and observations about data with pictures, numbers or in words.	**National Geographic Science for Grades 1-2** Earth Science: *Sun, Moon and Stars* SN2-SN12, T1h, T5, T7, T15e-T15f, T15j, T23, T27f, T33, T34-T35, T37a Earth Science: *Weather* SN2-SN12, T1h, T5, T9, T12-T13, T15d, T15j, T27d, T27g-T27h, T27n, T31, T33, T34-T35, T41a, T41i Life Science: *Life Cycles* SN2-SN12, T1h, T7, T12-T13, T15e, T15j, T17, T28, T29f, T37a, T37i Physical Science: *Forces and Motion* SN2-SN12, T1h, T5, T11, T14-T15, T17, T23c, T23h, T23n, T25, T27, T29d, T29j, T31, T33, T37a, T37i Physical Science: *Pushes and Pulls* SN2-SN12, T1h, T5, T16, T17d, T17i, T17n, T27, T29d, T29j, T33, T34, T37, T37a, T37i Physical Science: *Solids, Liquids and Gases* SN2-SN12, T5, T9, T11, T15, T19, T25, T27, T29, T33, T37, T37a, T37i
Conduct investigations that may happen over time as a class, in small groups, or independently.	**National Geographic Science for Grades 1-2** Earth Science: *Sun, Moon and Stars* T1e-T1h, T5, T12, T15g-T15j, T23, T25, T33, T35, T37a-T37f Earth Science: *Weather* T1e-T1h, T12-T13, T15a-T15d, T15g-T15j, T27a-T27d, T27k-T27n, T33-T35, T41a-T41f, T41i-T41j Life Science: *Life Cycles* T1e-T1h, T12-T13, T15g-T15j, T37a-T37f

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continued from previous page Conduct investigations that may happen over time as a class, in small groups, or independently.	**National Geographic Science for Grades 1-2** Physical Science: *Forces and Motion* T1eT1h, T11, T13, T14-T15, T23e-T23h, T23k-T23n, T25, T27, T29a-T29d, T29g-T29j, T31 Physical Science: *Pushes and Pulls* T1e-T1h, T17a-T17d, T17i-T17j, T17k-T17n, T25, T29a-T29d, T29g-T29j, T37a-T37f Physical Science: *Solids, Liquids and Gases* T27g-T27j, T37a-T37f, T37i-T37j
Generate questions and make observations about natural processes.	**National Geographic Science for Grades 1-2** Earth Science: *Sun, Moon and Stars* T1e-T1h, T12, T15g-T15j, T23, T25, T33, T35, T37a-T37f Earth Science: *Weather* T1eT1h, T12-T13, T15a-T15d, T15g-T15j, T27a-T27d, T27k-T27n, T34-T35, T41a-T41f, T41i-T41j Life Science: *Life Cycles* T1e-T1h, T12-T13, T15g-T15j, T37a-T37f Physical Science: *Forces and Motion* T1e-T1h, T11, T13, T14-T15, T23, T23e-T23h, T23kT23n, T25, T27, T29a-T29d, T29g-T29j, T31, T33, T37a-T37f Physical Science: *Pushes and Pulls* T1e-T1h, T17a-T17d, T17i-T17j, T17k-T17n, T25, T29a-T29d, T29g-T29j, T32-T33, T37a-T37f
Make predictions based on observations.	**National Geographic Science for Grades 1-2** Earth Science: *Sun, Moon and Stars* T37a-T37f Earth Science: *Weather* T15a-T15d, T31, T41a-T41f, T41i-T41j Life Science: *Life Cycles* T17, T37a-T37f Physical Science: *Forces and Motion* T23, T23k-T23n, T31, T35, T37a-T37f Physical Science: *Pushes and Pulls* T1e-T1h, T17a-T17d, T17i-T17j, T17k-T17n, T37a-T37f Physical Science: *Solids, Liquids and Gases* T27g-T27j, T37a-T37f

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Discuss observations with peers and be able to support your conclusion with evidence.	**National Geographic Science for Grades 1-2** Earth Science: *Sun, Moon and Stars* T1e-T1h, T14, T15e-T15f, T15g-T15j, T26, T27c-T27f, T33-T34, T37a-T37f Earth Science: *Weather* T1e-T1h, T5, T9, T12-T13, T15a-T15d, T15g-T15j, T24-T25, T27a-T27d, T27h, T27k-T27n, T33-T35, T41a-T41f, T41j Life Science: *Life Cycles* T1e-T1h, T12-T13, T15g-T15j, T29c-T29f, T37a-T37f, T37i-T37j Physical Science: *Forces and Motion* T1e-T1h, T13, T14-T15, T23c-T23d, T23e-T23h, T23k-T23n, T29a-T29d, T29g-T29j, T37a-T37f, T37i-T37j Physical Science: *Pushes and Pulls* T1e-T1h, T16, T17a-T17d, T17i-T17j, T17k-T17n, T25, T27, T29a-T29d, T29g-T29j, T32-T33, T37a-T37f Physical Science: *Solids, Liquids and Gases* T1e-T1h, T13a-T13d, T13j, T13k-T13n, T17, T27a-T27d, T27g-T27j, T32-T34, T37a-T37f, T37j
Make and use simple equipment and tools to gather data and extend the senses.	**National Geographic Science for Grades 1-2** Earth Science: *Weather* T27a-T27d Physical Science: *Forces and Motion* T14-T15, T21, T23, T37a-T37f Physical Science: *Pushes and Pulls* T17a-T17d, T17k-T17n, T29a-T29d, T29g-T29j, T32-T33, T34, T37a-T37f, T37i-T37j Physical Science: *Solids, Liquids and Gases* T37i-T37j
Recognize a fair test.	**National Geographic Science for Grades 1-2** Physical Science: *Pushes and Pulls* T37a-T37f Physical Science: *Solids, Liquids and Gases* T27g-T27j, T37a-T37f

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Process Standard – The Design Process	
As citizens of the constructed world, students will participate in the design process. Students will learn to use materials and tools safely and employ the basic principles of the engineering design process in order to find solutions to problems.	
Identify a need or problem to be solved.	**National Geographic Science for Grades 1-2** The opportunity to guide students through the design process is available. See, for example: Earth Science: *Weather* T27a-T27d Physical Science: *Forces and Motion* T23e-T23h, T37a-T37f, **T103** Physical Science: *Pushes and Pulls* T37i-T37j Physical Science: *Solids, Liquids and Gases* T37i-T37j
Brainstorm potential solutions.	
Document the design throughout the entire design process.	
Select a solution to the need or problem.	
Select the materials to develop a solution.	
Create the solution.	
Evaluate and test how well the solution meets the goal.	
Communicate the solution with drawings or prototypes.	
Communicate how to improve the solution.	
Standard 1: Physical Science	
Observe and describe that the properties of materials can change, but not all materials respond in the same way to the same action.	
Observe and describe the motion of an object and how it changes when a force is applied to it.	
2.1.1. Observe, describe, and measure ways in which the properties of a sample of water (including volume) change or stay the same as it is heated and cooled and is transformed into different states.	**National Geographic Science for Grades 1-2** Physical Science: *Solids, Liquids and Gases* T27k-T27l, T28-T31, T54-T55, T68-T69, T82-T83
2.1.2. Predict the result of combining solids and liquids in pairs. Mix; observe, gather, record and discuss evidence that the result may be a material with different properties than the original materials.	**National Geographic Science for Grades 1-2** Physical Science: *Solids, Liquids and Gases* T27g-T27j, T32-T33
2.1.3. Predict and experiment with methods (e.g. sieving, evaporation) to separate solids and liquids based on their physical properties.	**National Geographic Science for Grades 1-2** Physical Science: *Solids, Liquids and Gases* T1e-T1h, T27g-T27j, T32-T33

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2.1.4 Observe, sketch, demonstrate, and compare how objects can move in different ways (straight, zig-zag, back-and-forth, rolling, fast and slow).	**National Geographic Science for Grades 1-2** Physical Science: *Forces and Motion* T1e-T1h, T8-T15, T23e-T23h Physical Science: *Pushes and Pulls* T1e-T1h, T17a-T17d, T17k-T17n, T20-T21, T25, T29a-T29d, T37i-T37j
2.1.5 Describe the position or motion of an object relative to a point of reference (background or another object).	**National Geographic Science for Grades 1-2** Physical Science: *Forces and Motion* T8-T10, T12-T13 Physical Science: *Pushes and Pulls* T1e-T1h, T8-T9, T11-T13
2.1.6 Observe, demonstrate, sketch, and compare how applied force (push or pull) changes the motion of objects.	**National Geographic Science for Grades 1-2** Physical Science: *Forces and Motion* T1e-T1h, T1i-T1j, T4-T15, T23e-T23h Physical Science: *Pushes and Pulls* T1e-T1h, T9, T11, T13, T15, T17a-T17d, T17k-T17n, T20-T21, T25, T29a-T29d
2.1.7 Investigate the motion of objects when they are acted upon by forces at a distance such as gravity and magnetism.	**National Geographic Science for Grades 1-2** Physical Science: *Forces and Motion* T23k-T23n, T25-T29, T29a-T29d, T29g-T29j, T31-T35, T37a-T37f Physical Science: *Pushes and Pulls* T22, T29g-T29j, T32-T33, T37a-T37f
Standard 2: Earth Science	
Day to day and over the seasons observe, measure, record, recognize patterns and ask questions about features of weather.	
Investigate how the position of the sun and moon and the shape of the moon change in observable patterns.	
2.2.1 Construct and use tools to observe and measure weather phenomena such as precipitation, changes in temperature, wind speed and direction.	**National Geographic Science for Grades 1-2** Earth Science: *Weather* T27a-T27d, T27k-T27n, T33-T35, T41a-T41f, T105-T107
2.2.2 Experience and describe wind (moving air) as motion of the air that surrounds us and takes up space.	**National Geographic Science for Grades 1-2** Earth Science: *Weather* T5, T15g-T15j, T27a-T27d, T27k-T27n, T34-T35
2.2.3 Chart or graph weather observations such as cloud cover, cloud type, and type of precipitation on a daily basis over a period of weeks.	**National Geographic Science for Grades 1-2** Earth Science: *Weather* T15g-T15j, T19, T27a-T27d, T27k-T27, T33-T35, T41a-T41f, T41i-T41j, T107

Indiana's Academic Standards for Science Grade 2	National Geographic Science Teacher's Edition Page References
2.2.4 Ask questions about charted observations and graphed data. Identify the patterns and cycles of weather day-to-day as well as seasonal time scales in terms of temperature and rainfall/snowfall amounts.	**National Geographic Science for Grades 1-2** Earth Science: *Weather* T15g-T15j, T18-T27, T27a-T27d, T27k-T27n, T33-T35, T41a-T41f
2.2.5 Ask questions and design class investigations on the effect of the sun heating the surface of the earth.	**National Geographic Science for Grades 1-2** Earth Science: *Weather* T1e-T1h, T9, T41a-T41f
2.2.6 Learn about, report on, and practice severe weather safety procedures.	**National Geographic Science for Grades 1-2** Earth Science: *Weather* T1a-T1b, T36-T39
2.2.7 Investigate how the sun appears to move through the sky during the day by observing and drawing the length and direction of shadows.	**National Geographic Science for Grades 1-2** Earth Science: *Sun, Moon and Stars* T15g-T15j, T24-T27
2.2.8 Investigate how the moon appears to move through the sky during the day by observing and drawing its location at different times.	**National Geographic Science for Grades 1-2** Earth Science: *Sun, Moon and Stars* T33
2.2.9 Investigate how the shape of the moon changes from day to day in a repeating cycle that lasts about a month.	**National Geographic Science for Grades 1-2** Earth Science: *Sun, Moon and Stars* T34-T35, T37a-T37f
Standard 3: Life Science	
Observe, ask questions about, and describe how organisms change their forms and behavior in the course of their life cycles.	
2.3.1 Observing closely over a period of time, record in pictures and words the changes in plants and animals throughout their life cycles, including details of their body plan, structure and timing of growth, reproduction and death.	**National Geographic Science for Grades 1-2** Life Science: *Life Cycles* T1e-T1h, T12-T13, T15c-T15f, T15g-T15j, T37a-T37f, T103
2.3.2 Compare and contrast details of body plan and structure within the life cycles of plants and animals.	**National Geographic Science for Grades 1-2** Life Science: *Life Cycles* T1i-T1j, T6-T15, T15k-T15l, T16-T19, T22-T29, T36-T37, T48-T57, T60, T62-T71, T74, T76-T85, T88, T103

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Standard 4: Science, Engineering and Technology	
Describe how technologies have been developed to meet human needs.	
2.4.1 Identify parts of the human body as tools, such as hands for grasping and teeth for cutting and chewing.	**National Geographic Science for Grades 1-2** The opportunity to introduce this objective is available. See, for example: Life Science: *Life Cycles* T20-T21 Physical Science: *Pushes and Pulls* Students discuss/investigate how the human body initiates pushes and pulls and changes in direction. T1j, T8-T9, T12-T17, T21, T24-T25
2.4.2 Identify technologies developed by humans to meet a human need and investigate the limitations of the technology and how it has improved quality of life.	**National Geographic Science for Grades 1-2** Earth Science: *Sun, Moon and Stars* T21, T27c-T27f, T27g-T27h, T28-T29, T37g-T37j Earth Science: *Weather* T1a-T1b, T10-T11, T28-T35, T36-T39, T41g-T41j Life Science: *Life Cycles* T37g-T37j Physical Science: *Forces and Motion* T1a-T1b, T16-T23, T37g-T37j
2.4.3 Identify a need and design a simple tool to meet that need.	**National Geographic Science for Grades 1-2** The opportunity to address this standard is available. See, for example: Physical Science: *Forces and Motion* T14-T15, T21, T23, T37a-T37f Physical Science: *Pushes and Pulls* T1e-T1h, T37g-T37j

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Process Standard – The Nature of Science	
Students gain scientific knowledge by observing the natural and constructed world, performing and evaluating investigations and communicating their findings. These principles should guide student work and be integrated into the curriculum along with the content standards on a daily basis.	
Make predictions and formulate testable questions.	**National Geographic Science for Grade 3** *Earth Science,* Teacher's Edition Pages: T55a, T87a, T119a, T159a, T191a *Physical Science,* Teacher's Edition Pages: T5f, T23a, T23b, T37e, T37f, T109e, T109f *Life Science,* Teacher's Edition Pages: T45e, T45f, T93e, T93f, T133e, T133f
Design a fair test.	**National Geographic Science for Grade 3** *Earth Science,* Teacher's Edition Page: T37f *Physical Science,* Teacher's Edition Pages: T23a, T23b, T37f, T109e, T109f *Life Science,* Teacher's Edition Pages: T93e, T93f, T133e, T133f, T133g
Plan and carry out investigations as a class, in small groups or independently, often over a period of several class lessons.	**National Geographic Science for Grade 3** *Earth Science,* Teacher's Edition Page: T37f *Physical Science,* Teacher's Edition Pages: T5f, T23a, T23b, T23c, T37f, T37g, T109f, T109g *Life Science,* Teacher's Edition Pages: T45g, T45h, T93e, T93f, T93g, T133f, T133g
Perform investigations using appropriate tools and technology that will extend the senses.	**National Geographic Science for Grade 3** *Earth Science,* Teacher's Edition Page: T37f *Physical Science,* Teacher's Edition Pages: T5f, T23b, T37g, T109g *Life Science,* Teacher's Edition Pages: T45g, T45h, T93f, T93g, T133f, T133g

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Process Standard – The Nature of Science *(continued from previous page)*	
Use measurement skills and apply appropriate units when collecting data.	**National Geographic Science for Grade 3** *Earth Science,* Teacher's Edition Pages: T37g, T37f *Physical Science,* Teacher's Edition Pages: T5g, T23b, T37g, T109g, T109h, T133h
Test predictions with multiple trials.	**National Geographic Science for Grade 3** *Physical Science,* Teacher's Edition Pages: T37g, T109g *Life Science,* Teacher's Edition Pages: T93h, T133h
Keep accurate records in a notebook during investigations and communicate findings to others using graphs, charts, maps and models through oral and written reports.	**National Geographic Science for Grade 3** *Earth Science,* Teacher's Edition Pages: T15, T23c, T61, T75, T99, T103 *Physical Science,* Teacher's Edition Pages: T5h, T23d, T37h, T109h *Life Science,* Teacher's Edition Pages: T45h, T93h, T133g, T133h
Identify simple patterns in data and propose explanations to account for the patterns.	**National Geographic Science for Grade 3** *Earth Science,* Teacher's Edition Page: T165f *Physical Science,* Teacher's Edition Pages: T5h, T23d, T37h, T109h *Life Science,* Teacher's Edition Pages: T45h, T93h, T133h
Compare the results of an investigation with the prediction.	**National Geographic Science for Grade 3** *Earth Science,* Teacher's Edition Page: T165f *Physical Science,* Teacher's Edition Pages: T5h, T23d, T37h, T109h *Life Science,* Teacher's Edition Pages: T45h, T93h, T133h

Indiana's Academic Standards for Science Grade 3	National Geographic Science Teacher's Edition Page References
Process Standard – The Design Process	
As citizens of the constructed world, students will participate in the design process. Students will learn to use materials and tools safely and employ the basic principles of the engineering design process in order to find solutions to problems.	
Identify a need or problem to be solved.	**National Geographic Science for Grade 3** The opportunity to guide students through the design process is available. See, for example: *Earth Science,* Teacher's Edition Pages*:* T5e-T5h, T17, T213, T276b-T276i, T276m *Physical Science,* Teacher's Edition Pages*:* T55e, T180j-T180q, T180x *Life Science,* Teacher's Edition Pages*:* T196j-T196q, T196r-T196u, T196x
Brainstorm potential solutions.	
Document the design throughout the entire design process.	
Select a solution to the need or problem.	
Select the most appropriate materials to develop a solution that will meet the need.	
Create the solution through a prototype.	
Test and evaluate how well the solution meets the goal.	
Evaluate and test the design using measurement.	
Present evidence using mathematical representations (graphs, data tables).	
Communicate the solution including evidence using mathematical representations (graphs, data tables), drawings or prototypes.	
Communicate how to improve the solution.	
Standard 1: Physical Science	
Observe and describe how sound is produced by vibrations.	
Observe and describe how light travels through the air.	
3.1.1 Generate sounds using different materials, objects and techniques; record; discuss and share results.	**National Geographic Science for Grade 3** *Physical Science,* Teacher's Edition Pages: T112, T113, T120, T122, T123, T124, T125, T135a, T135b, T135c, T135d, T136, T146, T147, T180l, T180m
3.1.2 Investigate how the loudness and pitch of sound changes when the rate of vibrations changes.	**National Geographic Science for Grade 3** *Physical Science,* Teacher's Edition Pages: T112, T113, T120, T122, T123, T124, T125, T135a, T135b, T135c, T135d, T136, T146, T147, T180l, T180m
3.1.3 Investigate and recognize that sound moves through solids, liquids and gases (air).	**National Geographic Science for Grade 3** *Physical Science,* Teacher's Edition Pages: T112, T113, T120, T121

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Standard 1: Physical Science *(continued from previous page)*	
3.1.4 Investigate how light travels through the air and tends to maintain its direction until it interacts with some other object or material.	**National Geographic Science for Grade 3** *Physical Science,* Teacher's Edition Pages: T156, T160, T161, T164, T165, T176, T177
3.1.5 Observe and describe how light is absorbed, changes its direction, is reflected back, or passes through objects. Observe and describe that when light cannot pass through an object a shadow results.	**National Geographic Science for Grade 3** *Physical Science,* Teacher's Edition Pages: T156, T157m T158, T159, T162, T163, T164, T165, T167a, T167b, T167c, T167d, T174, T175, T176, T177
3.1.6 Describe evidence to support the idea that light and sound are forms of energy.	**National Geographic Science for Grade 3** *Physical Science,* Teacher's Edition Pages: T149e, T149f, T149g, T149h, T150, T151, T152, T153, T154, T155, T168, T172, T173
Standard 2: Earth Science	
Observe, describe, and identify rocks and minerals by their specific properties.	
Observe and describe how natural materials meet the needs of plants and animals, including humans.	
3.2.1 Examine the physical properties of rock samples and sort them into categories based on size using simple tools such as sieves.	**National Geographic Science for Grade 3** *Earth Science,* Teacher's Edition Pages: T101e, T101f, T101g, T101h, T109, T110, T111, T112, T113, T118, T119, T124, T125, T130, T131
3.2.2 Observe the detailed characteristics of rocks and minerals and identify rocks as being composed of different combinations of minerals.	**National Geographic Science for Grade 3** *Earth Science,* Teacher's Edition Pages: T108, T109, T112, T124, T125, T128, T129
3.2.3 Observe, classify, and identify minerals by their physical properties of hardness, color, luster, and streak.	**National Geographic Science for Grade 3** *Earth Science,* Teacher's Edition Pages: T108, T109, T110, T111, T112, T113
3.2.4 Observe fossils and describe how they provide evidence about the plants and animals that lived long ago and the nature of their environment at that time.	**National Geographic Science for Grade 3** *Life Science,* Teacher's Edition Pages: T30, T31, T74, T75, T76, T77, T79, T79c
3.2.5 Describe natural materials and give examples of how they sustain the lives of plants and animals.	**National Geographic Science for Grade 3** *Earth Science,* Teacher's Edition Pages: T138, T139, T150, T151
3.2.6 Describe how the properties of earth materials make them useful to humans in different ways and describe ways that humans have altered these resources to meet their needs for survival.	**National Geographic Science for Grade 3** *Earth Science,* Teacher's Edition Pages: T114, T115, T116, T119, T122, T134, T135, T138, T139, T144, T145, T148, T149, T150, T151

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Standard 3: Life Science	
Observe, describe, and ask questions about plant growth and development.	
3.3.1 Observe and identify the common structures of a plant including roots, stems, leaves, flowers, fruits, and seeds, and describe their functions.	**National Geographic Science for Grade 3** *Life Science,* Teacher's Edition Pages: T13, T14, T15,T26, T27, T28, T29, T36, T37, T40, T41, T99, T104, T105, T126, T127, T139, T172, T173
3.3.2 Investigate plant growth over time, take measurements in SI units, record the data and display them in graphs. Examine factors that might influence plant growth.	**National Geographic Science for Grade 3** *Life Science,* Teacher's Edition Pages: T10, T11, T12, T14, T15, T16, T17, T20, T21, T22, T23, T24, T25, T26, T27, T28, T29, T36, T37, T108, T110
Standard 4: Science, Engineering and Technology	
Define a real world problem and list criteria for a successful solution.	
3.4.1 Choose and use the appropriate tools to estimate and measure length, mass and temperature in SI units.	**National Geographic Science for Grade 3** *Earth Science,* Teacher's Edition Pages: T37e, T37f, T37g, T37h *Physical Science,* Teacher's Edition Pages: T16, T17, T23a, T23b, T23c, T23d, T52, T53, T55a, T55b, T55c, T55d *Life Science,* Teacher's Edition Pages: T165e, 165f, 165g, 165h, 183a, 183b, 183c, 183d
3.4.2 Define the uses and types of simple machines and utilize simple machines in the solution to a real world problem.	**National Geographic Science for Grade 3** Machines, inventions, and technologies are discussed extensively throughout grade 3 materials. However, students do not utilize simple machines to solve a real world problem. See, for example: *Physical Science,* Teacher's Edition Pages: T134-T135, T138-T148, T170-T171, T172-T180, T180b-T180h

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Process Standard – The Nature of Science	
Students gain scientific knowledge by observing the natural and constructed world, performing and evaluating investigations and communicating their findings. These principles should guide student work and be integrated into the curriculum along with the content standards on a daily basis.	
Make predictions and formulate testable questions.	**National Geographic Science for Grade 4** *Life Science,* Teacher's Edition Pages: T45f, T85f, T169b, T213c, T268b *Earth Science,* Teacher's Edition Pages: T93f, T127b, T141f, T173b, T221f, T268b, T268c *Physical Science,* Teacher's Edition Pages: T45f, T97b, T109f, T125c, T173g, T205f, T244a, T244b
Design a fair test.	**National Geographic Science for Grade 4** *Life Science,* Teacher's Edition Pages: T268b, T268c *Earth Science,* Teacher's Edition Pages: T127b, T127c, T268b, T268c *Physical Science,* Teacher's Edition Pages: T244a, T244b
Plan and carry out investigations as a class, in small groups or independently, often over a period of several class lessons.	**National Geographic Science for Grade 4** *Life Science,* Teacher's Edition Pages: T33f, T33g, T45f, T45g, T69b, T69c, T169b, T169c, T181f, T181g *Earth Science,* Teacher's Edition Pages: T39b, T39c, T93f, T93g, T141f, T141g, T221f, T221g, T255b, T255c, T268b, T268c *Physical Science,* Teacher's Edition Pages: T45g, T77f, T77g, T173f, T173g, T244a, T244b
Perform investigations using appropriate tools and technology that will extend the senses.	**National Geographic Science for Grade 4** *Life Science,* Teacher's Edition Pages: T33f, T33g, T85f, T268b, T268c *Earth Science,* Teacher's Edition Pages: T79b, T268b, T268c *Physical Science,* Teacher's Edition Pages: T5f, T77f, T141f, T205f, T244a, T244b

Indiana's Academic Standards for Science Grade 4	National Geographic Science Teacher's Edition Page References
Process Standard – The Nature of Science *(continued from previous page)*	
Use measurement skills and apply appropriate units when collecting data.	**National Geographic Science for Grade 4** *Life Science,* Teacher's Edition Pages: T33f, T33g, T45g, T213c, T268b, T268c *Earth Science,* Teacher's Edition Pages: T93g, T127c, T141g, T173c, T189g, T255c, T268b, T268c *Physical Science,* Teacher's Edition Pages: T31c, T31d, T97b, T161b, T244a, T244b
Test predictions with multiple trials.	**National Geographic Science for Grade 4** *Life Science,* Teacher's Edition Pages: T45g, T169c *Earth Science,* Teacher's Edition Page: T189g *Physical Science,* Teacher's Edition Pages: T77f, T97c
Keep accurate records in a notebook during investigations and communicate findings to others using graphs, charts, maps and models through oral and written reports.	**National Geographic Science for Grade 4** *Life Science,* Teacher's Edition Pages: T15, T33f, T33g, T45h, T85g, T169d, T181h, T213d, T268b, T268c *Earth Science,* Teacher's Edition Pages: T39d, T79b, T79d, T93h, T127d, T221h, T268b, T268c *Physical Science,* Teacher's Edition Pages: T5h, T45h, T77h, T97d, T125d, T161d, T205h, T244a, T244b
Identify simple patterns in data and propose explanations to account for the patterns.	**National Geographic Science for Grade 4** *Life Science,* Teacher's Edition Page: T169d *Earth Science,* Teacher's Edition Pages: T39d, T93g, T255c *Physical Science,* Teacher's Edition Pages: T244a, T244b
Compare the results of an investigation with the prediction.	**National Geographic Science for Grade 4** *Life Science,* Teacher's Edition Pages: T45g, T85g, T268b, T268c *Earth Science,* Teacher's Edition Pages: T93h, T127d, T141h, T173d, T221h, T268b, T268c *Physical Science,* Teacher's Edition Pages: T125d, T173h, T205f, T244a, T244b

Indiana's Academic Standards for Science Grade 4	National Geographic Science Teacher's Edition Page References
Process Standard – The Design Process	
As citizens of the constructed world, students will participate in the design process. Students will learn to use materials and tools safely and employ the basic principles of the engineering design process in order to find solutions to problems.	
Identify a need or problem to be solved.	**National Geographic Science for Grade 4** *Physical Science,* Teacher's Edition Pages: T63e-T63i, T63j Further opportunity to address the design process in Grade 4 is available. See, for example: *Life Science*, Teacher's Edition Pages:T268b-T268i, T268j-T268m *Earth Science,* Teacher's Edition Pages: T39a-T39d, T268b-T268l, T268j-T268m, T268o
Brainstorm potential solutions.	
Document the design throughout the entire design process.	
Select a solution to the need or problem.	
Select the most appropriate materials to develop a solution that will meet the need.	
Create the solution through a prototype.	
Test and evaluate how well the solution meets the goal.	
Evaluate and test the design using measurement.	
Present evidence using mathematical representations (graphs, data tables).	
Communicate the solution including evidence using mathematical representations (graphs, data tables), drawings or prototypes.	
Communicate how to improve the solution.	
Standard 1: Physical Science	
Identify heat and electricity as forms of energy that can exist within a system.	
Design and assemble electric circuits that provide a means of transferring energy from one form or place to another.	
4.1.1 Describe and investigate the different ways in which heat can be generated.	**National Geographic Science for Grade 4** *Physical Science,* Teacher's Edition Pages: T151, T153, T224
4.1.2 Investigate the variety of ways that heat can be generated and move from one place to another and explain the direction in which the heat moves.	**National Geographic Science for Grade 4** *Physical Science,* Teacher's Edition Pages: T150, T151, T152, T154, T155
4.1.3 Construct a complete circuit through which an electrical current can pass as evidenced by the lighting of a bulb or ringing of a bell.	**National Geographic Science for Grade 4** *Physical Science,* Teacher's Edition Pages: T216, T217, T218, T219, T241
4.1.4 Experiment with materials to identify conductors and insulators of heat and electricity.	**National Geographic Science for Grade 4** *Physical Science,* Teacher's Edition Pages: T154, T155, T161a, T161b, T161c, T161d, T214, T215

Indiana's Academic Standards for Science Grade 4	National Geographic Science Teacher's Edition Page References
4.1.5 Demonstrate that electrical energy can be transformed into heat, light, and sound.	**National Geographic Science for Grade 4** *Physical Science,* Teacher's Edition Pages: T222, T223, T224, T225, T226, T227
Standard 2: Earth and Space Science	
Observe, describe, and ask questions about ways that the shape of the land changes over time.	
Describe how the supply of natural resources is limited and investigate ways that humans protect and harm the environment.	
4.2.1 Demonstrate and describe how smaller rocks come from the breakage and weathering of larger rocks in a process that occurs over a long period of time.	**National Geographic Science for Grade 4** *Earth Science,* Teacher's Edition Pages: T148, T49, T151, T156, T157
4.2.2 Demonstrate and describe how wind, water and glacial ice shape and reshape earth's land surface by eroding rock and soil in some areas and depositing them in other areas in a process that occurs over a long period of time.	**National Geographic Science for Grade 4** *Earth Science,* Teacher's Edition Pages: T159, T160, T161, T162, T163, T164, T165, T168, T169, T178, T179, T180, T181, T182, T183, T184
4.2.3 Demonstrate and describe how earthquakes, volcanoes, and landslides suddenly change the shape of the land.	**National Geographic Science for Grade 4** *Earth Science,* Teacher's Edition Pages: T167, T198, T202, T203
4.2.4 Investigate earth materials that serve as natural resources and gather data to determine which are in limited supply.	**National Geographic Science for Grade 4** *Earth Science,* Teacher's Edition Pages: T106, T108, T110, T113, T114
4.2.5 Describe methods that humans currently use to extend the use of natural resources.	**National Geographic Science for Grade 4** *Earth Science,* Teacher's Edition Pages: T104, T119, T121, T123, T125
4.2.6 Describe ways in which humans have changed the natural environment that have been detrimental or beneficial.	**National Geographic Science for Grade 4** *Earth Science,* Teacher's Edition Pages: T118, T119, T120, T124, T125, T127

Indiana's Academic Standards for Science Grade 4	National Geographic Science Teacher's Edition Page References
Standard 3: Life Science	
Observe, describe, and ask questions about structures of organisms and how they affect their growth and survival.	
4.3.1 Observe and describe how offspring are very much, but not exactly, like their parents or one another. Describe how these differences in physical characteristics among individuals in a population may be advantageous for survival and reproduction.	**National Geographic Science for Grade 4** *Life Science,* Teacher's Edition Pages: T50, T61, T62, T63, T65, T66, T67
4.3.2 Observe, compare, and record the physical characteristics of living plants or animals from widely different environments, and describe how each is adapted to its environment.	**National Geographic Science for Grade 4** *Life Science,* Teacher's Edition Pages: T113, T115, T117, T119, T158, T159, T160, T161, T163
4.3.3 Design an investigation to explore how organisms meet some of their needs by responding to stimuli from their environment.	**National Geographic Science for Grade 4** *Life Science,* Teacher's Edition Pages: T169a, T169b, T169c, T169d, T181e, T181f, T181g, T181h, T268b, T268c
4.3.4 Describe a way that a given plant or animal might adapt to changes arising from human or non-human impact on the environment.	**National Geographic Science for Grade 4** *Life Science,* Teacher's Edition Pages: T64, T138, T140, T144, T158, T159, T160, T161, T163, T190, T191
Standard 4: Science, Engineering and Technology	
Design a transportation system and measure its motion.	
4.4.1 Investigate transportation systems and devices that operate on or in land, water, air and space and recognize the forces (lift, drag, friction, thrust and gravity) that affect their motion.	**National Geographic Science for Grade 4** *Physical Science,* Teacher's Edition Pages: T86, T91, T96, T97, T97b, T97c, T104, T105, T106
4.4.2 Make appropriate measurements to compare the speeds of objects in terms of distance traveled in a given amount of time or time required to travel a given distance.	**National Geographic Science for Grade 4** *Physical Science,* Teacher's Edition Pages: T89, T97c
4.4.3 Investigate how changes in speed or direction are caused by forces; the greater the force exerted on an object, the greater the change.	**National Geographic Science for Grade 4** *Physical Science,* Teacher's Edition Pages: T83, T84, T85, T97
4.4.4 Define a problem in the context of motion and transportation and propose a solution to this problem by evaluating, reevaluating and testing the design, gathering evidence about how well the design meets the needs of the problem, and documenting the design so that it can be easily replicated.	**National Geographic Science for Grade 4** *Physical Science,* Teacher's Edition Page: T97d

NATIONAL GEOGRAPHIC SCIENCE

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Indiana's Academic Standards for Science Grade 5	National Geographic Science Teacher's Edition Page References
Process Standard – The Nature of Science	
Students gain scientific knowledge by observing the natural and constructed world, performing and evaluating investigations and communicating their findings. These principles should guide student work and be integrated into the curriculum along with the content standards on a daily basis.	
Make predictions and formulate testable questions.	**National Geographic Science for Grade 5** *Life Science,* Teacher's Edition Pages: T5, T101 *Earth Science,* Teacher's Edition Pages: T93, T181 *Physical Science,* Teacher's Edition Pages: T133, T213
Design a fair test.	**National Geographic Science for Grade 5** *Life Science,* Teacher's Edition Pages: T167a, T167b, T167c, T167d *Earth Science,* Teacher's Edition Pages: T228i, T228j *Physical Science,* Teacher's Edition Pages: T252j, T252k
Plan and carry out investigations as a class, in small groups or independently, often over a period of several class lessons.	**National Geographic Science for Grade 5** *Life Science,* Teacher's Edition Pages: T85a, T121a *Earth Science,* Teacher's Edition Pages: T133a, T181a *Physical Science,* Teacher's Edition Pages: T239a, T239b
Perform investigations using appropriate tools and technology that will extend the senses.	**National Geographic Science for Grade 5** *Life Science,* Teacher's Edition Pages: T44, T45 *Earth Science,* Teacher's Edition Pages: T167a, T167b, T167c *Physical Science,* Teacher's Edition Pages: T146, T156

Indiana's Academic Standards for Science Grade 5	National Geographic Science Teacher's Edition Page References
Process Standard – The Nature of Science *(continued from previous page)*	
Use measurement skills and apply appropriate units when collecting data.	**National Geographic Science for Grade 5** *Life Science,* Teacher's Edition Pages: T181g, T181h, T181i, T181j *Earth Science,* Teacher's Edition Pages: T167b, T213b *Physical Science,* Teacher's Edition Pages: T53f, T53h
Test predictions with multiple trials.	**National Geographic Science for Grade 5** *Life Science,* Teacher's Edition Pages: T213a, T213b, T213c, T213d *Earth Science,* Teacher's Edition Pages: T5g, T5h *Physical Science,* Teacher's Edition Pages: T93l, T252o, T252p
Keep accurate records in a notebook during investigations and communicate findings to others using graphs, charts, maps and models through oral and written reports.	**National Geographic Science for Grade 5** *Life Science,* Teacher's Edition Pages: T121c, T121d *Earth Science,* Teacher's Edition Pages: T213c, T228v *Physical Science,* Teacher's Edition Pages: T173h, T252x
Identify simple patterns in data and propose explanations to account for the patterns.	**National Geographic Science for Grade 5** *Life Science,* Teacher's Edition Pages: T112, T113 *Earth Science,* Teacher's Edition Pages: T181g, T181h, T181i, T181j *Physical Science,* Teacher's Edition Pages: T117c, T117d
Compare the results of an investigation with the prediction.	**National Geographic Science for Grade 5** *Life Science,* Teacher's Edition Pages: T213a, T213b, T213c, T213d *Earth Science,* Teacher's Edition Pages: T5g, T5h *Physical Science,* Teacher's Edition Pages: T93l, T252p

Indiana's Academic Standards for Science Grade 5	National Geographic Science Teacher's Edition Page References
Process Standard – The Design Process	
As citizens of the constructed world, students will participate in the design process. Students will learn to use materials and tools safely and employ the basic principles of the engineering design process in order to find solutions to problems.	
Identify a need or problem to be solved.	**National Geographic Science for Grade 5** *Physical Science,* Teacher's Edition Pages: T159e-T159g, T159h Further opportunity to address the design process in Grade 5 is available. See, for example: *Life Science*, Teacher's Edition Pages: T82, T83, T84, T85, T228k, T228l *Earth Science,* Teacher's Edition Pages: T167d, T201, T213a, T213d, T228i-T228p, T228w
Brainstorm potential solutions.	
Document the design throughout the entire design process.	
Select a solution to the need or problem.	
Select the most appropriate materials to develop a solution that will meet the need.	
Select the most appropriate materials to develop a solution that will meet the need.	
Create the solution through a prototype.	
Test and evaluate how well the solution meets the goal.	
Evaluate and test the design using measurement.	
Present evidence using mathematical representations (graphs, data tables).	
Communicate the solution including evidence using mathematical representations (graphs, data tables), drawings or prototypes.	
Communicate how to improve the solution.	
Standard 1: Physical Science	
Define weight and volume and measure weight and volume of various objects.	
Demonstrate that mass if conserved even when a substance has undergone changes in state.	
5.1.1 Describe and measure the volume and weight of a sample of a given substance.	**National Geographic Science for Grade 5** *Physical Science,* Teacher's Edition Pages: T12, T13, T14, T15, T16, T17
5.1.2 Describe the difference between weight and mass, with the understanding that weight is dependent on gravity and mass is the amount of matter in a given substance/material.	**National Geographic Science for Grade 5** *Physical Science,* Teacher's Edition Pages: T8, T9, T14, T15

Indiana's Academic Standards for Science Grade 5	National Geographic Science Teacher's Edition Page References
Standard 1: Physical Science *(continued from previous page)*	
5.1.3 Demonstrate that regardless of how parts of an object are assembled, the weight of the whole object is identical to the sum of the weight of the parts, but the volume can differ from the sum of the volumes.	**National Geographic Science for Grade 5** The opportunity to address this objective is available. See, for example: *Physical Science,* Teacher's Edition Pages: T17, T58-T59
5.1.4 Determine if matter has been added or lost by comparing weights when melting, freezing, or dissolving a sample of a substance.	**National Geographic Science for Grade 5** *Physical Science,* Teacher's Edition Pages: T61, T62, T63, T80
5.1.5 Observe, describe and record how different quantities of starting materials will result in products with different properties.	**National Geographic Science for Grade 5** *Physical Science,* Teacher's Edition Pages: T28, T29, T20, T31, T32, T33, T34, T35
Standard 2: Earth Science	
Observe, describe, and ask questions about patterns in the sun- moon-earth system.	
5.2.1 Recognize that our earth is part of the solar system in which the sun, an average star, is the central and largest body. Observe that our solar system includes the sun, moon, seven other planets and their moons, and many other smaller objects, such as asteroids and comets.	**National Geographic Science for Grade 5** *Earth Science,* Teacher's Edition Pages: T16, T17, T18, T19, T20, T21, T22, T23
5.2.2 Observe and use pictures to record how the sun appears to move across the sky in the same general way every day but rises and sets in different places as the seasons change.	**National Geographic Science for Grade 5** *Earth Science,* Teacher's Edition Pages: T18, T19, T20, T21, T22, T23
5.2.3 In monthly intervals, observe and draw the length and direction of shadows cast by the sun at several chosen times during the day. Use the recorded data as evidence to explain how shadows are affected by the relative position of the earth and sun.	**National Geographic Science for Grade 5** *Earth Science,* Teacher's Edition Pages: T12, T13
5.2.4 Use a calendar to record observations of the shape of the moon and the rising and setting times over the course of a month. Based on the observations, describe patterns in the moon cycle.	**National Geographic Science for Grade 5** *Earth Science,* Teacher's Edition Pages: T12, T24, T25, T26, T27, T28, T29
Standard 3: Life Science	
Observe, describe, and ask questions about how changes in one part of an ecosystem create changes in other parts of the ecosystem.	
5.3.1 Observe and classify common Indiana organisms as producers, consumers, decomposers, predator and prey based on their relationships and interactions with other organisms in their ecosystem.	**National Geographic Science for Grade 5** *Life Science,* Teacher's Edition Pages: T60, T61, T62, T63, T64, T65, T66, T67, T68, T69
5.3.2 Investigate the action of different decomposers and compare the role they play in an ecosystem with that of producers and consumers.	**National Geographic Science for Grade 5** *Life Science,* Teacher's Edition Pages: T110, T111, T112, T113, T114, T115

Indiana's Academic Standards for Science Grade 5	National Geographic Science Teacher's Edition Page References
Standard 4: Science, Engineering and Technology	
Design a prototype that replaces a function of a human body part and evaluate using selected criteria.	
5.4.1 Investigate technologies that mimic human or animal musculoskeletal systems in order to meet a need.	**National Geographic Science for Grade 5** The opportunity to address this objective is available. See, for example: *Life Science,* Teacher's Edition Pages: T228c, T228f
5.4.2 Investigate the purpose of prototypes and models when designing a solution to a problem and how limitations in cost and design features might affect their construction.	**National Geographic Science for Grade 5** *Life Science,* Teacher's Edition Pages: T228b, T228c, 228f
5.4.3 Design a solution to a problem in the context of musculoskeletal body systems. Using suitable tools, techniques and materials, draw or build a prototype or model of a proposed design.	**National Geographic Science for Grade 5** *Life Science,* Teacher's Edition Pages: This objective is not specifically addressed. The *Life Science* Unit 5 wrap-up activities section could easily be expanded to introduce this assignment.