

## Unit 1.9: Earth and Space Science – Earth's Orbit & Review

**Weekly Focus:** Reading for Main Idea  
**Weekly Skill:** Review of Unit 1 – Earth & Space Science

**Lesson Summary:** This week students will use reading passages to further their knowledge of Earth's orbit and basic information on stars.

### Materials Needed:

- Reading "Soaring Through Space" [Unit 1.9 handout 1](#) (Spectrum Science, Gr. 6, pages 80-81)
- Review of Unit 1: Earth and Space Science with GED-like questions [Unit 1.9 Handout 2](#)
- Self-evaluation from [Unit 1.1: Handout 1](#) (introduction) – if students don't have it, see [Unit 1.9 Handout 3](#).
- Homework [Unit 1.9 Handout 4](#) (6-way Paragraphs, Introductory Level, pages 78-79)

**Objectives:** Students will be able to...

- Understand basic concepts on Earth's orbit
- Attempt GED-like science test questions
- Evaluate their knowledge of Earth and Space Science from Science Unit 1.

**College and Career Readiness Standards:** RI, RST, WHST

**ACES Skills Addressed:** LS, AL, CT, SM, N

**Notes:** There is a lot of reading for this lesson. Students need to read for the main idea for most areas or modules of the GED tests and today's lesson is good practice for this. There will also be a review of Unit 1: Earth and Space Science. The objective is to have students practice with GED-like questions on Unit 1. If there are newer students, please have them try the test questions. It will be a way to gauge their knowledge in the area of Earth and Space Science.

### GED 2014 Science Test Overview – For Teachers and Students

The GED Science Test will be 90 minutes long and include approximately 34 questions with a total score value of 40. The questions will have focus on three content areas: life science (~40%), physical science (~40%), and Earth and space science (~20%). Students may be asked to read, analyze, understand, and extract information from a scientific reading, a news brief, a diagram, graph, table, or other material with scientific data and concepts or ideas.

The online test may consist of multiple choice, drop down menu, and fill-in-the-blank questions. There will also be a short answer portion (suggested 10 minutes) where students may have to summarize, find evidence (supporting details), and reason or make a conclusion from the information (data) presented.

Unit 1.9: Earth and Space Science – Earth’s Orbit & Review

The work students are doing in class will help them with the GED Science Test. They are also learning skills that will help in many other areas of their lives.

**Activities:**

**Warm-Up: Quick Review of Scientific Method** **Time: 10 minutes**

- As students enter the class, have the following written on the board or overhead **“In astronomy, the Earth’s orbit is the motion of the Earth around the Sun.”** Have students create a **“KWL”** chart on a piece of notebook paper (below). This helps to activate students’ prior knowledge by asking them what they already **Know** (column 1); students (collaborating as a classroom unit or within small groups) set goals specifying what they **Want** to learn (column 2); and after reading students discuss what they have **Learned** (column 3).
- Students apply higher-order thinking strategies which help them construct meaning from what they read and help them monitor their progress toward their goals.

**KWL Chart:**

K - What (else) do I KNOW?	W - What do I WANT to know?	L - What did I LEARN?

**Activity 1: Reading for Comprehension (Unit 1.9 Handout 1)** **Time: 30 - 40 minutes**

**1)** Hand out (**Unit 1.9 Handout 1**) to students. **2)** discuss with students that when reading for comprehension, there are many strategies to use: read the title to predict what the reading is about; look at the words in bold and their definitions on different parts of the pages; if there are images, look at them to get a better understanding; while reading remember to ask “What is this all about?” **3)** Have students read the passage and answer the questions independently **4)** circulate class while they are reading to make sure they understand the information presented and see if there are any questions **5)** review answers as a whole class – note: some answers may vary – ask students with different answers to discuss theirs with the class. **6)** If there is time remaining before break, have students read passages in pairs to practice their fluency.

**Break: 10 minutes**

**Activity 2: Unit 1: Earth and Space Science Review (Unit 1.9 Handout 2)** **Time: 30 - 40 minutes**

**1)** Hand out (**Unit 1.9 Handout 2**) to students. **2)** Explain that over the past 8 weeks, you have studied various aspects of Earth and Space Science as it relates to parts of the GED Science module. **3)** Ask students to recall some of the areas they have studied and write their answers on the board. Point out that this is one strategy to do prior to a test: overall review of information covered. **4)** Discuss with students although this is not a “timed” test as the GED test will be, it is important to review some test taking strategies. Explain to them they can use the same strategies

Unit 1.9: Earth and Space Science – Earth's Orbit & Review

for many different tests they may have to take, such as the TABE, GED, or Accuplacer (college entrance exam) tests. Strategies include: 1. Read instructions first 2. Read question and possible answers 3) Make sure you understand what the question is asking 4) skim and scan for information 5) mark an answer for every question 6) keep an eye on the clock (for a timed test) **5)** Have students begin the review. Circulate as needed to help struggling or newer students with the material. **6)** Review answers as a whole class. **7)** Ask for students to share their answers and what evidence or information helped them find the answer. Remind students that there can be different possible answers for some questions and the writing portion on the GED Science module. What is important is that they cite evidence to support their answer. **8)** Have students circle the questions they didn't have correct. They should note this is an area they may need to study further.

**Wrap-Up: Fill out Self Evaluation (post)**

**Time: 10 - 15 minutes**

**1)** Hand out a self-evaluation sheet (Unit 1- Handout 1 or Unit 1.9 Handout 3) for students. **2)** Have student rate their post-unit knowledge of Earth and space science by using the Likert rating scale. Remind students this is a way for them to assess their own knowledge and determine which areas they may need to continue to work. **3)** Check to see if students are comfortable with sharing their self-evaluations, you can ask them how they answered each question, or they can share in pairs or table groups. **4)** It may be useful for you to see how students evaluated themselves to determine what areas may need to be reviewed. If possible circulate to see how students evaluated their knowledge and take notes. **5)** Ask students to discuss methods they can review and study some of the material on their on own.

**Extra Work/Homework: The Lights in the Night Sky  
(Unit 1.9 Handout 4)**

**Time: 20 minutes outside of class**

Students can read and answer questions from the **6-way Paragraphs (Introductory Level) reading #39 (pages 84-85) "Lights in the Night Sky"**. This is an excellent opportunity for students to review today's material in an independent manner.

Differentiated Instruction/ELL Accommodation Suggestions	Activity
If some students finish early, they can use the time to practice summarizing a multi-paragraph reading or writing the main idea of the passage. This is a skill that cannot be practiced enough!	<b>Unit 1.9 Handout 1</b>
If there are newer students, please have them try the test questions. It will be a way to gauge their knowledge in the area of Earth and Space Science.	<b>Unit 1.9 Handout 2</b>

### **Online Resources:**

This is a **great** website to use if you have an Internet connection. You can show a solar system simulation. Students will be able to see planets in orbit around the sun as well as Earth's moon rotating around Earth. (Click on "enter" and then use the play "button" on the top of screen. Zoom in and out using the "buttons" at the top to see all the planets or a close up of Earth. Pay attention to the date and how it corresponds with planets' orbits.

<http://www.faustweb.net/>

### **Suggested Teacher Readings:**

GED Testing Service – GED Science Item Sample (to get an idea of what the test *may* be like)

<http://www.gedtestingservice.com/itemsamplerscience/>

## Unit 1.9: Handout 2

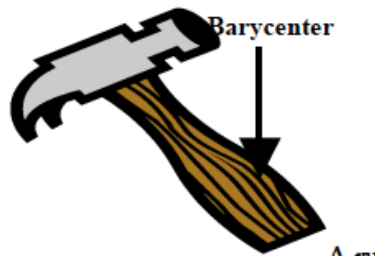
**Earth and Space Science Review** (5 pages total)

Read the following passage, and then answer questions 1-3.

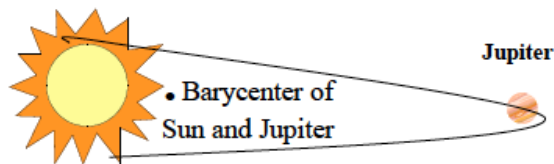
**Passage 1**

Why have we not explored other solar systems even, remotely, through a telescope? Planets in other solar systems are too small and too far away to be seen using a telescope. However, scientists have "discovered" other planets in a rather ingenious way.

First of all, it is not entirely true that a planet revolves around a star like our Sun, while the star remains stationary. It is more correct to say they revolve around a center of mass between the two, called a "barycenter." A barycenter is the point at which two bodies will rotate around and is determined by each body's mass or weight. The heavier the object is compared to the other, the closer the barycenter will be to it. Take a hammer, for instance. The head of a hammer often weighs more than the entire handle. The point of balance should not be in the center, but rather closer to the head of the hammer, where most of its weight is found.



A ruler, on the other hand would have a barycenter right in the middle. Scientists do the same with planets and their corresponding suns. For example, Jupiter and the Sun revolve around a center of gravity located just outside of the Sun. See the diagram below. As planets orbit around a star, the star will wobble because it, too, will slightly move around its "barycenter." Scientists can view this wobble using telescopes, thus proving the existence of other planets outside of our solar system.



1. **A barycenter is**
  - 1) the center of gravity between a star and a planet.
  - 2) the center of mass inside of a planet.
  - 3) the center of mass inside of a star.
  - 4) the wobbling motion seen in distant stars.
  - 5) the telescope used by astronomers to see distant stars

2. **Why does a star "wobble"?**

- 1) It is off balance.
- 2) It is becoming a Red Giant.
- 3) The gravitational pull from orbiting planets causes it to move slightly.
- 4) It is an optical illusion.
- 5) Major explosions occurring on the star's surface causes it to wobble.

**3. The center of gravity of a hammer can be found near the**

- 1) head of the hammer.
- 2) exact center of the hammer.
- 3) the end of the handle.
- 4) The outside surface of the handle.
- 5) The outside surface of the head.

Read the following passage, and then answer questions 4 - 7.

**Passage 2**

The **Richter Scale** was created to describe the magnitude, or the amount of energy released, of an earthquake. The scale reads as follows:

**M=1 to 3:** recorded on local seismographs, but generally not felt

**M=3 to 4:** often felt, but no obvious damage

**M=5:** felt widely, slight damage near the epicenter

**M=6:** damage to poorly constructed buildings and other structures within a few miles of the epicenter; some possible injuries

**M=7:** "major" earthquake causes serious damage and injuries up to 60 miles away (recent Taiwan, Turkey, Japan, and California earthquakes).

**M=8:** "great" earthquake, great destruction, loss of life over several hundred miles (1906 San Francisco)

**M=9:** rare great earthquake, major damage over a large region extending to 1000 miles; extensive loss of life. The largest recorded earthquake was 9.5 in Chile in 1960. The largest in the US was in Alaska in 1964, which measured 9.2.

The Richter Scale is based on logarithms, so an increase of "one" is actually 10 times as powerful. An earthquake of 8 is ten times greater than an earthquake of 7.

**4. What magnitude was the recent earthquake in Taiwan?**

- 1) 5                      2) 6                      3) 7                      4) 8                      5) 9

**5. How many times larger would a 9.5 earthquake be compared to 8.5 earthquake?**

- 1) Twice as large                      2) 5 times as large                      3) 10 times as large  
4) 100 times as large                      5) 1000 times as large

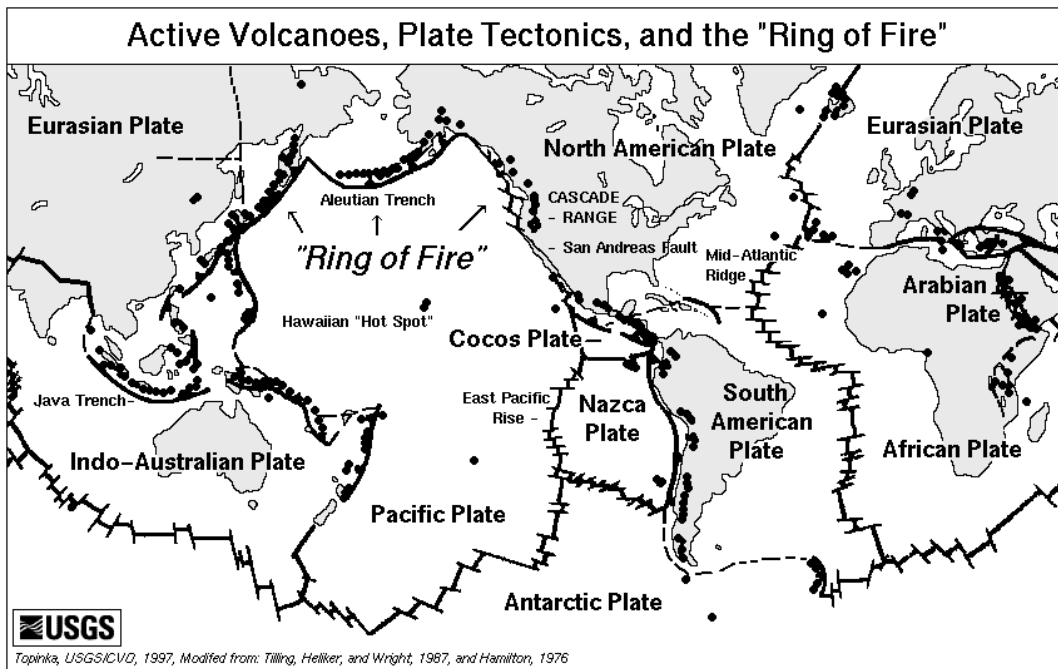
**6. Where was the largest earthquake in the US?**

- 1) California                      2) Alaska                      3) Hawaii                      4) Oregon                      5) Washington

**7. What was the magnitude of the largest earthquake in US history?**

- 1) 9                      2) 7.2                      3) 8.2                      4) 9.2                      5) 10

Use the map below to answer questions 8 – 9.



- = active volcano                      ---- = plate boundary line

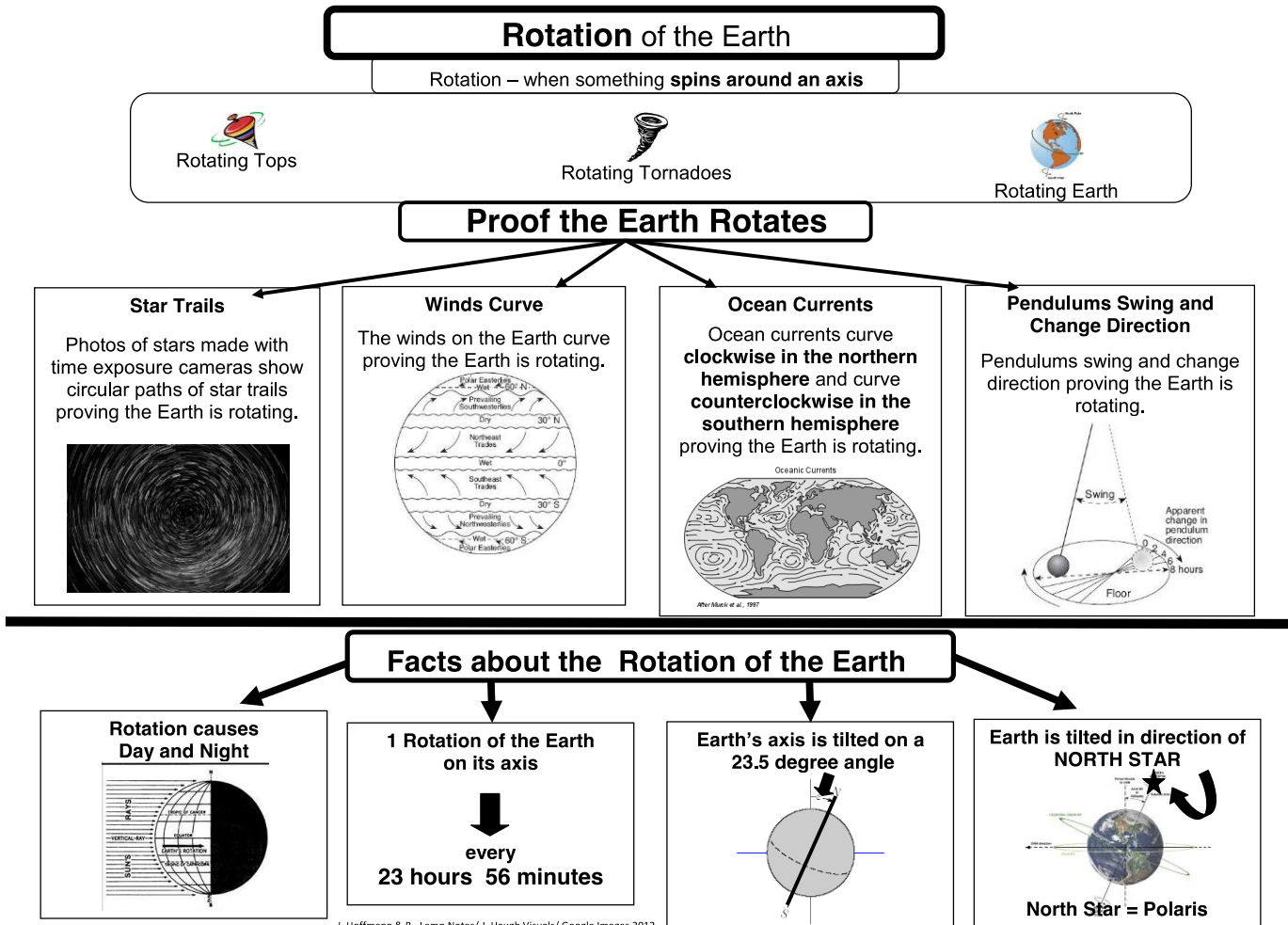
**8. Which conclusion can be reached from the information on the map?**

- 1) Volcanoes are scattered randomly across the Earth.  
2) Volcanoes are only located along edges of continents.  
3) Volcanoes are mostly located along boundaries between plates.  
4) Volcanoes are distributed equally in the Northern and Southern Hemispheres.

9. The Pacific Plate is one of the world’s main tectonic plates and the “Ring of Fire” coincides with its edges. The “Ring of Fire” is created because plates push against each other. What type of plate interaction is that called?

- 1) convergent                      2) divergent                      3) transform                      4) induction

Use the diagram below to answer question 10.



10. Explain how the evidence supports the rotation of the earth. Write a brief answer below.

Read the passage below to answer question 11.



### **Water Pollution**

All living things need water to stay alive, which is why water is our most precious natural resource. For this reason, it is important to learn about the causes of water pollution.

Water pollution is simply any harmful thing that is added to water. There are many causes of water pollution, but you cannot always see what is polluting it. Water can look clear, yet still be unsafe. It can be polluted with microscopic organisms, which are so tiny they can only be seen with a microscope. These organisms are sometimes contagious and can make us sick. One cause of microscopic organisms in water is sewage from pipes.

Another major cause of water pollution is the fertilizers farmers use to make their crops grow fast and the pesticides they use to kill bugs and rodents. When it rains, these fertilizers and pesticides can wash off into waterways.

In addition, wastewater from factories contains harmful chemicals that can be poisonous to marine life. This wastewater is also very hot, and when it is pumped into waterways, it has the effect of heating up the temperature of the water. Many plants and animals cannot survive if the temperature of the water rises due to lack of oxygen.

Litter also pollutes waterways. When not disposed of properly, garbage shows up on the shorelines of beaches and can also be harmful to marine animals. Moreover, anything with a sharp edge can cut a mammal or fish. Marine animals are also known to mistake garbage for food.

Petroleum companies ship their oil all over the world in large supertankers, but accidents do happen. An important cause of water pollution and a great loss of marine life along shorelines is accidental oil spills by these large supertankers.

**11. Which is the main idea from the passage on Water Pollution?**

- 1) Supertankers create the most water pollution on coastal shorelines.
- 2) There are a variety of sources of water pollution and often they are not easily seen.
- 3) Many marine animals can be saved if there is less water pollution.
- 4) Water pollution will always happen.
- 5) Rain causes many kinds of water pollution.

## EARTH AND SPACE SCIENCE REVIEW – ANSWER KEY (ANSWERS IN BOLD)

1. **A barycenter is**
  - 1) **the center of gravity between a star and a planet.**
  - 2) the center of mass inside of a planet.
  - 3) the center of mass inside of a star.
  - 4) the wobbling motion seen in distant stars.
  - 5) the telescope used by astronomers to see distant stars
  
2. **Why does a star “wobble”?**
  - 1) It is off balance.
  - 2) It is becoming a Red Giant.
  - 3) **The gravitational pull from orbiting planets causes it to move slightly.**
  - 4) It is an optical illusion.
  - 5) Major explosions occurring on the star's surface causes it to wobble.
  
3. **The center of gravity of a hammer can be found near the**
  - 1) **head of the hammer.**
  - 2) exact center of the hammer.
  - 3) the end of the handle.
  - 4) The outside surface of the handle.
  - 5) The outside surface of the head.
  
4. **What magnitude was the recent earthquake in Taiwan?**

1) 5                      2) 6                      **3) 7**                      4) 8                      5) 9
  
5. **How many times larger would a 9.5 earthquake be compared to 8.5 earthquake?**

1) Twice as large                      2) 5 times as large                      **3) 10 times as large**  
 4) 100 times as large                      5) 1000 times as large
  
6. **Where was the largest earthquake in the US?**

1) California                      **2) Alaska**                      3) Hawaii                      4) Oregon                      5) Washington
  
7. **What was the magnitude of the largest earthquake in US history?**

1) 9                      2) 7.2                      3) 8.2                      **4) 9.2**                      5) 10

8. Which conclusion can be reached from the information on the map?

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9. The Pacific Plate is one of the world's main tectonic plates and the "Ring of Fire" coincides with its edges. The "Ring of Fire" is created because plates push against each other. What type of plate interaction is that called?

- 1) convergent                      2) divergent                      3) transform                      4) induction

10. Explain how the evidence supports the rotation of the earth. Write your answer below.

Answers will vary: possible answer: **According to the diagram, the evidence that supports the idea of Earth's rotation are the following: the winds on Earth flow on a curve; the currents of the Earth's oceans curve or flow clockwise in the Northern Hemisphere and counterclockwise in the Southern Hemisphere; when using a pendulum, it swings and changes direction; and when people take time-lapsed or time-exposed photos of stars, there are circular paths. All of this evidence or proof points to the fact that the Earth rotates.**

11. Which is the main idea from the passage on Water Pollution?

- 1) Supertankers create the most water pollution on coastal shorelines.
- 2) There are a variety of sources of water pollution and often they are not easily seen.**
- 3) Many marine animals can be saved if there is less water pollution.
- 4) Water pollution will always happen.
- 5) Rain causes many kinds of water pollution.

Unit 1.9: Earth and Space Science – Earth's Orbit & Review

Unit 1.1 Handout 1 & Unit 1.9: Handout 3 **Pre- & Post- Self Evaluation – Earth & Space Science**

**Pre-Evaluation**

Statement	Self-Rating				
1. I can state the main areas of study in Earth and space science.	1 strongly agree	2 agree	3 somewhat agree	4 disagree	5 strongly disagree
2. I can discuss the <i>Greenhouse Effect</i> .	1 strongly agree	2 agree	3 somewhat agree	4 disagree	5 strongly disagree
3. I can describe plate tectonics and their relationship to earthquakes.	1 strongly agree	2 agree	3 somewhat agree	4 disagree	5 strongly disagree
4. I can explain the basics of the <i>Big Bang</i> theory.	1 strongly agree	2 agree	3 somewhat agree	4 disagree	5 strongly disagree
5. I can understand some academic vocabulary related to Earth and space science.	1 strongly agree	2 agree	3 somewhat agree	4 disagree	5 strongly disagree

**Post-Evaluation**

Statement	Self-Rating				
1. I can state the main areas of study in Earth and space science.	1 strongly agree	2 agree	3 somewhat agree	4 disagree	5 strongly disagree
2. I can discuss the <i>Greenhouse Effect</i> .	1 strongly agree	2 agree	3 somewhat agree	4 disagree	5 strongly disagree
3. I can describe plate tectonics and their relationship to earthquakes.	1 strongly agree	2 agree	3 somewhat agree	4 disagree	5 strongly disagree
4. I can explain the basics of the <i>Big Bang</i> theory.	1 strongly agree	2 agree	3 somewhat agree	4 disagree	5 strongly disagree
5. I can understand some academic vocabulary related to Earth and space science.	1 strongly agree	2 agree	3 somewhat agree	4 disagree	5 strongly disagree

Unit 1.9 Handout 4 (6-way Paragraphs – introductory, #39 pages 78 - 79)

## ANSWER KEY

1. Main Idea
  - a. M
  - b. B
  - c. N
2. A
3. C
4. D
5. C
6. B