Chapter 3 Models of the Earth

Name _______________________
Date_____________Class_______

Vocabulary List (Number, write and define these words on another sheet of paper, please illustrate those that have a *)

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
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<td>Contour Line</td>
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<td>Depression Contour*</td>
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<tr>
<td>Geomagnetic Pole*</td>
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<td>Gnomonic Projection</td>
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<tr>
<td>Great Circle*</td>
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<td>Index Contour</td>
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<td>Latitude*</td>
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<tr>
<td>Magnetic Declination</td>
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<td>Mean Sea Level</td>
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<td>Map Projection</td>
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<td>Meridian</td>
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<td>Mean Sea Level</td>
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<td>Parallel</td>
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<td>Mean Sea Level</td>
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<td>Relief</td>
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<tr>
<td>Prime Meridian*</td>
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<td>Relief</td>
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<tr>
<td>Polyconic Projection*</td>
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<td>Relief</td>
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<tr>
<td>Topographic Map</td>
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<tr>
<td>Scale</td>
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</tbody>
</table>

A. Latitude
1. What are ____________________?
   - Circles that run east and west around the world that are parallel to the Equator, each parallel forms a complete circle around the globe.
2. What is ____________________?
   - The angular distance north to south of the equator.
   - Latitude is measured in _____________, at equator 0 degrees, North and South Pole 90 degrees north and south.
   - One degree of latitude equals 1/360 the Earth ________________ (approx. 40,000 km)/360=
   - One degree of latitude is about 111 km.
   - Latitude is broken down into smaller parts: ________________.
   - 60 minutes in 1 degree of latitude= ______________
   - 60 seconds in 1 minute of latitude= 1.85 km= 1850 meters= ______________
3. What are meridians?
   - Circles similar to parallels that run north to south that are parallel to the Prime Meridian- passes through ________________
4. What is ________________?
   - The angular distance east or west of the Prime Meridian.
   - All locations east of P.M. have longitudes of 0 to 180 degrees __________, Philadelphia being west of the P.M. will have a longitude of about 75 degrees west and latitude of 39 degrees north.
   - Unlike latitude, longitude lines get closer together so a degree of longitude = 55 km at 60 degrees north and 20 km at 80 degrees north.

B. Great Circles
1. Why do ____________________ follow great circle routes instead of parallels?
   - Great circles- any circle that divides the globe into halves, a straight line on a sphere that makes for the ________________, shorter than parallels (see page 44)

C. Finding Direction
1. How can using a ________________ be useful?
   - Can indicate direction due to the Earth’s magnetic properties.
2. What is different about the geographic North Pole and the magnetic north pole?
   - The tilt of the ________________ inside of Earth causes the magnetic north pole to be located in a different spot than the geographic North Pole.
3. What is magnetic declination?
- The angle between the direction of the ______________________ and the direction in which the compass needle points
- In the Northern Hemisphere, magnetic declination is measured in degrees east or west of the geographic north pole (see page 45), in Philadelphia a compass needle points 
________________ of true north

Mapping the Earth’s Surface
1. What are some advantages and disadvantages of using a globe as a model of the Earth?
- Advantages- studying larger surface features such as _________________________
- Disadvantages- studying smaller features such as streams is too difficult, globe cannot show details
__________________________ - science of map making, subfield of the earth sciences and geography

2. What happens when placing the curved surface of Earth on a flat surface?
- Causes distortion in size, shape, distance and direction, the larger ______________________ the greater the distortion

A. Map Projections
1. What are the three most common types of map projections?

B. Mercator Projection
1. Where is the Mercator accurate and not accurate, why?
- By the ______________ it is accurate, distorts areas closer to the North and South Pole
- All meridians are evenly spaced on this map, which causes the distortion
- Norway, Alaska and Greenland are extremely exaggerated in _____________

C. Gnomonic Projection
1. Why is this projection useful, for whom?
- Though parallels are distorted from the point of contact, great for determining a ______________
- Navigators can readily find the great circle route

D. Conic Projection
1. Why is this projection useful?
- Polyconic projections are made with this type of map that may be used to map a ______________

Reading a Map
A. Symbols
1. The ______________________ explains all symbols on a map, some symbols resemble the features they represent- airports= airplane symbol, points of interest= box???

B. Map Scale
1. A map must be accurate and ______________________, the relationship to distance as shown on a map and actual distance
2. What is the difference between a graphic scale, fractional scale and verbal scale?
- ________________- a line of measurement such as kilometers is represented, each part of the scale represents a specific distance on the Earth
- __________________- using a ratio, 1:25,000 for example means 1 unit of distance on the map represents 25,000 of the same unit on the Earth 1:100 could be 1 inch is equivalent to 100 inches
- ________________- one centimeter equals one kilometer, the distance is stated

Topographic Maps
1. What are they?
- Illustrate the topography of the Earth: hills, rivers, buildings, roads etc.
- Provides more detailed information about a ________________ than other maps

A. Making a topographic map
1. How are they measured?
   - Measures elevation from ________________ (the point between the highest and lowest tide levels of the ocean)
   - Elevation at sea level is 0

B. Contour Lines
1. Contour lines show the ________________, the shape of the contour lines reflects the shape of the land

C. Contour Intervals
1. The ________________ is the difference in elevation between one contour line and the next
2. The interval is suited to the relief (difference in elevation between highest and lowest elevation), in a mountainous area- 50-100 meters, flat area- ________________

Interpreting a Topographic Map
1. Who makes topographic maps
   - The ________________ makes all maps of the United States called quadrangles
   - Each quadrangle covers ________________ and shows various surface features such as roads, streams, elevation, etc.
2. What is the scale used on a topo. map?
   - 1: 24,000- 1 inch on map is equal to ____________, use can use a ruler to measure distances on the map and then convert the inches to feet or miles
3. How is elevation determined on a map?
   - The contour interval determines the elevation, if the interval is ____________, than the contour lines will be 10, 20, 30, 40 meters, etc.
   - Exact elevations are marked by an X and labeled
4. How can landforms be determined on Topo. maps?
   - Contour lines spaced far apart means the gradient is ________________
   - ________________ contour lines indicates a rapid change in elevation
   - Contour lines that bend to form a ________________ indicate a valley, the V points towards the higher end of the valley, if a stream points through the valley the V will point upstream
   - ________________ are marked to show the direction of a depression
EXERCISE 2: *Bearings and Direction*

**Directions:** It is important to become familiar with the direction that various bearings represent. Assuming that "A" is zero degrees, give the direction and degree reading for all points.

**Answers:**

<table>
<thead>
<tr>
<th>BEARING/DEGREE</th>
<th>DIRECTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>or</td>
</tr>
<tr>
<td>B</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
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<tr>
<td>G</td>
<td></td>
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<tr>
<td>H</td>
<td></td>
</tr>
</tbody>
</table>
EXERCISE 1: *Compass Part Identification*

*Directions:* Match the terms below with the correct parts on the compass diagram.

A. Azimuth Ring  
B. Compass Base  
C. Declination Scale  
D. Acreage Scale  
E. Orienting Arrow  
F. Protractor Scale  
G. Sighting Line (Direction of Travel Arrow)  
H. Vial  
I. Magnifier  
J. Magnetic Needle

9020 COMPASS

*Answers:* Write the correct letter in the corresponding blank.

1.  
2.  
3.  
4.  
5.  
6.  
7.  
8.  
**Sighting and Following a Compass Bearing**

**Directions**

1. Hold your compass level in front of you, with the base plate travel arrow pointing towards the direction you wish to go. Do not point the compass with your hand. Turn your whole body. When your compass is held flat, the Magnetized Needle will rotate freely and it RED end will point towards the Magnetic North.

2. Holding the compass level, rotate the graduated dial unit the orienting arrow and the red “N” are aligned with the RED end of the magnetic needle.

3. Your Bearing or Direction of Travel can now be read in Degrees at the Index Line on the dial at the base of the Travel Arrow, which now points precisely to your destination.

**What’s Their Bearing?**

Try these markers in the classroom/school to see what direction you are facing. Remember to keep your body directly in front of the item!

<table>
<thead>
<tr>
<th>Classroom</th>
<th>Degree Reading</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Facing Rainbow</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Facing Poster: “Florida’s Aquatic ...”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Facing Poster: “Comets”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Facing First TV</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Around School**

1. Flat Screen TV in main Hallway | | |
2. Flagpole | | |
3. Entrance to Library | | |
4. Entrance to Auditorium | | |
5. Facing Field Hockey Field (window outside Ms. Senske’s room) | | |

**Using Google Earth:**

Draw a map of CB South in reference to the direction and degrees that you measured above:
1. What is the difference in elevation from the back parking lot row to Folly Road? (Show work with labels)

2. Using the ruler tool, how wide is South from end to end (Auditorium-Gyms) in feet?

3. From the North (Bristol) to the South (Pickertown) entrance, how long is the South’s campus in meters?

4. What sport would you be competing in at the southernmost end of campus (hint: it’s red on the map)?

5. Where are you on campus with the following coordinates:
   a. 40 15’53.49 N
      75 09’47.68 W
   b. 40 15’42.62 N
      75 09’43.29 W
   c. 40 15’38.06 N
      75 09’55.35 W

6. Using the time slider, take the time back to 9/23/2003, how did South look then?

Bonus:
Please list any other cool tools and tricks that can be used to study our campus:
Contour Map of Mount Capulin in New Mexico

Purpose
To model the shape of the earth’s surface features in two dimensions using hand drawn contour lines.

Materials
Plastic Mountain Replica  Clear Plastic Box  Ruler (metric side)
Tape  Clear Acetate Sheet  Waterbase projector pens
Water  Beaker

Background:
Contour lines, as visualized on the Earth’s surface, are closed curves (in the grandest sense) at constant elevation, which are always perpendicular to the slope of the surface at any point. Since a contour line might actually close only after wandering a large geographical region, contour lines on a model, a map or chart might seem to close. Each contour line has an expressed or implied elevation. The contour interval is the constant difference between adjacent contour lines. Closely spaced contour lines on a map or chart would indicate a steep slope. Drainage features such as gullies, streams or rivers are distinguished on the map or chart by a consistent dip in the contour lines as each crosses the thread of the stream at right angles.

Procedure:
1. Using tape, secure the mountain replica to the bottom of the box. The hole in the top of the mountain should be sufficient to keep the model from floating.
2. Make marks every one half of a centimeter (5 mm) apart up the side of the box, beginning at the bottom.
3. Label this elevation scale using zero at the bottom, .5 cm, 1 cm, 1.5 cm etc. with the waterbase projector pen
4. Carefully fill the box with water using the beaker until you reach the first mark. The resulting “shore line” matches the definition of a contour line since it is at a constant elevation (Observing this is the whole point of the activity).
5. This, and the remaining contour lines can be inscribed on a two dimensional surface. First, cover the box with it’s lid and place the acetate sheet on top of the lid
6. Using the crayon, draw each contour of the replica as it appears at the “shore line” directly onto the acetate sheet by viewing from above.
7. Water is carefully added with the beaker to bring the level to the next mark. Make sure the mountain is still attached to the bottom.
8. Continue until the mountain is completely submerged
9. Label your contour lines, to do this you need to know that the bottom of the box is at an elevation of approximately 6,000 feet. One centimeter scales to 250 feet.
10. When you are finished trace the contour lines onto a plane white sheet of paper label each contour line to turn in with your lab.

**Evaluation Questions:**

1. Describe the general shape of the contour lines.

2. What general statement can be made about the closeness of the lines and the steepness of the slope?

3. Describe how the solidified lava flows have affected the pattern of contour lines.

4. How would a steep valley down the side of the volcano change the contour pattern?

5. Would it be possible to distinguish a basin from a mountain on a topographic map or chart?

6. What was the meaning of this lab?
Name ___________________________

**Crack the Code**

**Your Mission**
Crack the code to find out where the thieves are taking the loot.

**Briefing**
Crafty robbers broke into the Royal Geographical Society in London and stole armfuls of priceless maps. Finding them would be hopeless, except that they dropped a scrap of paper with some odd scribbles on it.
The thieves who broke into the Royal Geographical Society left behind this code. (As a bonus clue, we’ve added the number of letters in each city’s name.)

First letters from each place-name read.
Spell out the town and come with speed.

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<tr>
<th>LATITUDE</th>
<th>LONGITUDE</th>
<th>LETTERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>40° 58' N</td>
<td>5° 39' W 9</td>
<td>(9)</td>
</tr>
<tr>
<td>21° 18' N</td>
<td>157° 51' W</td>
<td>(8)</td>
</tr>
<tr>
<td>36° 52' S</td>
<td>174° 46' E</td>
<td>(8)</td>
</tr>
<tr>
<td>1° 17' S</td>
<td>36° 49' E</td>
<td>(7)</td>
</tr>
<tr>
<td>6° 48' N</td>
<td>58° 10' W</td>
<td>(10)</td>
</tr>
<tr>
<td>21° 2' N</td>
<td>105° 51' E</td>
<td>(5)</td>
</tr>
<tr>
<td>16° 51' N</td>
<td>99° 55' W</td>
<td>(8)</td>
</tr>
<tr>
<td>41° 1' N</td>
<td>28° 58' E</td>
<td>(8)</td>
</tr>
</tbody>
</table>

**KEY:** ° represents degrees of latitude or longitude.

‘ represents minutes (out of 60) within a degree.

Those dastardly crooks are heading to . . .
Map Distortions
Go to: http://www.classzone.com/books/earth_science/terc/navigation/investigation.cfm,
Go back to investigations and scroll down to Chapter 3 and click on ‘How do map
projections distort Earth’s Surface?’
Step 1: A Multitude of Maps
  1. Click on the three top maps, what does each map depict?
     Map 1 _________________________________
     Map 2 _________________________________
     Map 3 _________________________________
Step 2: A Spherical Planet
  1. According to this step, why is map making a major challenge?

Step 3: Flattening Earth
  1. What happens to the surface of Earth when it is pulled off a globe and flattened?

Step 4: From Globe to Map
  1. How do the two images compare?

Step 5: Projecting the Surface
  1. What is a Mercator projection?

Step 6: Map projections
  1. In which projection does Antarctica appear disproportionately large?
     _________________________________
  2. In which projection does Asia appear disproportionately large?
     _________________________________
  3. In which projection does Asia appear disproportionately small?
     _________________________________

Step 7: Three Common Projections
  1. What are the three types of planar projection surfaces? _______________________,
     _______________________, _______________________

Step 8: Measuring Projection Properties
Cylindrical Projection
1. Use the ruler tool to measure the distance between Barrow, Alaska and Miami, Florida: ______________
2. What is the area of Africa? ________________________________

Conical Projection
1. Use the ruler tool to measure the distance between Barrow, Alaska and Miami, Florida: ______________
2. What is the area of Africa? ________________________________

Planar Projection
1. Use the ruler tool to measure the distance between Barrow, Alaska and Miami, Florida: ______________
2. What is the area of Africa? ________________________________
3. Which projection minimizes distortion of South America, Africa, and areas near the equator? ______________
4. Which projection minimizes distortion of the United States and other temperate regions? ______________
   Which projection minimizes distortion of land in polar regions? Look at Antarctica or Greenland. ______________
Name _________________________

Topographic Maps

Go to: http://www.classzone.com/books/earth_science/terc/navigation/investigation.cfm,
Click on: ‘How are Landforms represented on Flat Maps?’

Step 1: Earth’s Varied Topography

1. Define topography-

2. Click the image to see a simulated flyby of Death Valley, California. Write a detailed description of the topography that you encounter during this flyby.

3. What do light areas on the surface represent? ________________________________

4. What part of CA is Death Valley located (click on where on Earth)? ______________

Step 2: Showing Topography on Maps

1. When you click on identify, what three features appear? _________________, ____________, _____________________

2. Click on the Topographic Map, what is the highest elevation on the map? ____________

3. Where on Earth is this map located? __________________

Step 3: Contour Lines and Elevation

1. Which part of this land is the last to flood as the water rises?

Step 4: Reading Elevation from Contour Lines

1. What does the line of the contour indicated? _________________________________

2. Why do only the heavier lines show labels? _________________________________

3. What does the contour interval tell? _______________________________________

4. What is the elevation of the points marked A: ___________ B ______ and C __________

Step 5: The Spacing of Contour Lines

1. What do closely spaced contour lines indicate about the shape of a feature? In other words, when the lines are close together, does the feature have gentle slopes or steep sides?

Step 6: Closed Contours

1. What is the pattern of the contour lines around a simple hill?

Step 7: Contour Lines and Valleys
1. Make a sketch of the pattern of the contour lines moving up the valley. Draw an arrow to indicate the direction in which water flows across the lines.

Step 8: Hachures on Contour Lines
1. What landform feature does the model show, and what do hachures on contour lines indicate?

Step 9: Mount Shasta inn 3-D
1. Describe the structure inside the box on the map. _______________________________
2. Where in CA is this mountain? ________________________________

Step 10: Interpreting a Topographic Map
1. Identify the feature A ____________________, B ____________________
2. What is the lowest elevation on the Map ____________________, highest? __________
3. What color are the lowest areas on the map represent in __________, highest? ______

Step 11: A Topographic Tour
1. Click on the Map of Meteor Crater and type in the Meteor Crater, AZ. What is the elevation at the bottom of Meteor Crater? ________________, at the top? ___________

Step 12: Visualizing Topography With Space-Based Technology
1. What did the Shuttle Radar Topography Mission (SRTM) do in 2001?
2. Where in CA is this image located? ________________________________
Name _________________________

Latitude and Longitude
Go to: http://www.classzone.com/books/earth_science/terc/navigation/investigation.cfm,
Click on: ‘How do Latitude and Longitude Coordinates Help us See Patterns on Earth?’

Step 1: Sea Surface Temperatures
1. How does sea surface temperature appear to change with latitude?

2. How does sea surface temperature appear to change with longitude?

Step 2: Gridding the Earth
1. What line on the grid would be considered the x-axis? ________________________
2. What line on the grid would be considered the y-axis? ________________________
3. Which lines (longitude or latitude) run from north to south? ________________________
4. Which lines (longitude or latitude) run from east to west? ________________________
5. Which line is the reference line for longitudes? ________________________
6. Which line is the reference line for latitudes? ________________________

Step 3: Locating Sea Surface Temperatures
Follow the instructions in the box below to generate a map of global sea surface temperatures. Proceed carefully; you will need to start over if you leave this page before you are finished.

1. How does sea surface temperature change along latitude lines?

2. How does sea surface temperature change along longitude lines?

3. What conclusion might you have drawn had you looked at global sea surface temperature along only one latitude line?

Step 4: Changes in Sea Surface Temperature over Time
1. Consider how the sea surface temperature pattern shifts over time. Does the location of the pattern change with respect to longitude or latitude? By how many degrees does the pattern shift?

Step 5: Sea Surface Temperature and Global Climate
1. What are the two direct reasons for sea surface temperature changes? ________________________, ________________________
2. What months does the phenomena of El Nino occur? ________________________

Step 6: Using Space-Based Technology to Find Latitude and Longitude
1. What does GPS consist of?
2. Why is GPS important?
LATITUDE AND LONGITUDE
Introduction to Coordinate Systems on Earth

This exercise is an introduction to a standardized coordinate system used throughout the world for centuries, Latitude and Longitude. While there are many coordinate systems that have been developed for a variety of mapping and geographic purposes, the great majority of maps produced for public use still rely on the traditional Latitude and Longitude system.

In Google Earth, you can toggle the latitude/longitude grid on/off from the menu bar at the top of the page. Move your cursor to the ‘View’ option on the menu bar and click it. Locate the Lat/Lon Grid option and click it. You will see the latitude/longitude grid appear on the Earth image in Google Earth. Clicking on the Lat/Lon Grid option again will turn off the grid. Alternatively, you can toggle the latitude/longitude grid by simultaneously using the ‘ctrl + L’ keys on your keyboard.

In the latitude/longitude system, the nearly spherical Earth is divided into a grid composed of parallels of latitude (North-South grid lines) and meridians of longitude (East-West grid lines). The equator serves as the reference line for latitude and was arbitrarily assigned a value of 0 degrees centuries ago. Latitude is then measured in degrees north or south from the equator.

1. What is the angular distance from the South Pole to the North Pole?

2. What is the angular distance from the Equator to the South Pole?
3. What is the angular distance from the Equator to the North Pole?

Longitude is measured in degrees east or west from the Prime Meridian (rotate the Google Earth globe to locate the Prime Meridian). Note that the Prime Meridian is the meridian of longitude passing through the Greenwich Observatory in Greenwich, England. In 1884, this meridian was arbitrarily chosen as the ‘zero meridian’ for the world. Not only is the Prime Meridian the east-west origin of the global longitude grid, it is also the point of origin for the global system of time keeping – each new day begins on the Prime Meridian. This time is known as 0000 hours Greenwich Mean Time, corresponding to midnight at the Greenwich Observatory, and Greenwich Mean Time is often abbreviated as GMT.

Note on the Google Earth latitude/longitude grid that several grid lines are indicated in yellow. These are 1) the Prime Meridian, 2) the Equator, 3) the Tropic of Cancer, 4) the Tropic of Capricorn, 5) the Arctic Circle, and 6) the Antarctic Circle.

4. At what latitude is the Tropic of Cancer and what is its significance?

5. At what latitude is the Tropic of Capricorn and what is its significance?

6. At what latitude is the Arctic Circle and what is its significance?

7. At what latitude is the Antarctic Circle and what is its significance?

Compile a table showing the approximate latitude and longitude of the following locations. Enter the location name into the query bar of Google Earth, then record the latitude/longitude displayed in the Google Earth window for each site.

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>LATITUDE</th>
<th>LONGITUDE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your college/university</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your home town</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Forbidden City</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Taj Mahal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Eiffel Tower</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Sydney Opera House</td>
<td></td>
<td></td>
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<tr>
<td>The Pyramids of Giza</td>
<td></td>
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<tr>
<td>The Parthenon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CN Tower</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Big Ben</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Crack the Code**

**Your Mission**
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<tr>
<td>6° 48’ N</td>
<td>58° 10’ W</td>
<td>(10)</td>
</tr>
<tr>
<td>21° 2’ N</td>
<td>105° 51’ E</td>
<td>(5)</td>
</tr>
<tr>
<td>16° 51’ N</td>
<td>99° 55’ W</td>
<td>(8)</td>
</tr>
<tr>
<td>41° 1’ N</td>
<td>28° 58’ E</td>
<td>(8)</td>
</tr>
</tbody>
</table>

KEY: ° represents degrees of latitude or longitude.
’ represents minutes (out of 60) within a degree.

Those dastardly crooks are heading to . . .
Each of the coordinates represent a major city, plot the following coordinates on the map and label what city you think it is.

Name __________________

Objective: To identify map symbols, distance, topography, stream flow direction and elevation on a topographic map.

Materials: **100 Topographic Maps** book and a writing instrument

**Activity #1**
Procedure: Review the various symbols using Map Symbols on page 10 of **100 Topographic Maps**, fill in the chart below with the correct symbol.

<table>
<thead>
<tr>
<th>Name</th>
<th>Symbol</th>
<th>Name</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td></td>
<td>Cemetery</td>
<td></td>
</tr>
<tr>
<td>Railroad</td>
<td></td>
<td>Power Line</td>
<td></td>
</tr>
<tr>
<td>Church</td>
<td></td>
<td>Unimproved Road</td>
<td></td>
</tr>
<tr>
<td>County Boundary</td>
<td></td>
<td>Heavy Duty Road</td>
<td></td>
</tr>
</tbody>
</table>

**Activity #2**
Materials: Same as above, + ruler

Procedure: To measure distance on a map using a graphic scale is quite simple. First, find the graphic scale, (usually at bottom of map). Then, take a ruler/paper and make note of the distance to be measured on the ruler/paper. Hold the ruler/paper along the scale starting at one mark and measure the distance to the other mark.

1. Page 12: Antelope Peak, Arizona- Distance of four lane highway, running east, west across map ____________
2. Page 17: Bray, California- Distance from summit of Orr Mountain to summit of Cedar Mountain (summits marked with an triangle) __________________
3. Page 24, Commerce City, Colorado- Length of South Platte River shown on map ________________

**Activity #3**
Procedure: Please determine specific topographic features on various maps.

1. What are the contour intervals for the following maps
   a. Page 31, Lake Wales, Florida ________________
   b. Page 102, Holden, Washington ________________
   c. Page 82, Renova West, Pennsylvania ________________
   d. Why are there different intervals for the different maps above, which is the flattest; which has the most rugged terrain?
   e. Page 34, Thousand Springs, Idaho: The Snake River flows through a steep canyon. How do the contour lines represent this?
2. On the following maps, give the general direction that each stream flows:
   a. Page 103, Lake Tapps, Washington, Wilkenson Creek (A3,4) __________
   b. Page 61, Crawford Notch, New Hampshire, Saco River ____________
   c. Page 34, Thousand Springs, Idaho, Briggs Creek (E5) ____________
   d. Page 29, Washington DC, Rock Creek ______________

3. On the following maps, give the minimum, maximum or exact locations of the following. Those marked with a (***) are to be exact elevations.
   a. Page 46, Cumberland, Maryland/West Virginia
      1) Allegany High School (D4) __________
      2) ‘Water’ (E1) _____**
      3) County Home (C5) _____**
   b. Page 57 Chief Mountain, Montana
      1) Mt. Cleveland (A1) ________**
      2) Appekunny Mtn (B4) _______**
      3) Grinnell Glacier (D3) ______
   c. Page 63, Paterson, New Jersey
      1) Preakness School (D1) __________
      2) Haledon Reservoir (B4) __________
      3) High Mtn _______**
   d. Page 89, Rover, Tennessee
      1) Ransom Cemetery (B2) _______ _____
      2) Rockvale (A5) _______**
      3) Lebanon Charge ______
Section 3.1
Finding Locations on the Earth

Choose the one best response. Write the letter of that choice in the space provided.

1. A plane leaves Greenwich, England, flying in a westerly direction. After flying three fourths of the way around the earth, the plane's longitude would be:
   a. 90° E.
   b. 90° W.
   c. 270° E.
   d. 270° W.

2. The circumference of the earth is approximately:
   a. 400 km.
   b. 4,000 km.
   c. 40,000 km.
   d. 400,000 km.

3. The earth's axis of rotation intersects the earth's surface at the:
   a. magnetic poles.
   b. geographic poles.
   c. prime meridian.
   d. equator.

4. The vertical lines in this diagram represent:
   a. relief.
   b. parallels.
   c. seconds.
   d. meridians.

5. The latitude of the equator is:
   a. 0°.
   b. 90°.
   c. 180°.
   d. 360°.

Complete each statement by writing the correct term or phrase in the space provided.

6. Magnetic declination is the angle between the direction in which the compass needle points and the direction of the ____________________________.

7. An imaginary line that divides the earth into equal halves is called a ____________________________.

8. The line of longitude selected to be 0° is called the ____________________________.

9. True north is in the direction of the geographic ____________________________.

10. A degree of latitude consists of 60 equal parts called ____________________________.
Section 3.2

Mapping the Earth’s Surface

Choose the one best response. Write the letter of that choice in the space provided.

1. On a Mercator projection, the greatest distortion is produced:
   - a. at the equator.
   - b. at the poles.
   - c. along the prime meridian.
   - d. midway between the poles.

2. Which type of map is produced by fitting together a series of map projections?
   - a. Mercator
   - b. conic
   - c. polyconic
   - d. gnomonic

3. Great circles are shown as straight lines on which type of map projection?
   - a. gnomonic
   - b. Mercator
   - c. polyconic
   - d. conic

4. Which of the following is true of a Mercator projection?
   - a. Coastline shapes are accurate.
   - b. Spacing between parallels is equal.
   - c. Compass directions are curved.
   - d. Equatorial regions are greatly distorted.

Read each statement below. If the statement is true, write T in the space provided.
If the statement is false, write F in the space provided.

5. On a polyconic projection, the relative size and shape of small areas are nearly the same as those on a globe.

6. The globe is a type of map projection.

7. The ratio of 1:10,000 can also be expressed as 1 cm equals 1 km.

8. Directions on a map should be determined in relation to the meridians and parallels.

9. According to this map, the distance between Osaka and Tokyo is approximately 500 km.

10. Osaka is a capital city.

14 Chapter 3
Section 3.3
Topographic Maps

Read each statement below. If the statement is true, write T in the space provided. If the statement is false, write F in the space provided.

1. On topographic maps, contour lines connect points having the same elevation. T
2. Topographic maps show only natural features of an area. F
3. Eastern and western boundaries of U.S.G.S. maps are indicated by meridians of longitude. T
4. Index contours are contour lines that are printed bolder in order to make map reading easier. T
5. A 15' topographic map shows more detail than a 7.5' map of the same area. F

Choose the one best response. Write the letter of that choice in the space provided.

6. On a topographic map, rapid increases in elevation are represented by:
   a. depression contours
   b. V-shaped contour lines.
   c. contour lines forming closed loops.
   d. closely spaced contour lines. d

7. The elevation difference between two contour lines on a map is called the:
   a. map scale.
   b. contour interval.
   c. map projection.
   d. index contour. b

8. Contour intervals are most likely to be smallest on maps of:
   a. hilly areas.
   b. flat areas.
   c. high-altitude areas.
   d. low-altitude areas. c

9. At what elevation is the point labeled X on the map?
   a. 400 m
   b. 450 m
   c. 500 m
   d. 600 m

10. Which feature is indicated by the arrow?
    a. peak
    b. valley
    c. stream
    d. depression c