

PHYSICAL SCIENCE	
Motion and Stability: Forces and Interactions	Third Grade
SCRIPTURE	
<i>David put his hand into the bag and took out a stone, hurled it with the sling, and struck the Philistine on the forehead. The stone embedded itself in his brow, and he fell on his face to the ground.</i>	
S.1-S.2 1 Samuel 17: 49	
<i>Draw near to God, and He will draw near to you.</i>	
S.3-James 5:8	
STANDARD	
<p>S. 1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object, acknowledging that God is the first and ultimate ‘mover’ of all creation.</p> <p>a. Examples could include an unbalanced force on one side of a ball can make it start moving; and, balanced forces pushing on a box from both sides will not produce any motion at all. Assessment does not include quantitative force size, only qualitative and relative. Gravity is being addressed as a force that pulls objects down.</p> <p>S. 2. Make observations and/or measurements of an object’s motion to provide evidence that a pattern can be used to predict future motion.</p> <p>a. Examples of motion with a predictable pattern could include a child swinging on a swing, a ball rolling back and forth in a bowl, and two children on a see-saw. Assessment does not include technical terms such as period and frequency.</p> <p>S.3. Just as God draws us closer to him, determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.</p> <p>a. Examples of an electric force could include the force could include the force on hair from an electrically charged balloon and the electrical forces between a charged rod and pieces of paper; examples of magnetic force could include the force between two permanent magnets, the force between an electromagnet and steel paper clips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of cause and effect relationships could include how the distance between objects affects the strength of the force and how the orientation of magnets affects the direction of the magnetic force. Assessment is limited to forces produced by objects that can be manipulated by students, and electrical interactions are limited to static electricity.</p> <p>S.4. Define a simple design problem that can be solved by applying scientific ideas about magnets, acknowledging that they are naturally found in the world God has created.</p> <p>a. Examples of problems could include constructing a latch to keep a door shut and creating a device to keep two moving objects from touching each other.</p>	
EXAMPLES	
Alessandro Volta – Catholic scientist who worked with static electricity (1775) and invented an early electrochemical cell battery (1800)	
ESSENTIAL QUESTIONS	
<ul style="list-style-type: none"> ● What causes an object to be put in motion? ● What causes an object’s motion to stop? ● How does gravity affect the object? ● How did God first set us in ‘motion’ and how does he continue to affect us? 	
VOCABULARY TERMS	
<ul style="list-style-type: none"> ● Balance ● Unbalance 	

- Repelling force
- Attracting force
- Pattern

ACTIVITIES

S.1-S.2 Challenge students to design and create their own slingshot (using consumables: plastic cups, balloons, pom pom balls) Have students aim at small paper cut out of Goliath as a way to see how the momentum and force behind David’s stone defeated Goliath, though it was an unbalanced force.

S.3-S.4-ENGINEERING-Challenge students to move an object through a maze on a poster board without touching it. They should be able to explain what they did, and why it worked. Use concepts of attractive force to move an object through a maze by placing something magnetic (or paperclip toy car) on the maze and pulling it through the path with a magnet placed below the maze. Use concepts of repelling force to move an object through a maze by using two magnets with similar poles facing one another, and “pushing” the secondary magnet along the path with the first magnet, without actually touching them together. For the “object,” stick an image of a sheep to the magnetic item.

When the magnet *pulls (attractive force)* the sheep through the maze it shows us how Jesus leads us to Heaven. When the magnet *pushes/repels* the sheep us away backwards in the maze it shows us how sin takes us away from God. But ultimately we need Christ to bring us back and lead us through the maze.

LIFE SCIENCE

From Molecules to Organisms: Structures and Processes

THIRD GRADE

SCRIPTURE

One generation departs and another generation comes, but the world forever stays.
Ecclesiastes 1:3-11

There is an appointed time for everything...A time to give birth, and a time to die; a time to plant, and a time to uproot the plant.
Ecclesiastes 3:1-8

STANDARD

- S. 1. Develop models to describe that organisms in God’s creation have unique and diverse life-cycles, and all have in common birth, reproduction, and death.
- a. The changes that organisms in God’s creation (plants and animals) go through during their life form a pattern. Assessment of plant life cycles is limited to those of flowering plants. Does not include details of human production.

EXAMPLES

Francesco Redi was an Italian physician and poet. He is called “the founder of experimental biology” He was the first person to challenge the theory of spontaneous generation by demonstrating that maggots come from eggs of flies. He continued his experiments by capturing the maggots and waiting for them to metamorphose, which they did, becoming flies.

Stephan Endlicher (1804–1849) – botanist who formulated a major system of plant classification

ESSENTIAL QUESTIONS

- Where do specific living organisms (plants or animals) come from?
- How do certain living organisms (plants or animals) grow?
- Why did God make so many plants and animals in such different ways?

VOCABULARY TERMS

- Life-cycle
- Organism

- Birth
- Death
- Reproduction

ACTIVITIES

Following Redi’s example as an ‘experimenter in biology,’ give students one or two mealworms in a container to observe once a week for several weeks. Students should observe how this enclosed creature change over time and changed from larva to pupa to adult (beetle)

<https://i.pinimg.com/originals/86/60/92/86609214b1aaec7c147ee0597a831991.png>

<http://ourmealworms.weebly.com/uploads/4/6/2/9/46297011/1422992292.png>

Students can keep an observation journal and record what they observe about their mealworm once a week (or more).

LIFE SCIENCE

Ecosystems: Interactions, Energy, and Dynamics.

THIRD GRADE

SCRIPTURE

Indeed, the parts of the body that seem to be weaker are all the more necessary

1 Corinthians 12:12-26

STANDARD

S. 1. Construct an argument that some animals in God’s creation form groups that help members survive.

- a. Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve in different functions and vary dramatically in size.

EXAMPLES

The saints are a great example of how one individual can influence many.

Saint Therese and her ‘Little Way’

Bartolomeo Eustachi-was one of the founders of the science of human anatomy.

ESSENTIAL QUESTIONS

- How is a part essential for the whole?
- How does one member help/hurt an entire group?
- How do I play a part in the community?
- How do we see that God made each person to be important and one of a kind?

VOCABULARY TERMS

- Member
- Group
- Survive

ACTIVITIES

Roll out butcher paper and trace a student’s body. Cut the body tracing off the roll and lay it out on a table. Remind the students that we are all part of the Body of Christ and we all have different talents and skills. Brainstorm all the skills, talents, and tasks that are performed in the Body of Christ, the Church. Students should write them down as they think of them, spreading them throughout the traced body. Label the paper, “The Body of Christ” and allow students to sign their names. Hang it up!

This activity will help students see how each part of their body is essential to who they are, and each one has a unique and important job. If a part of you body fails (your heart, a limb) it can affect you as a whole.

Similarly, YOU (the member) are an essential part of the body of Christ (the group) and YOU have a unique and important job to help the church to grow and thrive.

LIFE SCIENCE

Heredity: Inheritance and Variation of Traits.

THIRD GRADE

SCRIPTURE

Does not scripture say that the Messiah will be of David's family and come from Bethlehem, the village where David lived?

John 7:42

STANDARD

- S. 1. Analyze and interpret data to provide evidence that plants and animals within God's creation have traits inherited from parents and that variation of these traits exists in a group or similar organisms.
- Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans. (does not include genetics mechanisms of inheritance and prediction of traits; is limited to only non-human examples)
- S. 2. Use evidence to support the explanation that traits of organisms within God's Creation can be influenced by their environment.
- Examples of the environment affecting a trait could include normally tall plants grown with insufficient water are stunted; and a pet dog that is given too much food and little exercise may become overweight.

EXAMPLES

Antoine Laurent de Jussieu was a French botanist, notable as the first to publish a natural classification of flowering plants; much of his system remains in use today. His classification was based on an extended unpublished work by his uncle, the botanist Bernard de Jussieu.

ESSENTIAL QUESTIONS

- How does each person inherit the traits that they have?
- Where do our physical traits and interests come from?
- Do I see my own traits in my parents?
- What traits did Jesus inherit from his Mother and from God the Father?

VOCABULARY TERMS

- Inherited
- Trait
- Random Variation
- Parent
- Offspring

ACTIVITIES

S. 1 Using the family tree of Joseph, the Foster Father of Jesus and Mary, the Mother of God, have students analyze this family tree (<https://lightnercrew.files.wordpress.com/2013/07/houseof david.jpg>) and show them that Jesus' lineage goes all the way back to King David. This visual aid will help students to understand how Jesus is both the King of Heaven *and* on Earth because he is the Son of God as well as a member of a line of 'royalty'.

Read the book "The One and Only Me" and have students match the offspring with the parent and discuss the traits found in both parent and offspring. Students may also create their own 'My Hereditary Tree'. Students will list their inherited and learned traits that they received from their parents and display what is unique about us and why. <https://i.pinimg.com/564x/ef/16/71/ef1671ab115425652f1e28eb51bb8d9b.jpg>

S. 2 Referring to Biological Evolution: Unity and Diversity - the activity on planting seeds in different grounds can also be used here.

LIFE SCIENCE	
Biological Evolution: Unity and Diversity	THIRD GRADE
SCRIPTURE	
<p>The Parable of the Sower-<i>The seed falling on rocky ground refers to someone who hears the word and at once receives it with joy. But since they have no root, they last only a short time. When trouble or persecution comes because of the word, they quickly fall away. The seed falling among the thorns refers to someone who hears the word, but the worries of this life and the deceitfulness of wealth choke the word, making it unfruitful. But the seed falling on good soil refers to someone who hears the word and understands it. This is the one who produces a crop, yielding a hundred, sixty or thirty times what was sown.</i></p> <p>Matthew 13: 20-23</p> <p><i>Do not be conformed to this world, but be transformed by the renewal of your mind, that by testing you may discern what is the will of God, what is good and acceptable and perfect.</i></p> <p>Romans 12:2</p>	
STANDARD	
<p>S. 1. Analyze and interpret data from fossils to provide evidence of the organisms in God’s creation and the environments in which they lived long ago.</p> <p>S. 2. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.</p> <p>S. 3. Construct an argument with evidence that in a particular habitat some organisms in God’s creation can survive well, some survive less well, and some cannot survive at all.</p> <p>S. 4. Make a claim about the merits of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.</p>	
EXAMPLES	
<p>Coronado discovered the Grand Canyon (Catholic Spanish explorer) which contains fossil records Joachim Barrand-For ten years (1840–1850) he made a detailed study of these rocks, engaging workmen specially to collect fossils, and in this way he obtained upwards of 3500 species of graptolites, brachiopoda, mollusca, trilobites and fishes.</p>	
ESSENTIAL QUESTIONS	
<ul style="list-style-type: none"> ● What elements of the environment make survival easier or harder? ● How do animals ‘learn’ to survive when their environment changes? ● Where do we see this in God’s creation? 	
VOCABULARY TERMS	
<ul style="list-style-type: none"> ● Survive ● Adapt ● Environmental Changes ● Advantage ● Disadvantage 	
ACTIVITIES	
<p>S.1 Using images of shark teeth, leaf imprints, scorpion imprints, turtle shells, fish bones, etc. have students determine the type of fossils and the type of environment where the creature lived. Students should be able to explain their answers. This activity will help students to see and appreciate the vast variety in God’s creation and how each organism serves its own purpose.</p>	

S.2 Place students into groups of five. Allow students to select one student in each group to represent a less-skilled gatherer of food. The less-skilled gatherer will only be allowed to pick up as much pasta as he or she can grasp with their thumb and forefinger. The remaining students in the group represent highly skilled food gatherers. They will be allowed to pick up as much pasta as they can using their entire hand. On your signal, allow the students to walk across the room and gather their pasta (food) in the appropriate manner (either whole-hand, or thumb and finger). Have students record the amount of food they were able to collect on their own in their journal. Direct students to combine all of the food gathered by the members of their group into a single pile, divide it equally among the members of the group. Have students discuss the following: Do you think skilled hunters are always successful in getting food? What do you predict would happen to the most skilled and successful hunter if injured? Without the group, what would happen to the less-skilled hunters? (from STEMSCOPEDIA)

S.3 Read Matthew 13. Have students predict what would happen to a seed if it were planted on hard ground, thorny ground, or in rich soil. Then have students “plant” seeds in these environments and observe for a few weeks. Students should record observations and explain why some seeds were fruitful and why some were not. Also, they could answer the following question: What does ‘rich soil’ mean for our faith and what does ‘stony/thorny’ ground mean for our faith?

EARTH AND SPACE SCIENCE	
Earth's Systems	Third Grade
SCRIPTURE	
<p><i>There is an appointed time for everything...A time to give birth, and a time to die; a time to plant, and a time to uproot the plant.</i> Ecclesiastes 3:1-8</p> <p><i>As long as the earth endures, seedtime and harvest, cold and heat, summer and winter, day and night will never cease.</i> Genesis 8:22</p> <p><i>For as the rain and the snow come down from heaven and do not return there but water the earth, making it bring forth and sprout, giving seed to the sower and bread to the eater, so shall my words be that goes out from my mouth; it shall not return to me empty, but it shall accomplish that which I purpose, and shall succeed in the thing for which I sent it.</i> Isaiah 55:10-11</p>	
STANDARD	
<p>S. 1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.</p> <p>a. Examples of data could include average temperature, precipitation, and wind direction. Assessment of graphical displays is limited to pictographs and bar graphs.</p> <p>S. 2. Obtain and combine information to describe climates in different regions of the world that God has created.</p>	
EXAMPLES	
<p>Antoine Laurent de Jussieu was a French botanist, notable as the first to publish a natural classification of flowering plants; much of his system remains in use today. His classification was based on an extended unpublished work by his uncle, the botanist Bernard de Jussieu.</p>	

José Antonio de Alzate y Ramírez was a Mexican priest who was one of the earliest reliable observers of Mexican meteorology. (21 November 1737 – 2 February 1799)

ESSENTIAL QUESTIONS

- Why do certain regions of our country/our world have different weather patterns and climates?
- What patterns do we see in regional climate?
- What is the weather and climate like where I live?
- What could be a reason that God designed our world in this way?

VOCABULARY TERMS

- Data
- Weather
- Climate
- Seasons
- Regions

ACTIVITIES

S. 1 As a class, conduct research on the different regions of our country and the different weather patterns and crops that are found in the Northeast, Midwest, South, and West (dividing as you see fit for your Geography curriculum). Create a large scale map of the USA. Using 3D materials or simply art supplies to display these weather/climate patterns and crops grown in the region. Hang it on the wall!

<http://hansengeorge.blogspot.com/2013/10/world-studies-regions-project.html?m=1>

S.2 Tell students they are travel agents specializing in teacher vacation packages providing information to help teachers choose their ideal destination based on climate. (online sources may be used such as <https://weather.com/>). Divide students into groups. Give students a list of major cities to choose as a destination. Students research climate and create brochures, infomercials, dioramas, posters, slideshows of their destination.

https://cdn.acceleratelearning.com/system/part_type_image/images/129864/normal/Weather_and_Climate_color.png?1465930814

EARTH AND SPACE SCIENCE

Earth and Human Activity

Third Grade

SCRIPTURE

They came to Jesus and woke Him up, saying, "Master, Master, we are perishing!" And He got up and rebuked the wind and the surging waves, and they stopped, and it became calm. And He said to them, "Where is your faith?" They were fearful and amazed, saying to one another, "Who then is this, that He commands even the winds and the water, and they obey Him?"

Luke 8:24-25

The Story of Noah -Genesis 5:32-10:1->through end of story

STANDARD

S. 1. Make a claim about the merits of a design solution that reduces the impacts of a weather-related hazards.

EXAMPLES

Prokop Divis-theologian and natural scientist of Czechoslovakia who invented the 1st grounded lightning rod

ESSENTIAL QUESTIONS

- What can we do to prepare for weather hazards?

- What can we do to recover after a weather hazard?
- Can we protect ourselves from weather hazards without always getting a miracle from God?
- How can we help and serve our neighbor in times of hazard?

VOCABULARY TERMS

- Weather
- Climate
- Hazard
- Impact

ACTIVITIES

Have students imagine what it would be like if the story of Noah had happened today. Besides building the ark, what else could Noah have done to protect his family and the animals from the flood? Students will create their own flood barriers! Tell them the weather forecast is for heavy flooding in the area. You need to build a flood barrier or flood resistant shelter to keep the family safe! Students must design a shelter with the available supplies (cardboard, tape, pipe cleaner, tp roll, cotton ball, plastic lid. etc.) that is resistant to flooding. The shelter will be tested with water in a pan to see if the design was effective as a flood barrier. They can experiment with materials to see if they can protect Noah and the animals. Trial and error will lead them to revise and change their model. <https://www.teacherspayteachers.com/Product/Weather-Hazard-STEM-Flood-Barrier-Challenge-2240222>

ENGINEERING

Engineering Design

THIRD GRADE

SCRIPTURE

God created man in His own image

Genesis 1:27

The Story of Noah -Genesis 5:32-10:1->through end of story

STANDARD

- S. 1. Define a simple design problem reflecting a need or a want for God’s people that includes specified criteria for success and constraints on materials, time, or cost.
- S. 2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem while maintaining respect for the design in which creation is already set.
- S. 3. Following the model of God being the original engineer, plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

EXAMPLES

Jonathan Lunine (1959–) – planetary scientist at the forefront of research into planet formation, evolution, and habitability; serves as vice-president of the Society of Catholic Scientists

Wilhelm Heinrich Waagen (1841–1900) – geologist and paleontologist who provided the first example of evolution described from the geologic record, after studying Jurassic ammonites

ESSENTIAL QUESTIONS

- What is the difference between a want and a need?
- What is success?
- When you are building something, how do you know when it is ready/complete?
- How did God know when he was ‘done’ creating the World and everything was ready?

- What needs exist on Earth that were solved in the creation story? Ex. birds need the sky, fish need the sea-time to work (day), and time to rest (night).
- How does God allow us to participate in his creation?

VOCABULARY TERMS

- Criteria
- Problem
- Solution
- Variables
- Prototype
- Want
- Need

ACTIVITIES

S. 1 Students will read the Creation Story then play a game where students must list all comparing and contrasting traits between Adam and the animals he named. In the end, students will be able to see that Eve has the most in common with Adam which is why she is a perfect partner for him! They think alike, they look alike, they communicate in the same way, and so they are able to 'meet the criteria' and need of the other person. Students can also create an expandable creation story book, and discuss how each part of creation fills a need and solves a problem that could happen in the world (light and dark, sea and land, etc...) Discuss how God could have made the world in any way (prototypes) but chose to do it this way because it was the best way! <https://craftingthewordofgod.com/2013/10/17/in-the-beginning-bookmark/>

S.1, S.2, S.3 Project encompassing all: Mechanical engineers research, design, develop, and test tools, engines, and all kinds of mechanical devices. Give students the scenario that they must create a 'river course' which Noah's arc (a toy car with a picture of an arc attached to it) will travel through during the flood (it will resemble a racetrack). They must design a water maze that can move the 'arc' around in 30 seconds or less using the force of magnetism. Tell the students that they are going to be mechanical engineers for a day, designing and creating a way to move a toy 'arc' around a track using the force of magnetism. Students design and construct a 'racetrack' that uses magnetism to make the car move. The racetrack must be constructed from one piece of poster board. You may guide the 'arc' without actually touching it. The toy 'arc' must go around the track using magnetic force without the guiding magnet directly touching it. The arc must change directions three or more times while moving from one side of the poster board to the other. Prompt the students to list the steps of their plan and design for the challenge in a journal. Students could tape a washer to the bottom of the arc and hold a magnet below the poster board to guide it through the course without touching the magnet to the car. Students need to explain how their solution will solve the problem. Students must have sufficient evidence to support their design. Invite other students/groups to ask questions. (based on a Stemsopes Exploration lesson)