A. History of the theory of plate tectonics, including key scientists.
   1. __D__ (1 pt)
   2. __F__ (1 pt)
   3. __GEE__ (1 pt) Any order
   4. __D__ (1 pt)

5. (5 pts) What was the original evidence for the preliminary theory and where was it collected?
   - Fit between South America and Africa Continents.
   - Fossils of ancient plants and reptiles found on continents currently far apart.
   - Rock type and mountain ranges are the same on continents currently far apart.
   - Tropical fossil evidence on continents that currently do not have tropical climate zones.

6. __F__ (1 pt)
7. __CBD__ (1 pt) Any order

8. (5 points) Give an in-depth explanation of the modern evidence for Plate Tectonic Theory.
   - GPS show movement of the plates.
   - Bathymetric mapping of the Atlantic ocean after WWII showed magnetic stripes on the seafloor. Rock layers point "N" and "S" from Mid-Ocean Ridge.
   - Above a ground divergent boundary in Iceland, shows movement of Atlantic Ridge.
   - Earthquake and volcanic factors at boundary zones.

9. *(TB 3 pts)* How is the acceptance of the theory of Plate Tectonics similar to the currently debated scientific theory of Global Warming?
   Any discussion that shows evidence to support the theory that has some mechanism, gaps, and the hostile initial reception. As time went on, additional data comes to light to support the theory.

10. *(TB 3 pts)* Explain the relationship between Pangaea, Panthalassa, Gondwana, Laurasia and the current known tectonic plate arrangements.

Team Number: _______________

Station A: 1_2_3_4_5_6_7_8 = ________
9_10 = ________
Total Regular ____/16
TB Points ____ out of 6
Structure of the Earth: Using the picture, identify each portion of the Earth and answer the questions that are pertinent to each area.

A. (1 pt each) What is this layer of the Earth called?
1-A: Inner Core
2-A: Outer Core
3-A: Mesosphere
4-A: Asthenosphere
5-A: Lithosphere = Crust + upper mantle

B. (1 pt each) What is the composition of this layer of the Earth?
1-B: Iron, Nickel
2-B: Iron, Nickel
3-B: 
4-B: 
5-B: 

C. (1 pt each) How thick is this layer of the Earth?
1-C: 6,378 km
2-C: 3,280 km to 6,378 km
3-C: 2,790 km to 3,280 km
4-C: 1,300 to 2,790 km
5-C: 10 to 100 km, 0 to 100 km (Crust plus upper mantle)

D. (1 pt each) What are the physical characteristics of this layer of the Earth?
1-D: Solid, High Pressure, Temperature range from 0°C to 600°C, 1.5 to 3 atm
2-D: Melted, High Pressure, Temperature range from 2,800°C to 5,000°C, 8.2 to 15 M atm
3-D: Semi-melted, High Pressure, Temperature range from 2,800°C to 5,000°C, 8.2 to 15 M atm
4-D: Plastic, Melted, High Pressure, Temperature range from 2,800°C to 5,000°C, 8.2 to 15 M atm
5-D: Solid, rocky, brittle, low pressure, Temperature range from 0°C to 1000°C, 1.5 atm

E. * (TB 1 pt each) Why is this layer of the Earth comprised of these elements and why are its physical characteristics the way they are?
1-E: Very dense materials, iron, nickel, 1.0 to 12.7 g/cm³, high density, sinks to center
2-E: Slightly less dense, 1.9 to 12.1 g/cm³, mostly silicate, melted layer
3-E: Slightly less dense, 7.3 to 8.0 g/cm³
4-E: Low density, 2.7 to 3.0 g/cm³, plastic layer flows about 2 cm/year
5-E: Low density, SiO₂, Oxygen, mostly rigid, Mostly rigid, 2.7 to 3.0 g/cm³

Team Number: 

Station B: 1ABCD 2 ABCD 3 ABCD 4 ABCD 5 ABCD = 

TB 1E 2E 3E 4E 5E = 

Total Regular ___/16  TB Points ___/5
Station C 2017 (10 Minutes)

For the first part of this station, use the Figure 1 to answer Parts A through F.

A. (0.5 pt each) What is the name of this plate and how large is it (square meters)?

1. **Eurasian Plate**, \(6.78 \times 10^7 \text{ km}^2\)
2. **Indo-Australian Plate**, \(5.89 \times 10^7 \text{ km}^2\)
3. **Philippine Sea Plate**, \(5.5 \times 10^6 \text{ km}^2\)
4. **Pacific Plate**, \(1.03 \times 10^8 \text{ km}^2\)
5. **North American Plate**, \(7.59 \times 10^7 \text{ km}^2\)
6. **Caribbean Plate**, \(3.3 \times 10^6 \text{ km}^2\)
7. **Cocos Plate**, \(2.9 \times 10^6 \text{ km}^2\)
8. **Nazca Plate**, \(1.56 \times 10^7 \text{ km}^2\)
9. **South American Plate**, \(4.96 \times 10^7 \text{ km}^2\)
10. **African Plate**, \(6.13 \times 10^7 \text{ km}^2\)
11. **Arabian Plate**, \(5.0 \times 10^6 \text{ km}^2\)
12. ** Scotia Plate**, \(1.6 \times 10^6 \text{ km}^2\)
13. **Antarctic Plate**, \(6.09 \times 10^7 \text{ km}^2\)
14. **Juan de Fuca Plate**

B. (0.5 pt each) What type of plate is it (continental, oceanic, combination)?

1. **Continental Plate & Oceanic (Combination)**
2. Combination Oceanic and Continental
3. **Oceanic Plate**
4. **Oceanic Plate W. Hotspot**
5. Combination of Oceanic and Continental (hotspot)
6. **Oceanic plate**
7. **Oceanic plate**
8. **Oceanic plate**
9. Combination oceanic and continental
10. Combination Oceanic and Continental
11. Continental
12. Oceanic
13. Combination, Oceanic and Continental
14. Oceanic (small)

C. (0.5 pt each) Which direction is each plate currently moving (W, E, N, S, SW, SE, NE, NW)?

1. South, 7 to 14 mm/year
2. Northward, 8 to 14 mm/year
3. North West, 48 to 84 mm/year
4. North West, 56 to 102 mm/year
5. West, 15 to 25 mm/year
6. North-West, 10 to 11 mm/year
7. North-East, 67 mm/year
8. North-East, 40 to 53 mm/year
9. East, 27 to 34 mm/year
10. North-East, 53 to 106 mm/year
11. North, 25 to 20 mm/year
12. West, 25 mm/year
13. North West, 56 to 102 mm/year
14. North-East, 47 to 56 mm/year

D. (0.5 pt each) What type of boundaries does it have? (If there is more than one type, state the different types.)

1. Divergent (west side) near Iceland
2. Convergent Continental/Continental, Oceanic/Oceanic, Divergent
3. East is Convergent, Divergent Melting Plate
4. Convergent, Ridge of Fire, divergent (NE), transform (NW)
5. Transform, Convergent, Divergent
6. Transform, Convergent, Subduction Zone
7. Convergent, Subduction, Transform
8. Convergent Subduction, Divergent
9. Convergent on West, Divergent on East, Transform(s)
10. Divergent on Both Sides
11. Transform, Divergent, Convergent
12. Transform, Convergent with Subduction
13. Transform, Divergent
14. Convergent W. Subduction

Go to back of answer sheet to complete this section.

Team Number: ________________
Station C: A_ B_ C_ D_ E_ F_ G1-5,7_ = ____
Total Regular ____ = ____
TB Points ____/6
E. (0.5 pt each) What type of geologic events or features are generated as a result of the boundary type for each plate?

1. Earthquakes, Volcanic
2. Earthquake
3. Earthquakes, Volcanic
4. Earthquakes, Volcanics (tsunami)
5. Earthquakes, Volcanics
6. Earthquakes (tsunami), Volcanic eruption
7. Earthquake (large)
8. Earthquakes, Volcanic
9. Earthquakes, Volcanic
10. Earthquakes, Volcanics
11. Volcanic activity, Earthquakes (tsunami)
12. Volcanics
13. Small Earthquakes
14. Earthquake, Volcanic activity due to Subduction

F. (0.5 pt each) What type of rock is most common in this plate?

1. Basalt, Granite, gneiss
2. Gneiss, Granite, Basalt
3. Basalt
4. Basalt
5. Limestone, Basalt, Granite, Sedimentary
6. Basalt
7. Basalt
8. Basalt
9. Basalt, Granite, Gneiss
10. Basalt, Granite, Gneiss
11. Granite, Gneiss
12. Basalt
13. Sandstone, Gneiss, Schist
14. Basalt

Section G - For this section, use the diagrams supplied as Figures and your most reliable information.

1. (1 pt) Who was the scientist that linked the formation of the sea floor to the developing Plate Tectonic Theory?
   a. Harry Hess
   b. Rachel Carson
   c. Emile Argand
   d. Kurt Wegener
   e. Alfred Wegener
   f. Arthur Holms
   g. Alexander Du Toit
   h. Charles Darwin
   i. Madame Curie

2. (2 pts) Which plates are currently growing? (Use Figure 1)
   \[ 1, 5, 10 \]

3. (2 pts) Which plates are currently shrinking? (Use Figure 1)
   \[ 4, 7, 14, 6 \]

4. (1 pt) Where is the oldest seafloor located? (Use Figure 2)?
   \[ 1 \]

5. (1 pt) Where is new seafloor currently forming? (Use Figure 2)?
  否定回答

6. *TB (3 pts) Explain what is going on in this picture and how does it relate to plate tectonic theory? (Refer to Figure 3)
   The volcanic mountains formed due to the subduction of the Juan de Fuca Plate and the North American Plate. Mountains are pushed higher as the collision of the plates continue to newly melted rock feed
   the magma fluid in this area.

7. (2 pts) What type of geologic features does Tectonic plate theory explain? (Use Figure 3)
   Plate tectonic theory explains mountain building and earthquakes.

8. *(TB 3 pts) What is the correlation of the movement of the plates to the geologic feature?
   The subduction zone created the volcanoes shown in the diagram.
Station D 2017 (10 Minutes)

Each question is worth 1 point

1. C
2. D
3. D (*TB 1 pt)
4. A
5. A
6. A
7. B
8. A (*TB 1 pt)
9. A
10. A (*TB 1 pt)
11. D
12. A
13. C
14. D
15. D
16. E
17. D
18. C

Team Number: _____________

Station D: 1_2_4_5_6_7_9_11_12_13_14_15_16_17_18_ = ________
Total Regular ____/15

TB 3_8_10- = ________
TB Points ____/3
Station E 2017 (10 Minutes)

TEAM Key

Short Answer: Answer using complete sentences.

1. (2 pt) How do the three types of convergent boundaries differ from one another?
   - Subduction: Oceanic plate, Mountain building, folding, subduction, deep sea trenches form, volcanic islands.
   - Collision: Oceanic plate, continental plate, subduction, mountain building, folding.

2. (2 pt) Explain the process of subduction.
   One plate, generally a higher-density oceanic plate sinks beneath a continental plate or another oceanic plate as they collide. The part that is beneath or subducted is pulled into the mantle, and melted as it passes into the asthenosphere and upper part of the mantle. The newly melted material causes volcanoes to form nearby.

Examine the diagrams of boundaries and answer the questions that follow.

3. (2 pt) Which type of tectonic plates are colliding in A? Explain your reasoning.
   Continental tectonic plates. Mountain building is the result.

4. (2 pt) Which type of tectonic plates are colliding in B? Explain your reasoning.
   One continental plate, to the right, one oceanic plate, to the left. The ocean plate is subducted into mantle, melted and subducts on the other plate.

Imagine that you could travel to the center of an Earth-like planet (each layer has the same properties as that on Earth). Use the table below to answer the questions that follow.

<table>
<thead>
<tr>
<th>Composition</th>
<th>Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crust (35 km)</td>
<td>Lithosphere (250 km)</td>
</tr>
<tr>
<td>Mantle (1,500 km)</td>
<td>Asthenosphere (250 km)</td>
</tr>
<tr>
<td>Core (2,548 km)</td>
<td>Mesosphere (1,000 km)</td>
</tr>
<tr>
<td></td>
<td>Outer core (1,500 km)</td>
</tr>
<tr>
<td></td>
<td>Inner core (1,048 km)</td>
</tr>
</tbody>
</table>

5. *(TB 1 pt) How far beneath Planet's surface would you have to go to find the liquid material in the core?
   To 1,500 km where the outer core is located.

6. *(TB 1 pt) At what range of depth would you find mantle material but still be within the lithosphere?
   The upper mantle holds low castastatic stress at 35 km to 250 km.

7. *(TB 1 pt) Describe the role of the asthenosphere in the movement of tectonic plates.
   The asthenosphere is a plastic layer of the mantle that flows and pulls the plates around.

Go to back of answer sheet to complete this section.
Station E 2017 (10 Minutes)


Each multiple choice question is worth 1 point.

Team Number: ____________

Station E: 1_2_3_4_8_9_10_11_12_13_14_15_16_17_18 = ________
Total Regular __/45 19

TB 5__, 6__, 7__ = ________
TB Points ____/3