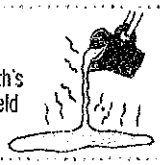
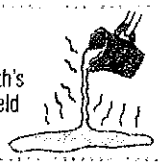
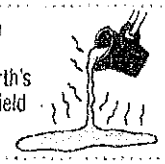
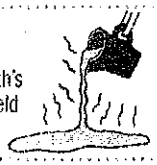
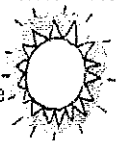
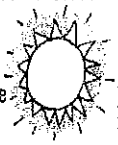
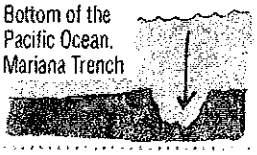
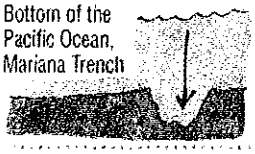
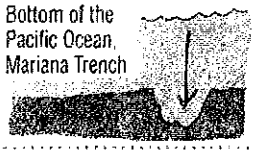
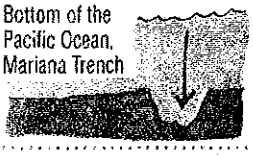
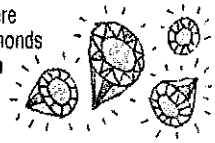
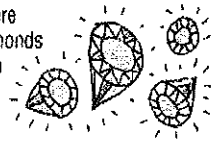
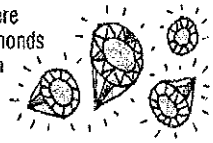
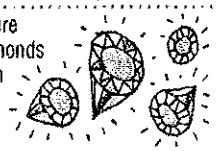
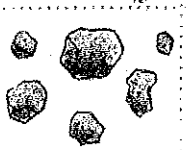
SD-3 Earth's Interior Event Cards

Liquid iron is found, creates Earth's magnetic field 	Liquid iron is found, creates Earth's magnetic field 	Liquid iron is found, creates Earth's magnetic field 	Liquid iron is found, creates Earth's magnetic field 
Temperatures reach 9,800 degrees F (as hot as the surface of the Sun!) 	Temperatures reach 9,800 degrees F (as hot as the surface of the Sun!) 	Temperatures reach 9,800 degrees F (as hot as the surface of the Sun!) 	Temperatures reach 9,800 degrees F (as hot as the surface of the Sun!) 
Bottom of the Pacific Ocean, Mariana Trench 	Bottom of the Pacific Ocean, Mariana Trench 	Bottom of the Pacific Ocean, Mariana Trench 	Bottom of the Pacific Ocean, Mariana Trench 
Where diamonds form 	Where diamonds form 	Where diamonds form 	Where diamonds form 
Deepest mine in the world 	Deepest mine in the world 	Deepest mine in the world 	Deepest mine in the world 
Maximum depth of earthquakes 	Maximum depth of earthquakes 	Maximum depth of earthquakes 	Maximum depth of earthquakes 
Maximum depth of magma 	Maximum depth of magma 	Maximum depth of magma 	Maximum depth of magma 
1.35 million atmospheres of pressure or **17,800** elephants balancing on your head 	**1.35** million atmospheres of pressure or **17,800** elephants balancing on your head 	**1.35** million atmospheres of pressure or **17,800** elephants balancing on your head 	**1.35** million atmospheres of pressure or **17,800** elephants balancing on your head 
3.6 million atmospheres of pressure or **47,700** elephants balancing on your head 	**3.6** million atmospheres of pressure or **47,700** elephants balancing on your head 	**3.6** million atmospheres of pressure or **47,700** elephants balancing on your head 	**3.6** million atmospheres of pressure or **47,700** elephants balancing on your head 
Place where rocks form 	Place where rocks form 	Place where rocks form 	Place where rocks form 

Make an Earth's Layer's Foldable©!

NOTE: Please follow the directions carefully!

1. Color the four layers using this guide:

Inner Core - red
Outer Core - red-orange
Lower Mantle - orange
Middle Mantle - light orange
Upper Mantle - yellow
Oceanic Crust - dark brown
Continental Crust - light brown
Ocean - blue

2. Fill out the small squares with the information for each of the main layers of the Earth. Use your textbook or Earth's Layers Booklet.

3. Now you may cut out the layers! Also cut out the four squares and the 12 labels. Remember to cut out **The Earth's Layers** title.

4. Set one piece of blue paper in front of you. Closely trim the title. Paste **The Earth's Layers** title in the top left corner of the paper.

5. Paste the **Crust** right below the title, centered on the page.

6. Set the second piece of paper on top of the first, close to the bottom of the crust.

7. Paste the **Mantle** on the second piece of paper. Part of the blue will show near the brackets. That's okay! You can clip it out later.

8. Carefully lining up the sides of the blue papers, and holding tightly, fold up the bottom of both papers to about 1/4 inch below the bottom of the Mantle.

9. Staple the fold with two staples very close to the edge.

10. Paste the **Outer Core** on the next flap down.

11. Paste the **Inner Core** on the bottom flap. Paste the Inner Core Information Square to the left of the Inner Core.

12. Paste the three other squares inside the flaps, next to the corresponding Layers.

13. Cut out any of the blue flaps that show.

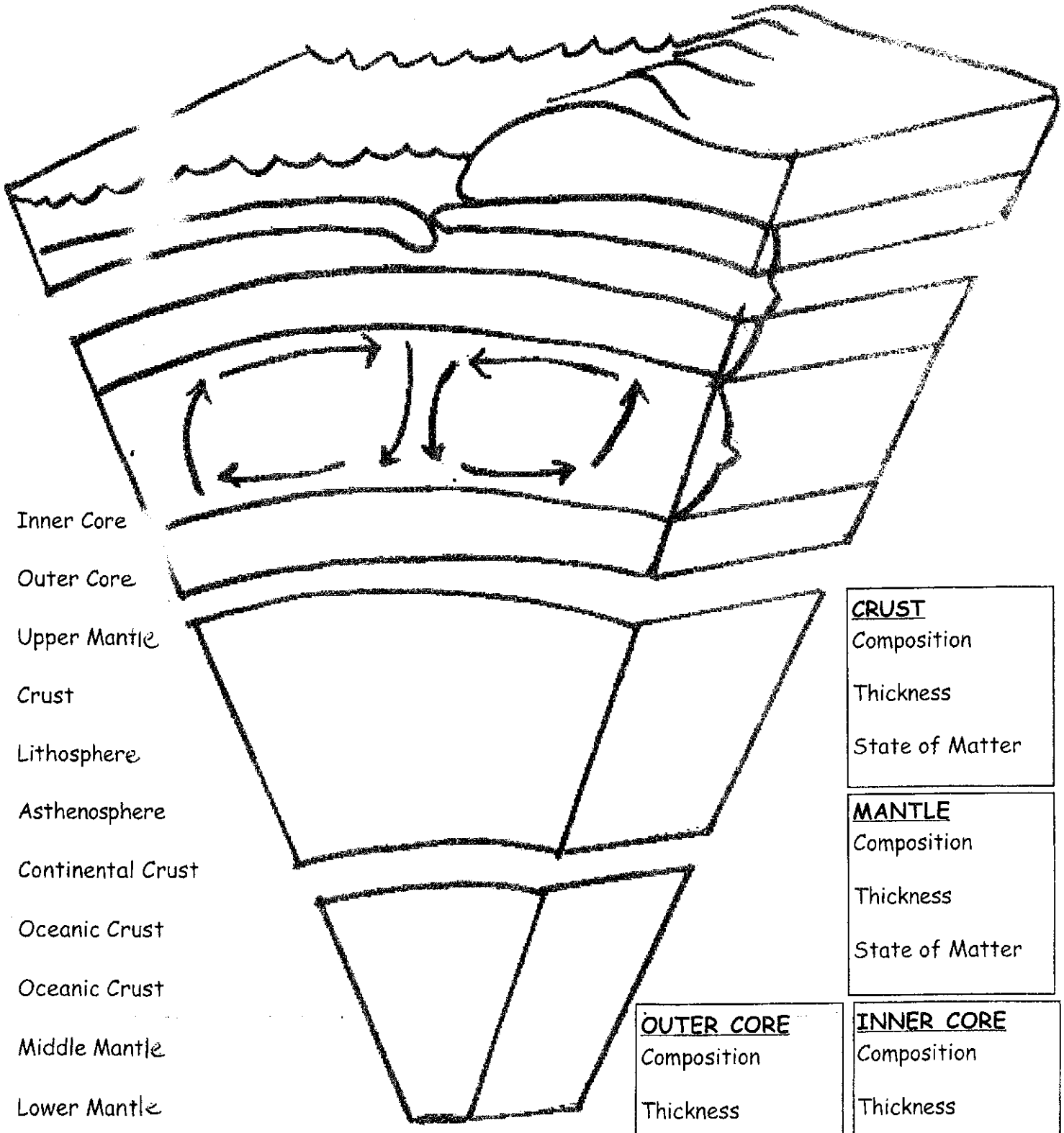
14. Using a black pen or marker, add the part of the Lithospheric bracket that was cut off.

15. Add two holes and write your name. **CONGRATULATIONS! YOU ARE DONE AND YOU ARE AMAZING! Line up for points!**

THE FOLDABLE© - See http://www.dinah.com

The Earth's Layers Foldable©

THE FOLDABLE© - See http://www.dinah.com



Inner Core

Outer Core

Upper Mantle

Crust

Lithosphere

Asthenosphere

Continental Crust

Oceanic Crust

Oceanic Crust

Middle Mantle

Lower Mantle

Convection Currents

CRUST
Composition

Thickness

State of Matter

MANTLE
Composition

Thickness

State of Matter

OUTER CORE
Composition

Thickness

State of Matter

INNER CORE
Composition

Thickness

State of Matter

Earth's Layers FOLDABLE©
Question Sheet

Name _____ **Block**_____

Directions: *Use your Earth's Layers FOLDABLE© to answer these questions.*
You may also need to use your textbook.

1. The planet we call Earth has how many main layers? _____

Write them in order from the center to the outside of the planet.

_____

_____

_____

_____

2. Use your FOLDABLE to answer these questions:

Name the thickest layer _____

Name the thinnest layer _____

Write as a fraction the relationship of the thinnest layer to the thickest layer. Show your work!

Challenge: Perhaps you have imagined digging a tunnel through the earth that comes out the other side. Figure it out ... How many kilometers would you have to dig? Show your work!

3. Write 4 interesting facts about the Earth's Crust.

a. _____

b. _____

c. _____

d. _____

4. The crust and the upper layer of the mantle together make up a zone of rigid, brittle rock called _____.

5. Write three amazing facts about the Mantle.

a. _____

b. _____

c. _____

6. What are the Convection Currents? _____

_____

7. Name two metals found in the Outer Core. _____ and _____

The border between the Outer core and the Inner Core is how many kilometers beneath the crust? _____

8. The Inner core is under so much pressure it does not move like a liquid, it _____.

Write the temperature of the center of the Earth. _____

9. Why is the Inner Core a solid if it is the hottest layer? How is that possible?

10. What is the difference between the **continental** crust and the **oceanic** crust. List two differences.

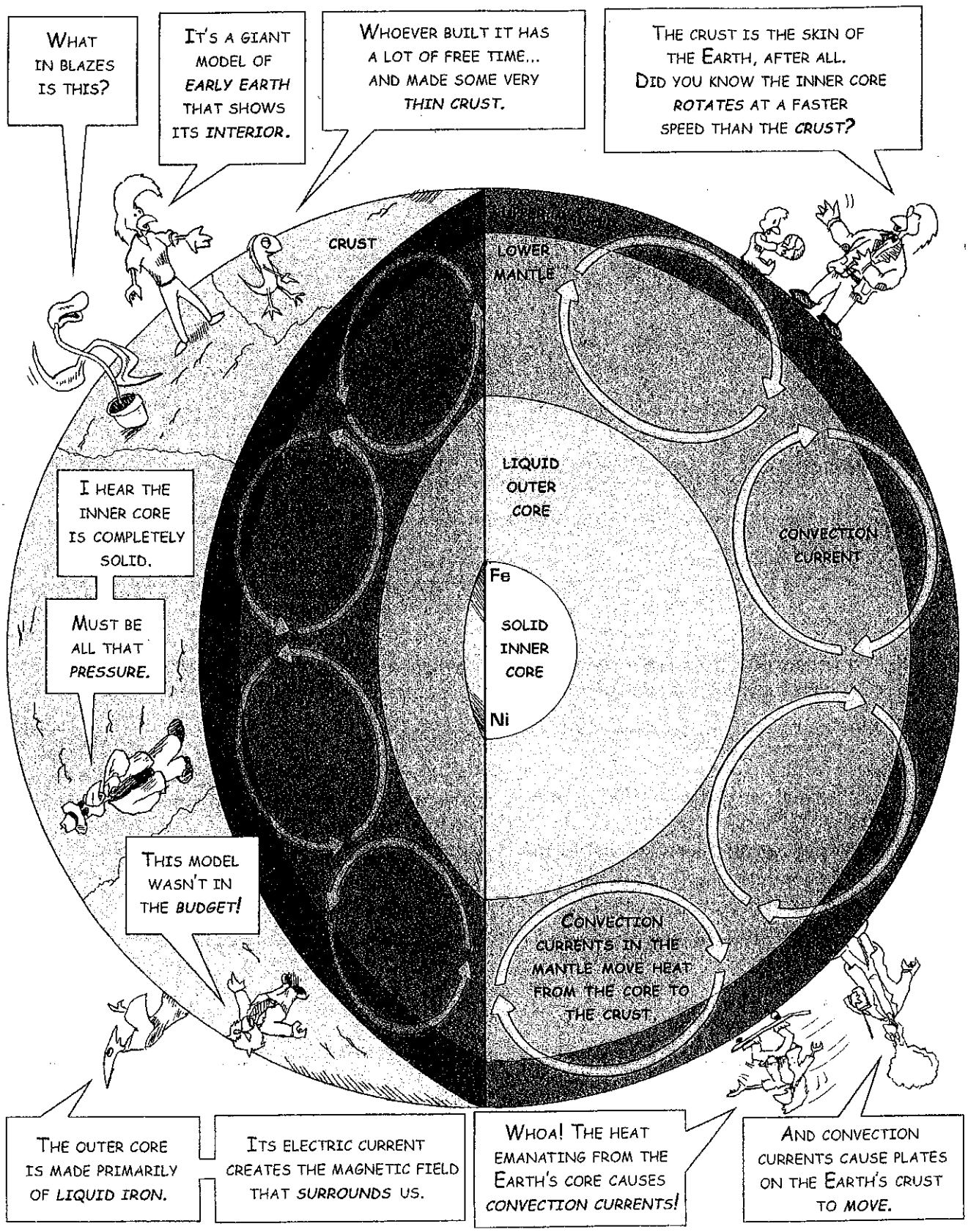
Continental Crust	Oceanic Crust
_____	_____
_____	_____

DR. BIRDLEY INVESTIGATES

EARTH'S LAYERS

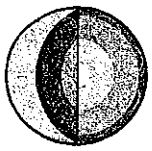
NAME:_____

CLASS:_____ DATE:_____

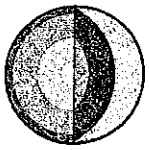


NAME: _____

CLASS: _____ DATE: _____



STUDY QUESTIONS



Directions: Answer the following questions to the best of your ability.

1. What are the main parts of Earth in this diagram?

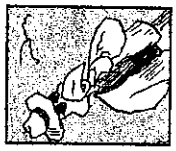
_____

_____

2. What is a convection current? Where is it located?

_____

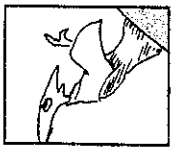
_____



3. According to Jaykes, why is the inner core completely solid? Why would the outer core be liquid?

_____

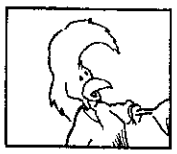
_____



4. How would Earth be different if its outer core could not conduct electricity?

_____

_____



5. Why does the movement of crustal plates depend on the heat in Earth's core?

_____

_____

Layers of the Earth - Vocabulary

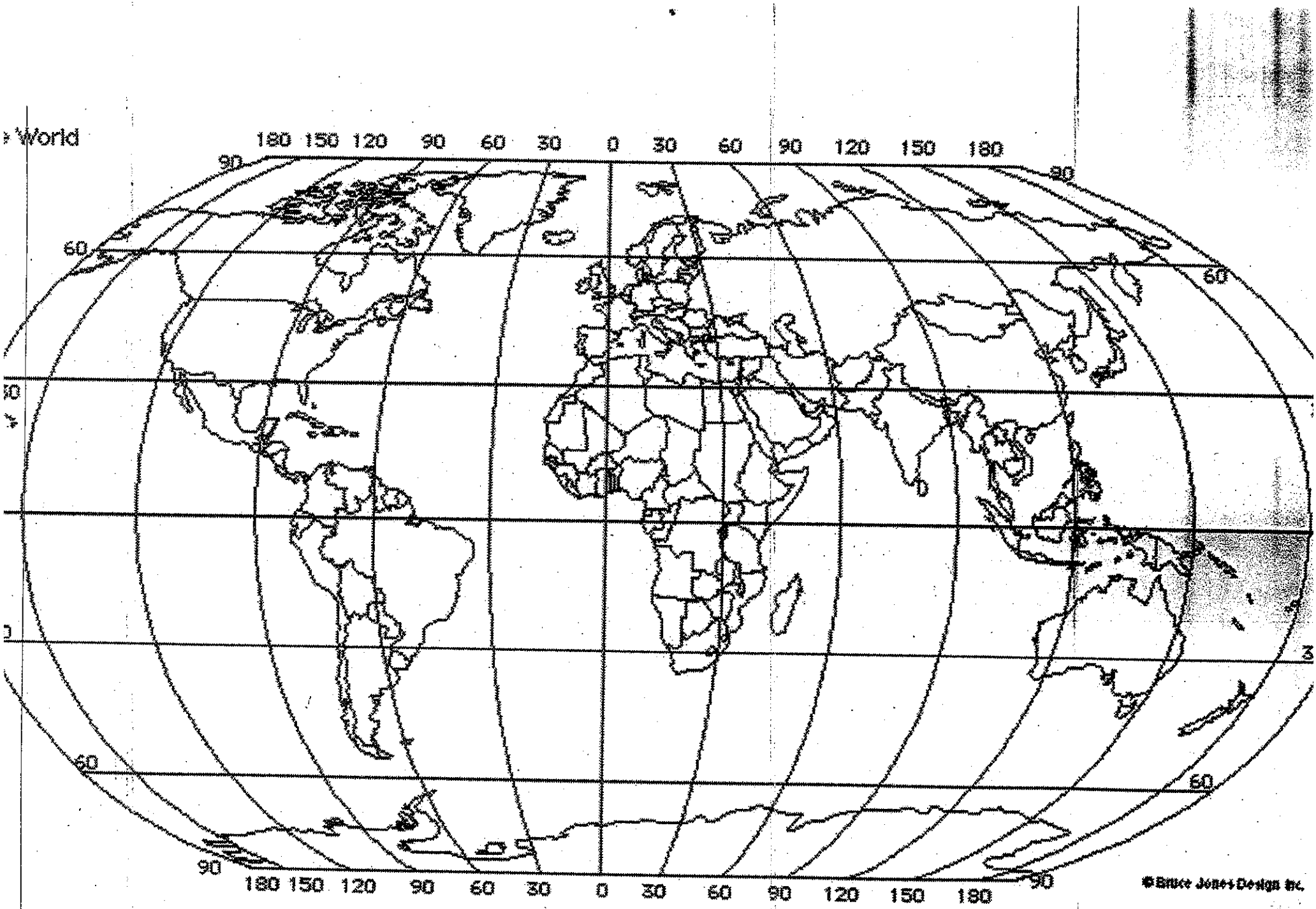
(Reference - Sheet)

1. **Geologist** is a scientist who studies the solid and liquid matter that constitutes the earth as well as the processes and history that have shaped it.
2. **Crust:** A thin outer layer of rock above a planet's mantle, including all dry land and ocean basins made of silicates.
3. **Continental crust:** is the crust under which the continents are built and is 10-70 km thick
4. **Oceanic Crust:** is the crust under the oceans, and is only 5-7 km thick.
5. **Convection Currents**: the movement of a fluid, caused by differences in temperature, that transfers heat from one part of the fluid to another
6. **Mantle**: The layer of rock between Earth's core and crust, in which most rock is hot enough to flow in convection currents; Earth's thickest layer. Mainly made of iron, magnesium and silicates.
7. **Lithosphere:** (rocky sphere) The layer of Earth made up of the crust and rigid rock of the upper mantle, averaging about 40 kilometers thick and broken into tectonic plates.
8. **Asthenosphere**: (weak sphere) The layer in Earth's upper mantle and directly under the lithosphere in which rock is soft and weak because it is close to melting.
9. **Mesosphere** - (middle sphere) solid layer in the mantle.
10. **Core:** At Earth's center, a layer made of metal mainly of nickel and iron.
11. **Inner Core** - a solid sphere of metal at Earth's center.
12. **Outer Core** - liquid metal layer that surrounds Earth's inner core.

I can recognize and name the Layers of the Earth.
(Knowledge, Comprehension)

Layers of the Earth: Vocabulary
Geologist
Crust
Oceanic Crust
Continental Crust
Upper Mantle
Lower Mantle

Layers of the Earth: Vocabulary
Lithosphere
Asthenosphere
Mesosphere
Convection Currents
Outer Core
Inner Core


World
180 150 120 90 60 30 0 30 60 90 120 150 180
90
60
0
60
90
© Bruce Jones Design Inc.

Volcanoes

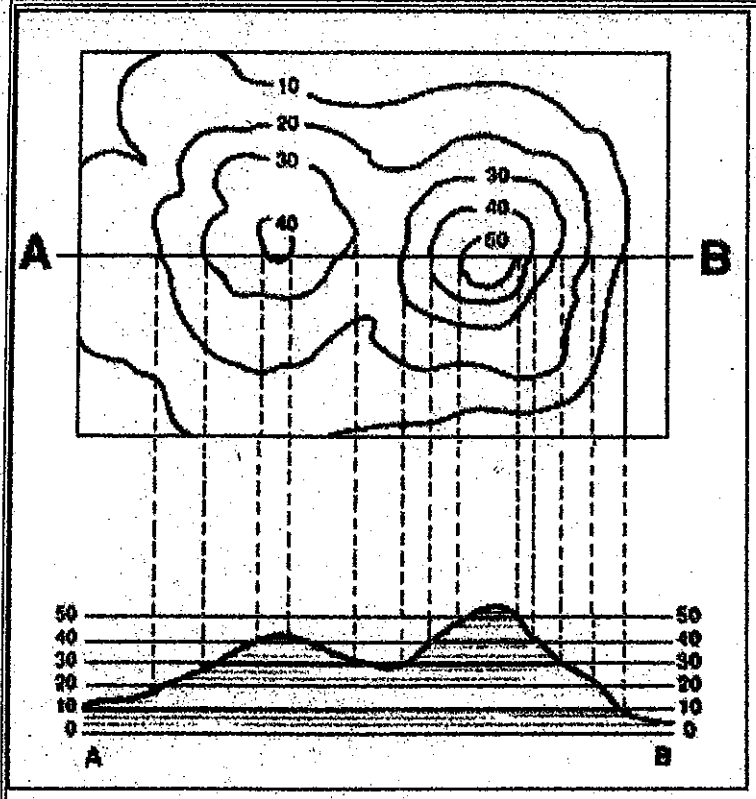
1. **Mount Mazama/Crater Lake, Oregon**—42.93 N, 122.12 W—Over 6,000 years ago Mount Mazama (posthumously named) erupted. Before the explosion the mountain was 12,000 feet high; when it was over it had been replaced by a 1,900-foot deep crater. Crater Lake, famed for its intense blue waters, was made a National Park in 1902. Volcanic activity occurred some time after the Mount Mazama explosion, creating Wizard Island in the middle of the lake.
2. **Mount Etna, Sicily**—37.734 N, 15.004 E—Although Mount Etna (or Aetna) is the highest active volcano in Europe, its renown comes from its role in Greek legends and in ancient works by writers such as Hesiod, Pindar and Aeschylus. According to Greco-Roman mythology, the giants—the enemies of the gods—were buried beneath Mount Etna. In their efforts to break free, the Giants caused frequent earthquakes around the mountain. The most recent eruption, in the Bove Valley section of Etna Volcano Park, occurred in December 1991.
3. **Mount Vesuvius, Italy**—40.821 N, 14.426 E—Vesuvius' eruption in 79 A.D. Covered the cities of Pompeii and Herculaneum, preserving them for generations to come. But this eruption also holds a place in history because of its documentation. Pliny the Younger left a detailed description of the event in two letters to Tacitus. A type of eruption—the Plinian type—is named for Pliny the Elder who died in the catastrophe. The volcano is still active and has had several eruptions—the most deadly being in 1631.
4. **Mount Tambora, Indonesia**—8.25 S, 118.00 E—The largest eruption during the last two centuries, as well as the deadliest volcano in recorded history, Mount Tambora exploded April 10-11, 1815. It killed an estimated 92,000 people. Almost 80,000 of the victims died of starvation brought on by the agricultural devastation in the volcano's wake. The eruption and the resulting massive clouds of dust and ash affected most of the Northern Hemisphere, causing unusually cool temperatures and failed crops in 1816—sometimes referred to as "the year without a summer."
5. **Mount Krakatau, Indonesia**—6.102 S, 105.423 E—On August 27, 1883, Mount Krakatau exploded with such force that it was heard in Australia, over 2,000 miles away. The force of the eruption triggered a series of tsunamis that reached the Hawaiian Islands and the coast of South America, killing more than 36,000 people. The five cubic miles of ejecta covered the surrounding areas in darkness for over two days and caused a series of dramatic sunsets around the world throughout the following year. The explosion and subsequent collapse of the volcano left only a remnant of the island above sea level. By 1928, another small island had emerged from a rising volcanic cone.
6. **Mount Pelee, Martinique**—14.82 N, 61.17 W—The eruption on May 8, 1902, killed 29,000, destroying the port town of Saint-Pierre four miles away. Almost all the deaths were caused by the resulting pyroclastic flow—a deadly, fast-moving cloud of hot gas and dense liquidized volcanic particles. Only two residents of the town survived the flow. Volcanology (also called Volcanism) was at best a primitive science in 1902, and the existence of pyroclastic flows was unknown. After this disaster a "new" type of eruption was named after Mount Pelee -- the Pelean-type eruption.

EARTHQUAKE DATA

	Location	Date UTC	Magnitude	Lat.	Long.	Reference
1.	Chile	1960 05 22	9.5	-38.29	-73.05	Kanamori, 1977
2.	1964 Great Alaska Earthquake	1964 03 28	9.2	61.02	-147.65	Kanamori, 1977
3.	Off the West Coast of Northern Sumatra	2004 12 26	9.1	3.30	95.78	Park et al., 2005
4.	Near the East Coast of Honshu, Japan	2011 03 11	9.0	38.322	142.369	PDE
5.	Kamchatka	1952 11 04	9.0	52.76	160.06	Kanamori, 1977
6.	Offshore Maule, Chile	2010 02 27	8.8	-35.846	-72.719	PDE
7.	Off the Coast of Ecuador	1906 01 31	8.8	1.0	-81.5	Kanamori, 1977
8.	Rat Islands, Alaska	1965 02 04	8.7	51.21	178.50	Kanamori, 1977

Activity Sheet — How to Read a Topographic Map

One special kind of map is called a **topographic map.** It has contour lines to show the shape and elevation of the land. They are sometimes called "level lines" because they show points that are at the same level. Here's how contour lines work:



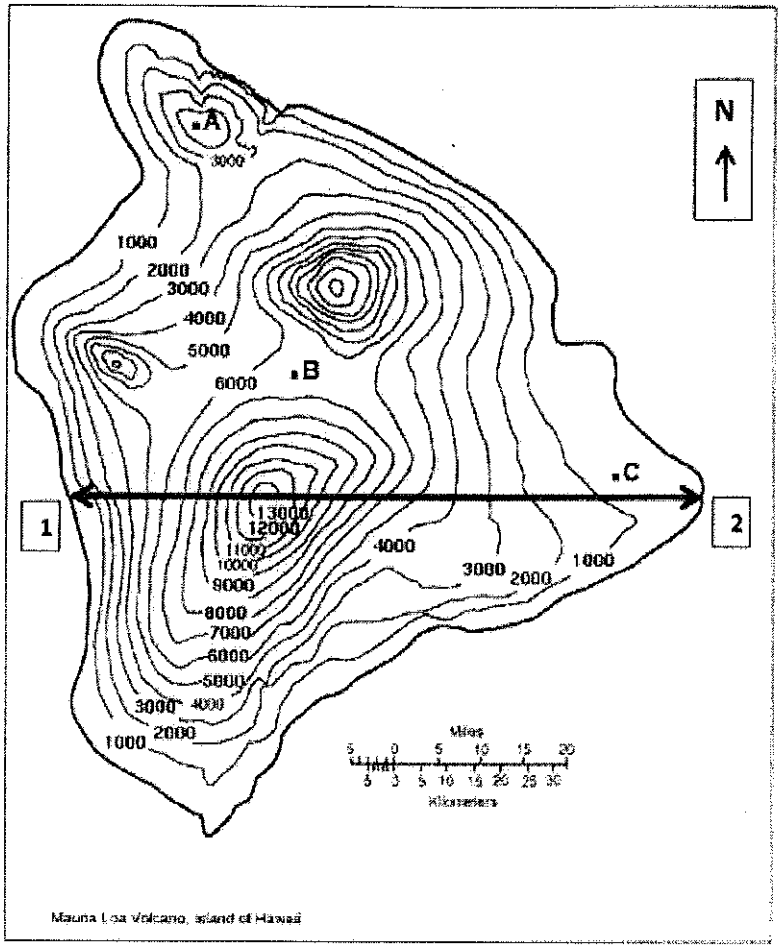
The top of this drawing is a contour map showing the hills that are illustrated at the bottom. On this map, the vertical distance between each contour line is 10 feet.

1. Which is higher, hill A or hill B?
2. Which is steeper, hill A or hill B?
3. How many feet of elevation are there between contour lines?
4. How high is hill A?
5. How high is hill B?
6. Are the contour lines closer together on hill A or hill B?

Look at this picture. It shows a river valley and several nearby hills. On the illustration, locate and label the following things:

- A church
- A bridge over the river
- An oceanside cliff
- A stream that flows into the main river
- A hill that rises steeply on one side and more smoothly on the other.

Map #3: the Island of Hawaii (showing Mona Loa volcano)



14. What is the contour interval, in feet, used on this map?

15. Estimate the elevations for the following points:

    a. Point A: _____

    b. Point B: _____

    c. Point C: _____

16. Estimate the elevation for the highest point on the island.

17. Using the graphic scale, determine the east-west distance (in miles) across the island from point #1 to point #2.

NAME (S):

MAPPING ACTIVITY (TOPOGRAPHICAL)

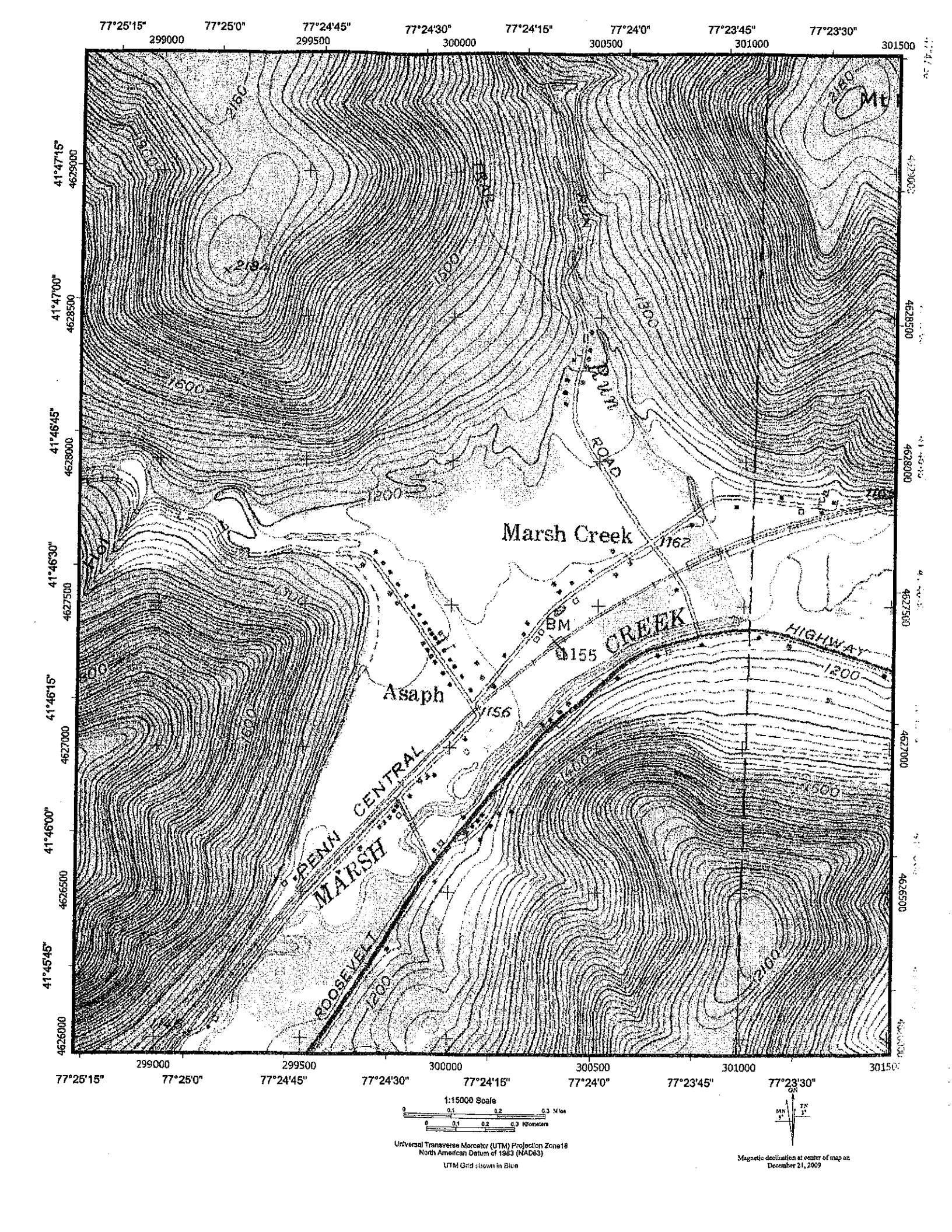
PLEASE DO NOT WRITE ON ME. THANK YOU

Directions: Using your brain and the map given to you, answer the following questions on a separate sheet of paper. TRY before giving up!!! Use the clues on the map and discuss with your group.

1. What is the name of the creek that runs through the area represented by the map?
2. The line marked ROOSEVELT is a type of _____?
3. The numbers (ex. 77 degrees, 23 minutes and 45 seconds) around the outside of the map refer to _____ and _____.
4. This type of map would be useful for people who _____.
5. In what state do you think this map area would be found? WHY?
6. Locate on the map the numbers 1300, 1500, 2184 and 2100. What do you think the numbers stand for?

WHEN YOU ARE FINISHED WITH THE QUESTIONS ABOVE TURN YOUR PAPER OVER AND RAISE YOUR HAND. DO NOT CONTINUE ANSWERING THE QUESTIONS BELOW.

7. What are the cardinal directions and how would one place them correctly on the map? WHY???
8. What is the location of MT NESMUK?
9. What are the lines on the map called?
10. Why are the lines important to some People?
11. If you started at the base of the mountain (Mt Nesmuk) and hiked to the top, how many feet would you have climbed in elevation?
12. Which side would you climb if you wanted a less steep path?
13. Three (3) centimeters (top line) on the map is equal to about ____ in real life. The bottom line equals what?
14. Why would anyone need to know the information is question 13?


77°25'15"
77°25'0"
77°24'45"
77°24'30"
77°24'15"
77°24'0"
77°23'45"
77°23'30"
299000
299500
300000
300500
301000
301500
41°47'15"
41°47'00"
41°46'45"
41°46'30"
41°46'15"
41°46'00"
41°45'45"
4629000
4628500
4628000
4627500
4627000
4626500
4626000
Marsh Creek
Asaph
MARSH CREEK
PENN CENTRAL
ROOSEVELT ROAD
HIGHWAY
BM
1155
1162
1156
1200
1300
1400
1500
1600
2100
2160
2194
1:15000 Scale
Universal Transverse Mercator (UTM) Projection Zone18
North American Datum of 1983 (NAD83)
UTM Grid shown in Blue
Magnetic declination at center of map on
December 21, 2009