Teacher Guide for the 36-week, 4th-6th grade science course!

The vital resource for grading quizzes and tests from the Science Starters: Elementary Physical & Earth Science course, which includes:

- Instruction on earth science and physical science from a young-earth, creationist perspective
- An instructional calendar to provide guidance for the investigations, hands-on projects, quizzes, and more.

OVERVIEW: Elementary physical science and earth science come alive through this activities-driven science course that ignites a sense of curiosity about the wonderful world God has made. Concepts are introduced in an engaging way by highlighting the science behind kids at play, like rollerskating, skateboarding, and even running. By guiding students through these easy-to-understand investigations, they learn to observe and relate what they have personally observed in detail. The learning progression helps students engage, investigate, explain, apply, expand, and assess the scientific principles, and is filled with helpful images, diagrams, and inexpensive activities. Students discover why caves and sinkholes form, what is in the soil we walk on every day, how warning signs are present prior to volcanic eruptions, what tests can be used to identify rocks, and more. This comprehensive series makes the study of God's creation both enjoyable and educational!

FEATURES: Two to three lessons weekly with clear objectives, and assessments based on the experiments and weekly learning.

- Approximately 30 to 45 minutes per lesson, two or three days a week
- Includes answer keys for quizzes and tests
- Quizzes and tests are included to help reinforce learning and provide assessment opportunities
- Designed for grades 4 to 6 in a one-year course

Tom DeRosa is an experienced science educator, a committed creationist, and founder/director of a growing national creation organization whose chief focus is education. His experience in the public school, Christian school, and homeschool markets for over 35 years has given special insights into what really works in engaging young minds. He holds a master’s degree in education, with the emphasis of science curriculum.

Carolyn Reeves is especially skilled at creating ways to help students develop a greater understanding of not just scientific concepts, but also how these are applied within the world around us. Carolyn retired after a 30-year career as a science teacher, finished a doctoral degree in science education, and now serves as a writer and an educational consultant.
I’m loving this whole line so much. It’s changed our homeschool for the better!
—Amy ★★★★★

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Curriculum
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Using This Teacher Guide

**Features:** The suggested weekly schedule enclosed has easy-to-manage lessons that guide the reading, worksheets, and all assessments. The pages of this guide are perforated and three-hole punched so materials are easy to tear out, hand out, grade, and store. Teachers are encouraged to adjust the schedule and materials needed in order to best work within their unique educational program.

**Lesson Scheduling:** Students are instructed to read the pages in their book and then complete the corresponding section provided by the teacher. Assessments that may include worksheets, activities, quizzes, and tests are given at regular intervals with space to record each grade. Space is provided on the weekly schedule for assignment dates, and flexibility in scheduling is encouraged. Teachers may adapt the scheduled days per each unique student situation. As the student completes each assignment, this can be marked with an “X” in the box.

| ![Clock] | Approximately 30 to 45 minutes per lesson, two to three days a week |
| ![Key] | Includes answer keys for quizzes and tests. |
| ![Document] | Quizzes and tests are included to help reinforce learning and provide assessment opportunities. |
| ![Repeat] | Designed for grades 4 to 6 in a one-year course |

**Course Objectives:** Students completing this course will

- Learn how to determine the speed and motion of favorite toys
- Create a catapult and experience the mechanics of pulleys
- Examine natural occurrences such as mountains, volcanoes, rocks, minerals, crystals, water, and dirt
- Discover why friction creates heat
- Use household items such as hard boiled eggs, oranges, measuring cups, maps, clay and markers to see these scientific truths will come to life.
- Learn how to determine the speed and motion of favorite toys, create a catapult and experience the mechanics of pulleys, set up a floating pencil race, and discover why friction creates heat.
Course Description

The Investigate the Possibilities curriculum has been developed with the following learning progression:

Engage - Students make a note of what they know or have experienced about the topic.
Investigate - Students will follow the instructions and make observations of what happens.
Explain - Students will begin to understand the science behind what they observed in the investigation.
Apply - Here, the understanding of the investigation is related to other situations and ideas.
Expand - Each investigation also includes a few “Dig Deeper” projects to further understanding.
Assess - Students explain what they have learned.

Elementary physical science and earth science comes alive through this activities-driven science course that ignites a sense of curiosity about the wonderful world God has made. Concepts are introduced in an engaging way by highlighting the science behind kids at play, like roller-skating, skateboarding, and even running. By guiding students through these easy-to-understand investigations, they learn to observe and relate what they have personally observed in detail. The learning progression helps students engage, investigate, explain, apply, expand, and assess the scientific principles, and is filled with helpful images, diagrams, and inexpensive activities. Students discover why caves and sinkholes form, what is in the soil we walk on every day, how warning signs are present prior to volcanic eruptions, what tests can be used to identify rocks, and more. This comprehensive series makes the study of God’s creation both enjoyable and educational!
Calculating a Final Grade

Calculate the Average of the student’s Activities & Observations grades.

Divide the average by 3

Calculate the Average of the student’s Questions & Quizzes grades.

Divide the average by 3

Calculate the Average of the student’s Projects, Contest & Dig Deeper grades.

Divide the average by 3

Add up the numbers for the Final Grade:

Suggested Optional Science Lab

There are a variety of companies that offer science labs that complement our courses. These items are only suggestions, not requirements, and they are not included in the daily schedule. We have tried to find materials that are free of evolutionary teaching, but please review any materials prior to presentation. The following items are available from www.HomeTrainingTools.com.

RM-GEOBAG  Geology Field Trip in a Bag
RM-ROCKMIN  Rocks & Minerals of the U.S. Basic Set
# First Semester Suggested Daily Schedule

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First Semester-Second Quarter — **Forces & Motion**
Quizzes and Test
for Use with
Forces & Motion

Testing:
This series is appropriate for elementary students from 3rd to 6th grades. Because of this, we have included quizzes and tests in two different levels, which you can choose from based on your child’s abilities and understanding of the concepts in the course.

Level 1: suggested for younger ages or those who struggle with application of the concepts beyond just definitions and basic concepts

Level 2: suggested for older ages or those who can both grasp the scientific concepts and apply them consistently

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Choose answers from these terms.  
All the terms may not be used and some may be used more than once:

- centimeters
- engineer
- frame of reference
- friction
- heat
- increase
- inertia
- no
- north
- reduce
- rolling friction
- scientist
- second
- sliding friction
- south
- streamlined
- time
- yes

Fill in the Blank: Each question is worth 5 points.

1. In order to find something’s speed, you need to divide the distance by the ______.

2. Does this graph of a runner’s speed show that the runner kept on going faster and faster? ______

3. Suppose a bug’s speed is 2 cm/s. This means it can travel 2 ____________ per ____________.

4. In order to tell how something is moving, you need a ____________.

5. A flat boat is moving north at 10 miles per hour. A walking toy on the boat is moving south at 5 miles per hour. Would someone watching the walking toy from the bank of the river see it moving north or south?

6. Is Darwin’s idea that all living things evolved from a one-celled organism represented by a forest of trees?

7. What force causes your tennis shoes to wear out?

8. What force helps you to walk without falling down?

9. Friction always produces what form of energy?

10. Ball bearings and roller bearings are used to ____________ friction.

11. Is it possible for the same set of facts to be interpreted in more than one way?

12. Many birds have a special shape that lets them fly smoothly through the air with little friction. What is this shape called?

13. Does a force have to be applied to an object to cause it to start moving?

14. Does a force have to be applied to a moving object to cause it to stop moving?

15. Which force is greater if other conditions are the same—rolling friction or sliding friction?

16. Someone who builds rockets and tries to make them faster, cheaper, and safer is called a rocket ____________.
Creative Interpretation: Each image is worth 10 points.

17. Sometimes we have one set of limited facts and can come to different conclusions. Examine the following image and what “remains” of a painting. Then draw two possible reconstructions.

Remains of the original painting    Possible reconstruction #1    Possible reconstruction #2
Choose answers from these terms.
All the terms may not be used and some may be used more than once:

- air
- Bernoulli
- buoyant
- density
- engineer
- falls
- friction
- gravity
- inertia
- lift
- mass
- mountaintop
- no
- resistance
- same
- sea level
- scientist
- volume
- yes

Fill in the Blank: Each blank is worth 5 points.

1. All matter has a tendency to keep moving once it is in motion. This property is called ____________.

2. Does air have weight?

3. Is air pressure greater at sea level or on a mountaintop?

4. Will a balloon get larger if the air pressure inside the balloon remains the same, but the air pressure outside becomes less?

5. Is there gravity on the moon?

6. A feather would fall as fast as a hammer on the moon, because there is no ____________ around the moon.

7. What is the unbalanced force pulling down on a falling object?

8. Does air’s resistance push up on a falling object?

9. Does air fill the space inside an “empty” cup?

10. Does friction push on a moving object opposite to the way the object is moving?

11. Archimedes used a method known as water displacement to measure what?

12. Archimedes discovered that there is a ____________ force on objects floating in water that is equal to the weight of the water the object displaces.

13. Would a solid block of iron displace the same amount of water as a boat made from an equal block of iron?

14. If you know the volume and the weight of an object, you can calculate what?

15. What is the name of the force that pushes upward on an airplane wing?
16. Are the forces on a floating ship balanced if the buoyant force is equal to the weight of the ship?

17. A hammer and a feather fall at the ______________ speed on the moon because there is no ______________ around the moon. Thus, there is no air ______________ on the feather as it ______________.
Quizzes and Test

for Use with

Earth

Testing:
This series is appropriate for both upper elementary and junior high students. Because of this, we have included quizzes and tests in two different levels which you can choose from based on your child’s abilities and understanding of the concepts in the course.

Level 1: suggested for younger ages or those who struggle with application of the concepts beyond just definitions and basic concepts

Level 2: suggested for older ages or those who can both grasp the scientific concepts and apply them consistently

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The Earth
Concepts & Comprehension
Quiz 1
Scope: Chapters 1–4
Total score: ____ of 100
Name

Fill in the Blank Questions: (4 points each)

Choose answers from these terms.
All the terms may not be used and some may be used more than once:

building materials  circle of lava  coal  color
concave-type  convection-type  crust  earthquake zone
earthquakes  elastic rebound theory  engineering  ethanol
gas  height  general position sector
hydrogen  longitudinal line(s)  helium
iron and nickel  magma
nickel and iron  oil
magma  mineral deposits
New Madrid Fault  Pangaea
glacial line(s)  steel
glacial line(s)  seafloor spreading
Mount Rushmore  steel
on or near the equator  tsunami
Ring of Fire  under land
twenty-four (24)  under ocean
weight

1. The International Date Line is a _____________________.
2. What is the name of the starting longitudinal line that is designated as 0°? _______________
3. Which lines go from the North Pole to the South Pole? _______________
4. Which lines circle the earth and are parallel to the equator? _______________
5. What part of the earth doesn’t have four seasons? _______________
6. Into how many time zones is the earth divided? _______________
7. What do the letters “GPS” mean when referring to a GPS device?
8. In which layer of the earth are solid rocks found that are not extremely hot? _______________
9. Most scientists believe the core of the earth is made of what elements? _______________
10. Is the earth’s crust thicker under the continents or under the oceans? _______________
11. Some geologists believe there are _______________ currents in parts of the earth’s mantle and core.
12. What are three natural resources found in the earth’s crust?
   a. _______________
   b. _______________
   c. _______________
13. Is the Mid-Atlantic Ridge a region of subduction or seafloor spreading? _______________
14. _______________ occur frequently along or near the San Andreas Fault in western California.
15. The ______________________are thought to have formed when two crustal plates collided into each other, but neither plate slid under the other one.

16. _____________________may have been the original land mass that broke apart and formed today's continents.

17. According to the ________________________, rocks break loose from a position of tension — and suddenly surge forward.

18. An earthquake begins as locked-up sections of rocks break free, creating more or less tension on the rocks? ________________________

19. Crustal plate movement is occurring along the fault line known as the ______________________ as the Pacific Plate is slowly moving past the North American Plate.

20. One of the main earthquake belts in the earth is known as the “________________.”

**Short Answer:** Each question is worth 5 points.

21. What can a GPS device in an automobile do?

22. Where are earthquakes most prone to occur?

23. What is happening where the Pacific Plate and the North American Plate meet along the coast of California?

24. The three main states of matter are solid, liquid, and gas. What is meant by a plastic state?

**Bonus Question:** (worth 5 points)

25. Sometimes buildings fall in during an earthquake. What are two things that play a big role in how well a building can withstand an earthquake?
Fill in the Blank Questions: (6 points each)

Choose answers from these terms.
All the terms may not be used and some may be used more than once:

Badlands (South Dakota) extrusive
Grand Canyon lava no
volcanic eruptions yearly

1. The strength of an earthquake is reported as a number from 0 to 10, known as the ____________.
2. What is the name of the instrument that is used to study and identify earthquakes?

3. How often do earthquakes occur throughout the world?
4. Which earthquake is more powerful — one that measures 3 on the Richter scale or one that measures 9 on the Richter scale? ________________
5. When magma reaches the surface of the earth, it is called__________.
6. Were there warning signs that Mount St. Helens was about to erupt before May 18, 1980? _____________
7. ____________, like earthquakes, tend to be found where large crustal plates meet. Sometimes they are found in areas known as “hot spots.”
8. Are volcanic eruptions always violent and explosive?
9. Give an example of a place in the United States where miles of flat, level layers of strata can be seen.

10. Name at least three ways in which sedimentary layers can be laid down in nature.
   a. 
   b. 
   c. 
11. Which of the following processes is most likely to produce flat level layers of sediment — glaciers, wind, water, or volcanic eruptions? ________________
12. What do we call breaks and cracks in large rock formations when rock on one side of the crack has slipped and moved?
13. ________________ rocks form when magma reaches the surface of the earth and hardens there.
14. _______________ rocks are rocks that cool and harden from hot magma below the surface of the earth.

15. Are dikes and sills intrusive or extrusive rocks? _______________

**Short Answer:** Each question is worth 5 points.

16. What are some ways the government of a country could reduce the deaths and damage caused by an earthquake?

17. Where are the two main earthquake belts in the earth?

**Bonus Question:** (worth 5 points)

18. This island first appeared in 1963. ________________.
Quiz and Test Answers
for Use with
Science Starters: Elementary Physical & Earth Science
# Forces & Motion

## Quiz Answer Keys

### Level 1 & 2

#### Quiz 1 Level 1, chapters 1-4
1. time
2. no
3. centimeters – second
4. frame of reference
5. north
6. no
7. friction
8. friction
9. heat
10. reduce
11. yes
12. streamlined
13. yes
14. yes
15. sliding friction
16. engineer
17. 

#### Quiz 3 Level 1, chapters 9-14
1. inertia
2. no
3. no
4. no
5. force
6. gravity
7. friction
8. no
9. torsion
10. Newton
11. no
12. yes
13. gravity
14. no
15. space
16. reaction
17. matter, moving, speed, friction

#### Quiz 2 Level 1, chapters 5-8
1. c
2. a
3. c
4. c
5. a
6. c
7. b
8. a
9. a
10. c
11. c

#### Quiz 4 Level 1, chapters 15-20
1. lower
2. yes
3. no
4. faster
5. moveable
6. yes
7. yes
8. big
9. wheel
10. no

#### Quiz 2 Level 2, chapters 5-8
1. c
2. a
3. c
4. a
5. a
6. a
7. a
8. b
9. b
10. a
11. c
12. c

#### Quiz 3 Level 2, chapters 9-14
1. c
2. c
3. b
4. b
5. a
6. a
7. b
8. b

#### Quiz 1 Level 2, chapters 1-4
1. c
2. a
3. c
4. c
5. a
6. c
7. b
9. b
10. a
11. c
12. a
13. c
14. b
15. a
16. b
17. c
18. c
19. b
20. a
21. a
22. a
23. b
24. c
25. a

Quiz 4 Level 2, chapters 15-20
1. a
2. b
3. a
4. a
5. a
6. a
7. c
8. a
9. b
10. a
11. b
12. b
13. a
14. b
15. b
16. a
17. b
18. a
19. a
20. a
21. c
22. a
23. b
24. b
25. b

Forces & Motion ➔
Test Answer Key
Level 1 & 2

Test 1 Level 1
1. time
2. frame of reference
3. friction
4. friction
5. heat
6. reduce
7. yes
8. yes
9. inertia
10. yes
11. yes
12. air
13. gravity
14. engineer
15. buoyant
16. density
17. lift
18. Bernoulli
19. inertia
20. no
21. force
22. gravity
23. no
24. gravity
25. space
26. yes
27. no
28. faster
29. moveable
30. no
31. Answers will vary. Should mention at least four of the following points for full credit:
   • There are upward and downward forces acting on the pencil as it falls.
   • The pencil's weight (from the earth's gravity) is a force that pulls down on the pencil.
   • There is some friction between the pencil and the air, which pushes up on the pencil.
   • The upward force on the pencil is increased by connecting a parachute-like device to the pencil. The parachute produces more air resistance.
   • More than one force was acting on the pencil as it was falling.
   • The weight of the pencil (gravitational force) was pulling down while the air resistance/friction was pushing up.
32. Answers will vary. Should mention at least four of the following points for full credit:
   • The thing that determines whether or not the ship will float is the weight of the water it displaces.
   • If the weight of the displaced water is equal to the weight of the ship, the ship will float.
   • If the weight of the displaced water is less than the weight of the ship, the ship will sink.
   • The upward force the water exerts on floating or sunken boats is called buoyant force.
   • Recall that when two forces oppose each other, they are said to be balanced when they cancel each other out. There are balanced forces acting on a floating ship.
   • The weight of the ship (from the earth's gravitational force) pulls down.
   • At the same time, the buoyant force on the ship pushes up. Therefore, the two forces cancel each other out, and the forces acting on the boat are balanced.

Test 1 Level 2
1. c
2. c
3. c
4. a
5. a
Bonus question: c

The Earth Quiz Answer Keys
Level 1 & 2

Quiz One, Level 1 Chapters 1-4
1. longitudinal line
2. the Greenwich Meridian or the Prime Meridian
3. longitudinal lines
4. latitudinal lines
5. the part of the earth on or near the equator
6. 24
7. it stands for Global Positioning System.
8. crust
9. iron and nickel
10. under land
11. convection-type
12. Any of the following: In addition to rocks and soil, the crust also contains water, coal, oil, gas, ores, and mineral deposits.
13. seafloor spreading
14. earthquakes
15. Himalayan Mountains
16. Pangaea
17. elastic rebound theory
18. less
19. San Andreas Fault
20. Ring of Fire
21. Global Positioning Systems can tell you where you are on the earth. They are usually able to show you how to get to a specific address.
22. Earthquakes tend to occur along the boundary of crustal plates or along other fault lines, especially where one plate in the earth’s crust is pushing against another plate or where two plates are sliding past each other.
23. The two plates are sliding and grinding past each other as the Pacific Plate moves northward at the rate of about 5 centimeters (just over an inch and a half) per year.
24. Something in-between a solid and a liquid; often depends on the amount of pressure and temperature on the material.
25. The engineering design and the materials used in buildings

Quiz Two, Level 1 Chapters 5-8
1. Richter scale
2. seismograph
3. every day
4. one that measures 9 on the Richter scale
5. lava
6. yes
7. volcanoes
8. no
9. Grand Canyon, Badlands of South Dakota, other places
10. Any of these: water, wind, glaciers, and volcanic eruptions
11. water
12. faults
13. extrusive rocks
14. intrusive
15. intrusive
16. They could enforce building codes for houses, schools, and other buildings that reduce the chances of the buildings falling in during an earthquake. Even if everyone could not afford to do this, the government could be sure that certain buildings, such as schools and hospitals, were built according to safe building codes.
17. One belt follows the coastline around the Pacific Ocean and is known as the “Ring of Fire.” The other belt is next to the Mediterranean Sea and extends to southern Asia.
18. Surtsey

**Quiz Three, Level 1 Chapters 9-12**

1. no
2. steep
3. gradual
4. topographic
5. no
6. small
7. yes
8. minerals
9. quartz, mica, and feldspar.
10. silicate
11. feldspars, micas, olivines, pyroxenes, amphiboles, quartz, clay minerals, and calcite (calcium carbonate)
12. calcium carbonate
13. limestone
14. sedimentary
15. heat and pressure
16. plants and animals that live in the ocean (or once lived there)
17. the surface of the ocean (sea level)
18. Granite is made up of several minerals that have been cemented together into a rock. A mineral is a pure substance.
19. Crystals have flat faces and a definite shape and rocks don’t. Crystals are pure substances and rocks are a mixture of minerals (crystals).
20. Erosion is a broad term that includes the processes that move soil, sediment, and other materials on the earth from one place to another.

**Quiz Four, Level 1 Chapters 13-16**

1. sedimentary, igneous, and metamorphic
2. metamorphic
3. intrusive igneous
4. sandstone, limestone, shale, conglomerate, and others
5. igneous
6. sedimentation
7. deposition
8. large/heavy
9. Delta
10. glaciers
11. on hills/bare ground
12. oxbow lake
13. physical weathering
14. expands
15. sharp and jagged
16. topsoil
17. sedimentation
18. iron oxide
19. limestone
20. Erosion is a broad term that includes the processes that move soil, sediment, and other materials on the earth from one place to another.

**Quiz Five, Level 1 Chapters 17-20**

1. water table
2. dry
3. pores
4. porosity
5. aquifer
6. deep below
7. saturated
8. runoff
9. stalactites; stalagmites
10. hot
11. drought
12. glaciers
13. valley/continental
14. humus
15. no
16. The porosity of the soil. If there is a layer of soil that is not porous, such as clay, then water cannot get past that layer (unless there are cracks in the clay layer). As long as the soil is porous (or cracked), it can seep farther down.
17. Even though water can’t seep past a layer of hard rock, if the rock is cracked, water can travel through the cracks and cause a wearing down of the rocks.
18. When water combines with carbon dioxide, a weak acid known as carbonic acid forms. Carbonic acid reacts chemically with limestone rocks, causing the limestone to come apart.
19. In some places around the world, streams and shallow wells are dangerously polluted with disease-causing organisms, but are the only available source of drinking water. Water from clean wells would greatly improve the health of people in these areas.