Topo Map Mania!

Unit Topic:	Navigation
Grade Level:	7th grade (with suggestions to scale for grades 6 to 8)
Lesson No.	5 of 10
Lesson Subject(s):	Map, Compass
Key Words:	Map, Compass, Scale, Legend, Bearing

Lesson Abstract —

The focus of this lesson is on how to read and use topographical maps. Students will also learn to use a compass to find bearing to an object on a map and in the classroom.

The activities include:

- Where is Your Teacher? – in this activity, students will learn how to take bearing with a compass. They will also learn how to describe a bearing and find an object using a bearing.
- The Trouble with Topos – in this activity, students will learn how to read topological features on a map.

Lesson Opening Topics / Motivation —

Ask your students how they might travel to somewhere they have never been to before. If they are going on a family vacation to the beach, how do their parents know how to get there? (Possible answer: Look at a map.) Why are they not able to use landmark navigation (determining your location by identifying known landmarks) like at home? (Possible answer: Because you do not know the relative location of landmarks if you have never been there before.)

Maps provide an image or picture of an area with landmarks. By comparing what you see around you to what is on the map, you can figure out where you are and how to get to where you want to be.

Maps are designed to allow people to travel to a new location without a guide to show the way. They tell us information about areas to which we may or may not have ever been. But how are maps useful? What do they tell us? (Possible answers: landmarks, roads, and cities.)

What if you were not traveling to another city but taking a trip in the wilderness? What kind of information do you think that you would need to know? (Possible answers: locations and names of trails, rivers, and mountains.) What if there was a mountain in the middle of where you wanted to go? Most of us would want to go around the mountain instead of up and over it. How is a map helpful? A map might only show an 'X' to indicate the peak (top) of a mountain, but the

mountain extends far beyond the actual peak. What would be really helpful would be a map that also tells us how high the mountain is. With a map like that, you could see how big the mountain really is. Luckily, there *is* a map made just for that purpose: it is called a topographical map. In Activity 2, *The Trouble with Topos*, you will get to work with this type of map.

Lesson Desired Student Outcomes —

Students will understand the major features of maps and compasses. They will learn how to read a topographical map, how to take a bearing using a compass, and how to follow a bearing.

Science: Students should be able to:

- Predict (hypothesize). (1)
- Evaluate data from other students to formulate conclusions. (1)
- Describe how using and understanding maps and compasses can help determine your location. (5)

Math: Students should be able to:

- Understand how scaling works, and
- Convert from one unit of measure to another.

Colorado State Standards Met —

- Science Standards 1, 5.
- Math Standards 4, 6.

Lesson Background and Concepts for Teachers —

Overview

The following topics will be discussed:

- Reading maps,
- Reading topographical maps,
- Common features of maps, and
- How to use a compass to take a bearing and follow a bearing.

Maps for Different People

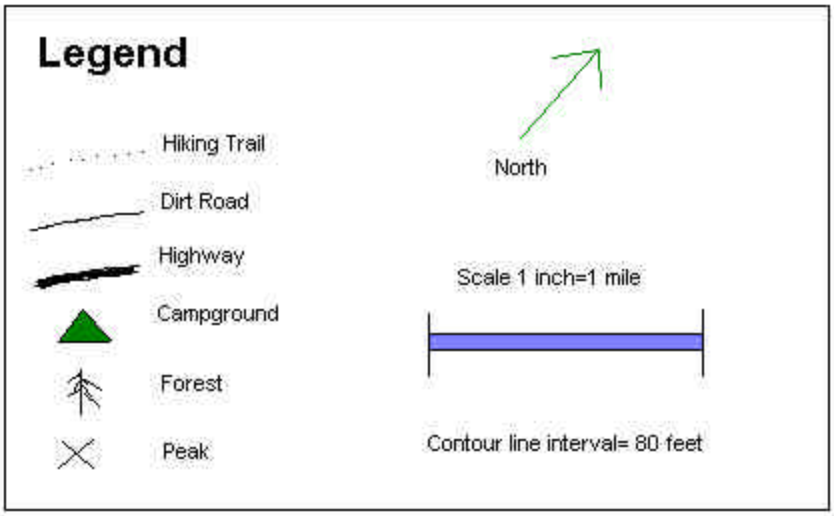
Maps come in a variety of forms: city maps, road maps, nautical maps, topographical maps, and many others. The features of a map are dependent upon the intended use. For example, a state map shows cities, major roads, national parks, county lines, etc. A city map shows streets and major landmarks, like hospitals and parks. To be able to use a map to find your way, you first have to figure out where your current location is on the map. You typically do this by comparing the landmarks you see to those shown on the map. You might use a physical landmark like a park or the intersection of two roads. In the U.S., most streets are marked with signs, so finding a street intersection is not too difficult. In some cities around the world, street signs are not very

common, so matching up where you are with a point on the map can be tough. In this case, you might compare the shapes of roads (curves, circles, etc.), or count the number of roads from another physical landmark, like a river or railroad.

Scale, Legends and Orientation

All maps have a scale and a legend. The *scale* of a map —which is based on the physical size of the map — shows the actual distance between different locations. People can determine this by relating the distance between points on a map (usually an inch) to the actual physical distance between those points on earth. For example, a scale that could be used on a state map equates an inch to 50 miles.

The scale is noted in the *legend*, a set of definitions and background information about what is shown on the map. The legend tells us the name of the area that the map is showing (like which city), the scale (how big the area is), and a list of landmark types and their corresponding symbols. Common symbols are crosses for peaks and the triangle that denotes a campground. Also shown on the map is its orientation. The orientation tells which direction is north. Most maps (state, road, topographical) show north as pointing straight up. So when we look at a map with the majority of words horizontally readable from left to right, north is always pointing up. City maps are usually oriented so that the layout of the city makes the most sense. If all the roads in a city run northwest to southeast, having a map oriented with north up would make the map look crooked. So, for convenience a city map for this area would be oriented with northwest toward the top of the page. The orientation arrow still points to north, but it is not pointing up.



Source: created by M. Lundberg, University of Colorado, Boulder, 2003.

Topographical Maps

One important type of map is called the topographical (or, topo) map. The most important feature of a topo map is that it shows the elevation (or height) of the land using contour lines. The picture below shows how this works. Contour lines connect points that are at the same elevation. Each contour line represents a specific elevation, and on a given map, there is a fixed elevation difference between contour lines. In the figure below, the innermost circle on the left is marked 40. That means that every point on the line is at an elevation of 40 ft.. A closed contour

ring like this represents either a peak or a valley — you can tell which one by checking the next few contour lines. In the figure below, the next ring is marked at 30 ft.. So, you can see that the 40-ft. contour line encloses a peak with an elevation of at least 40 ft. and not more than 50 ft.. (If it is higher than 50 ft., there would have to be another inner ring on the left.) In this picture, you can see that there are actually two peaks — the one on the right goes up to 50 ft.. As you move away from the two peaks the terrain levels out so that the 20-foot contour line actually encloses both of the peaks. You can use peaks and valleys on a topo map as landmarks to help identify where you are.

To get a better feel for what is represented by the topo map, we will look at a cross-section of the area. Let's say we are interested in going from point A to point B on the map below. The cross-section of this path is shown below the contour map. The cross-section shows the height of the terrain along the path. You can see from this diagram that traveling directly along the line from A to B would involve going straight up and down the two peaks!

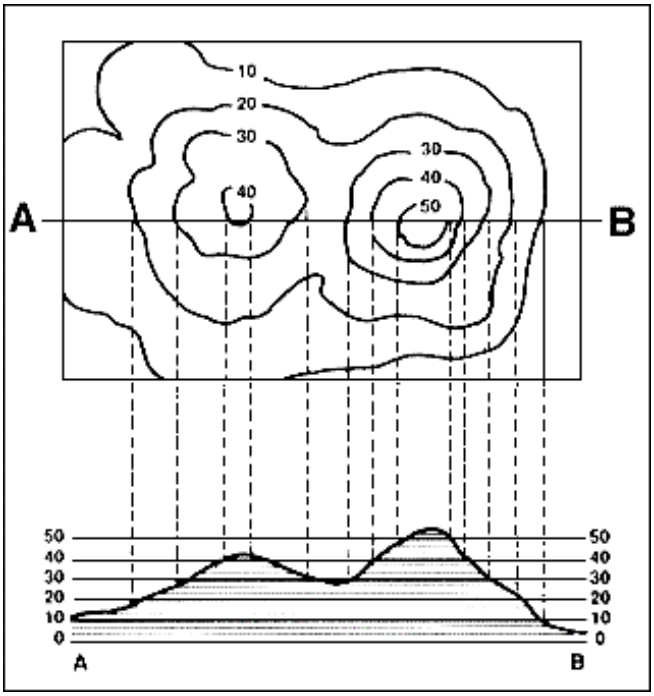


Image source: http://interactive2.usgs.gov/learningweb/teachers/mapsshow_act4.htm

Topo maps are tricky to read at first, but, with a little practice and some helpful tips, it becomes much easier.

The first thing to notice is the distance between the contour lines. If they are far apart, the slope (or elevation change) is small and vice-versa. If the contour lines are close together the slope is greater. The Grand Canyon, known for its high canyon walls, would have contour lines that are very closely packed together. A state like Nebraska, known for its flatness, would barely even have contour lines. This is illustrated in the picture above. On the left side, the 10-ft. contour line is far away from the 20-ft. contour line. Looking at the same point on the elevation plot, you can see that the slope is pretty shallow. It would be easy to walk up this slope. But, looking at the

right hill, the distance between the 40-ft. contour line and the 50-ft. contour line is small. The corresponding elevation plot shows a steep slope. Walking that part of the line would be much more difficult.

An experienced map-reader can also spot hills and peaks on the topo map. These are represented by roughly circular contour lines that keep on increasing and that are nested within each other. If the distance between the contour lines keeps decreasing, the slope up to the peak is getting steeper. If the circles are getting farther apart, then the slope is leveling out. In the picture above, there are two hills, one on the left and one on the right. The hill on the right has tight circles that are not very far apart, indicating that the slope of that hill is steep. The peak or summit of that hill would be somewhere within the 50-ft. contour circle. The left hill's circles are not as tight, showing a more moderate slope, and the peak or summit of that hill would be somewhere within the 40-ft. contour circle.

Scale, Orientation and Grids for Topo Maps

Topo maps use a set of standard scales. This number is a ratio of the distance on the map related to the actual distance. For example, if the ratio were 1:4, an inch on the map would represent 4 inches of actual distance. Of course, this scale is far too small to be useful, so actual scales are much larger. Below are the three most common scales for topo maps.

- 1:250,000 – These maps cover a large area such as a county or small state. Using this scale, an inch on the map is approximately an actual distance of 4 miles. These maps are useful for long-range exploration.
- 1:62,500 – These maps cover a moderately sized area like a national park. An inch on the map equates to roughly a mile of actual distance.
- 1:24,000 – These maps cover a small sized area. An inch on this map equates to 2,000 ft. This unit of measurement is useful for surveying, so these maps are generally made for this purpose.

The orientation of topographical maps is always north. In other words, north is always pointing up. Topo maps are specifically designed to be used easily with a compass.

Topo maps also have a grid. This grid separates the map into many small square sections. This makes it easier to read the map, use a compass, and discuss your location with other people. It is a lot easier to say "I am in grid A5" than it is to say "I am at N40'0.1" by W103'45.6"." This grid is made by drawing lines some distance apart that run north-south and then drawing lines that run east-west that same distance apart. This results in a square pattern on the map. These lines are also useful when using a compass.

An Introduction to the Orienteering Compass

An orienteering compass is specifically made for wilderness travel. It is easy to use and has a number of features that can be used with topographical maps. Let's take a look at the major features of an orienteering compass.

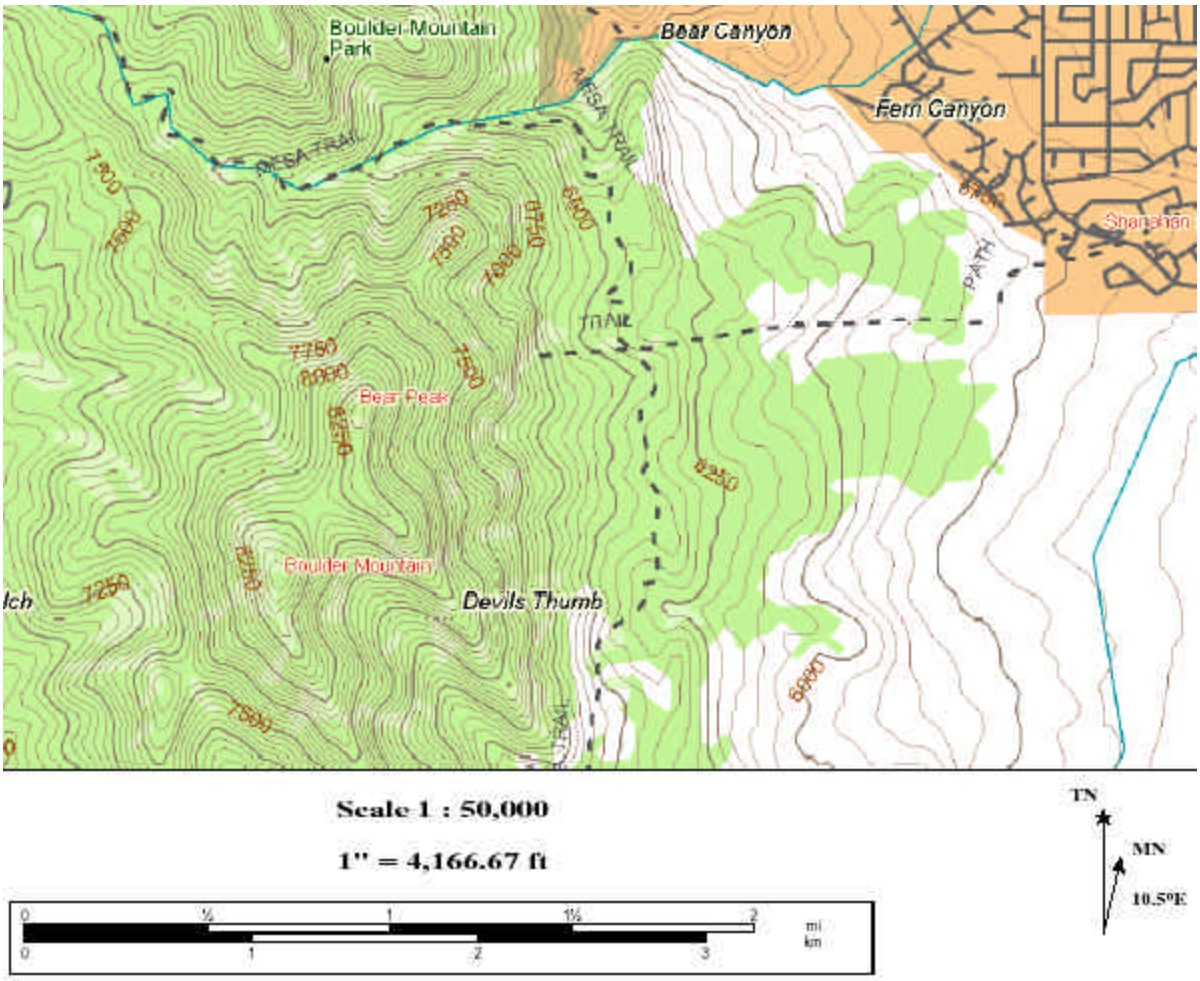
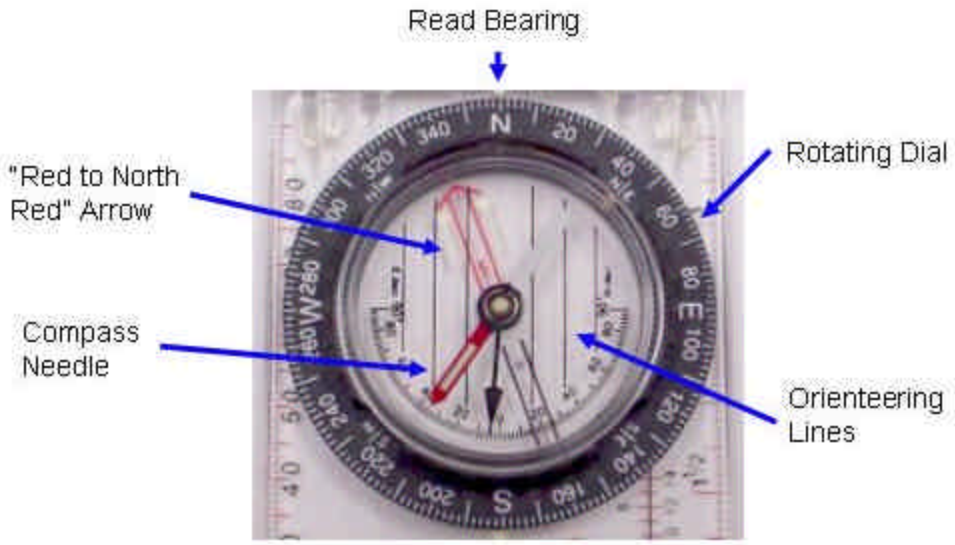


Photo courtesy of DeLorme: © 2002 DeLorme (www.delorme.com) Topo USA ®



Source: Image created by M. Lippis, University of Colorado, Boulder, 2003.

- *"Red to North Red" Arrow* – this arrow moves with the rotating dial to align with the compass needle. Notice the luminous lines around the top: these help to see in the dark.
- *Compass* Needle – this needle points in the direction of the magnetic field. The red end points to magnetic north. Notice the luminous line in the middle: this helps to see the needle in the dark.
- *Read Bearing* – after aligning the compass needle within the "red to north red" arrow, the bearing is read here.
- *Rotating Dial* – rotating this dial allows you to align the red-to-north-red arrow with the compass needle. This dial has the direction on it.
- *Orienteering Lines* – these lines are used with topographical maps. Topographical maps have grids on them that allow you to align the map and the compass.

Taking a Bearing Using a Compass

The most basic skill in using a compass is taking a bearing. This tells you what direction (or bearing) you are facing or what direction someplace is, like a mountain or a tree. This skill is essential to anything one might do with a compass. Luckily it is very easy. Using a compass, follow the steps below to take a bearing:

1. Face some object, like a mountain or a tree (about 20-30 ft. away) that you wish to know its direction.
2. If it opens, open up your compass, and put it against your stomach, or belt, perpendicular to your stomach and facing straight ahead of you.
3. Rotate the rotating dial until the red end of the compass needle lies between the "red to north red" arrow.
4. Read the bearing from the compass. Looking at the compass, this should be the number on the dial that is facing the front of the compass. Usually the compass has a little tick mark or might even say "READ BEARING."

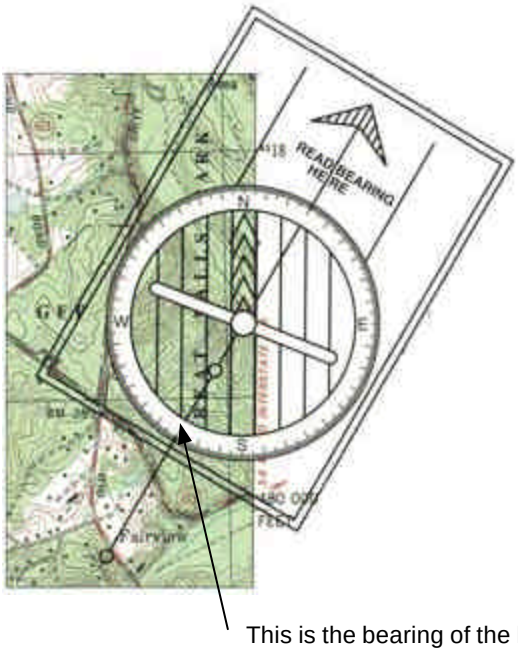
Following a Bearing Using a Compass

If you are walking someplace, such as back to your campsite, and camp is west 270 degrees, you need to know how to walk in that direction. This is called following a bearing.

1. Rotate the rotating dial until the red end of the compass needle lies between the "red to north red" arrow.
2. Walk in the direction that you need to go. If you need to go west back to camp, look at the compass to see what direction west is. Then just walk in that direction.
3. It is often easy to start veering off from the direction you really want to head. An easy solution for this is to place the compass on your stomach or belt so that you can always look down and make sure you are heading in the right direction.

Measuring a Bearing on a Map Using a Compass

If you are planning a trip using a topo map, you can use your compass to find the bearing that you need to follow. First draw a line on the map from the starting point to the next waypoint. Place the compass on the topo map with its center on your starting point and with the N on the



rotating dial pointing up, parallel to the vertical lines on the map. The bearing you need to follow is shown on the rotating dial at the point where it meets the line that you drew. In the example on the left, the bearing is 210 degrees.

Notice that if you were starting at the other end of the line, the bearing that you would measure is 180 degrees from the one you got. In this example, starting at Fairview (on the map), we would measure a bearing of 30 degrees.

Note: When we use the compass to measure bearings on the map, we are only really using the rotating dial. In the example, you can see that the compass needle is not lined up with north. You can ignore this, or if it makes things easier, you can reorient the map so that the top of the map really is in the north direction.

Source USGS website: http://mac.usgs.gov/mac/isb/pubs/factsheets/fs03501.html

Lesson Vocabulary List —

- **Scale** – The ratio of a distance on a map versus the actual distance is represents.
- **Legend** – The feature of the map that gives important information about the map. Includes the scale, location and landmarks symbols used by the map.
- **Orientation**– Shows which direction is North on the map.
- **Elevation** – The height of a location. At sea level this would be 0 ft..
- **Topographical Map** – A map that includes elevation information. Usually used for outdoor travel.
- **Contour Lines** – Lines on a topographical map that show the elevation along that line.
- **Compass** – An instrument that uses a magnetized metal bar to indicate the direction of the earth's magnetic poles.
- **Bearing** – The direction in degrees that an object at, like a mountain or tree.

Activity Attachments —

Activity 1: Where is your Teacher? – in this activity, students will learn how to take bearing with a compass. They will also learn how to describe a bearing and find an object using a bearing.

Activity 2: The Trouble with Topos – in this activity, students will learn how to read topological features on a map.

Lesson Closure and Follow-up —

Ask the students if they have ever wanted to go somewhere that they have never been. How could they find their way there? (Possible answer: Use a map.) Are all maps the same size? (Answer: No.) What tells a user the size of a map and how much area it shows? (Answer: The scale.) Where on the map do we find the scale and other important information about the map? (Answer: In the legend.) Ask the students that if they were planning a trip outside, how could a topographical map help them? (Possible answers: It shows the elevation and other interesting features like mountains, rivers and vegetation.) Ask the students how they could find the direction of an object like a tree? (Possible answer: Take a bearing of the tree using a compass.) But what if we knew what direction the tree was in, but we could not see it. How would we get there? (Possible answer: Use the compass to follow a bearing to the tree.)

Lesson Extension Activities —

1. Have a pair of students create a treasure hunt by listing compass readings and distances from a starting point. For example, "Starting at desk, walk three steps to the west. Next go south for 4 steps." Have another pair of students try to follow the direction to a "secret" object.
2. Have the students try to draw a map of their classroom. How would they draw topographic lines for a desk or chair?
3. Have the students do an Internet search for an interesting picture of a park, mountain or outdoor site. Have them try to draw a topographic map of their site in color.

Lesson Assessment and Evaluation —

Pre-Lesson Assessment

- Discussion Question: Ask students how they might travel to somewhere they have never been. If they are going on a family vacation to a new place, how do their parents know how to get there? (Possible answers: Look at a map.) Why are they not able to use landmark navigation (determining your location by identifying known landmarks) like at home? (Possible answer: Because you do not know the landmarks if you have never been there before.)

Lesson Summary Assessment

- Question/Answer: See "Lesson Closure and Follow-up" section above.

Homework

- Internet Search: Have students map out a set of directions using a free tool such as MapQuest® at www.mapquest.com.

Lesson References —

More resources from the U.S. Geological Survey for teachers can be found at: http://interactive2.usgs.gov/learningweb/teachers/lesson_plans.htm.

Lesson 5: Activity 1 - Where is Your Teacher?

This activity is planned for 28 students working in groups of 2.

Activity Materials List —

- 14 Group handouts
- 28 Individual handouts

Activity Equipment and Tools List —

- 28 or 14 compasses (depending on how you want to organize the activities)

Activity Cost Estimate —

Less than $5 total (if using school-owned or borrowed compasses)

Activity Attachments —

Individual Handout

Group Handout

Activity Time Estimate —

30 minutes

Activity Procedure —

Background

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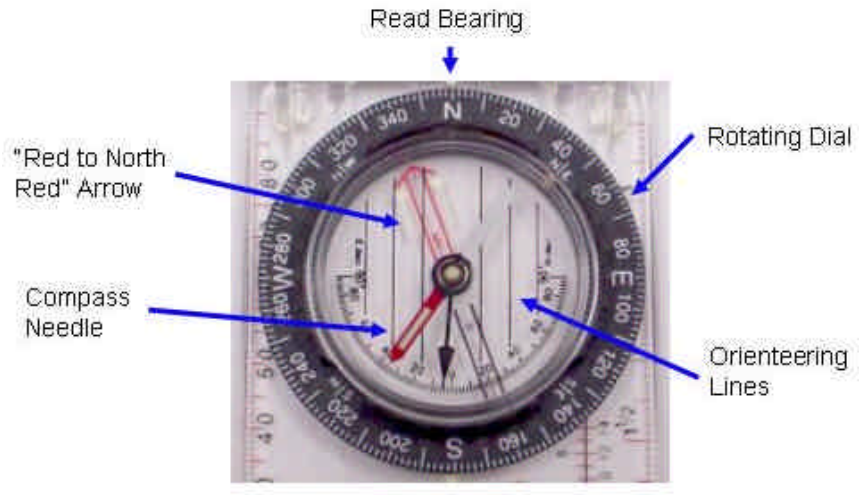

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1. Face some object, like a mountain or a tree, that you want to which you want to know the direction.
2. Open up your compass (if it opens), and put it against your stomach, or belt, facing straight ahead of you.
3. Rotate the rotating dial until the red end of the compass needle lies between the red arrow facing north.
4. Read the bearing from the compass. Looking at the compass, this should be the number on the dial that is facing the front of the compass. Usually the compass has a little tick mark or might even say "READ BEARING."

Following a Bearing Using a Compass

If you are walking somewhere, like back to your campsite, and camp is west, 270 degrees, you need to know how to walk in that direction. This is called following a bearing.

1. Rotate the rotating dial until the red end of the compass needle lies between the red arrow facing north.
2. Walk in the direction that you need to go. If you need to go west back to camp, look at the compass to see what direction west is. Then just walk in that direction.
3. It is often easy to start veering off from the direction you really wanted to head. An easy solution for this is to place the compass on your stomach or belt so that you can always look down and make sure you are heading in the right direction.

Before the Activity

Read through all the steps of the activity. Print the Individual Handouts and Group Handouts.

With the Students

Who has used a compass before? What is a compass for? How do they work? Normally we find things using landmark navigation. Everyone knows where the playground is! But what if we did not know what we were looking for? Let us say that we were stranded on a desert island looking

for Navigation Nemo's lost treasure. Being the navigation nut Navigation Nemo is, he did not make his treasure map using landmarks like most pirates, he used his compass and wrote down the course using bearings. In this case, we cannot use landmark navigation. Luckily, we have our compass handy, and all we have to know is how to use it.

Part 1: Find the Teacher

1. Break the students into groups of two or more – smaller is better.
2. Give each group a Group Handout.
3. Tell them they have a couple minutes to answer the first question. They should determine which direction the needle is pointing.
4. Tell them they have 5 minutest to take a bearing. When they're done, ask them what they did. (Possible answer: they took a bearing). What is a bearing? (Possible answer: the direction of some object relative to them.)
5. Tell them they have 5 minutes to find the bearing of the teacher.
6. Tell them to compare their answers with other groups.
7. Ask them if they have different answers from another group. If so, ask them why. (Possible answer: Because the bearing of an object is dependent on the location that they took the bearing.)

Part II

8. Hand out the Individual Handout to each student and complete the exercise with the students.
9. Tell them to pick an object and write down the first letter of that object on their handout.
10. Tell them to take the bearing of that object and write down that bearing on the handout.
11. Once they are done have them pick out a partner.
12. Have them exchange handouts and seats with their partner.
13. Now that they have their partner's handout and they are sitting at their partner's desk ask them to find the object their partner picked.
14. When they have completed that ask them to get with their partners to see if they guessed each other's objects correctly. If they didn't guess right have them try again.
15. Ask them why they had to sit in each other's seats? (Possible answer: Because the bearing of an object is dependent on where the bearing was taken from. Since their partner took the bearing at their seats, they had to use that same seat to get the correct bearing.)

Summary

1. Ask students, "What have you learned about a compass and finding directions?"
2. List answers on the board.

Math Skills Reinforced —

6^{th}, 7^{th} and 8^{th}: Degree measurement. See Activity 2 for math skills relating to scaling and unit conversion

Activity Troubleshooting Tips —

While the students are using compasses, it is easy to have the compass needle jump around a bit as they are moving. Try and have the students take a compass reading with the compass placed on their desk or other stationary object.

Also, students need to keep the compass in one position in order to walk in a straight line. Have the students place the compass against their stomach or belt in order to keep their heading steady.

Activity Desired Student Outcomes —

In this activity, the students should learn the basics of how to use a compass. This includes taking a bearing, finding the direction of bearing.

Activity Assessment & Evaluation —

Pre-Activity Assessment

- Discussion Questions: Who has used a compass before? What is a compass for? How do they work?

Activity Embedded Assessment

- Worksheets: Have the students follow along with the activity using the attached worksheets.

Post-Activity Assessment

- Discussion Question: What have you learned about a compass and finding directions? List answers on the board.

Suggestions to Scale Activity for Grades 6 to 8 —

- 6^{th}: For part 2, have 2 students, instead of one, determine an object and its bearing. Have them switch with another group of 2.
- 7^{th} and 8^{th} Grade: Do activity as is.

LESSON 5: Activity 1, Individual Worksheet - Where is your Teacher?

Your Name: _____ Date:_____

Your Partner's Name: _____

Directions

In this activity, you will be working with a partner. You should do the first part "For You to Do" and your partner should do the second part "For Your Partner to Do."

For You to Do

Pick any object in the room (like a desk or the chalk board). Write down the first letter of the object you choose. For example, if you picked the desk write down "D" in the space below. Do not write down the full name. Your partner is going to try and find that object.

Now face the compass toward that object. Take the bearing of the object by turning the movable face until the compass needle is between the red arrow on the movable face. Write down the direction of the object in the space below.

Object Direction: _____

Exchange seats with your partner and get their sheet and give them yours.

For Your Partner to Do

Using the direction of the object written above and the first letter, try and find what object your partner picked. First, look around for objects that start with that letter. Then, take that object's bearing. If that bearing matches or is close to the bearing your partner wrote, then you have found your object. If the bearing is wrong, look for another object that starts with the same letter and take its bearing. Do this until you find the object. Write down the object's name in the space below.

Name of Object: _____

Lesson 5: Activity 1, Group Worksheet - Where is your Teacher?

Group Name:_____ Date:_____

What direction is the compass needle pointing right now?

Now take a bearing. Hold the compass parallel to the ground in front of you so that you are able to look down on it. Now turn the movable face until the compass needle is inside the red arrow on the movable face. What direction (in degrees) is the line? What does this tell you?

Now face the compass towards your teacher. Turn the movable face until the compass needle is inside the red arrow on the movable face. What direction (in degrees) is your teacher?

Compare you answers with another group. Do they have the same answers? Why or why not?

Lesson 5: Activity 1 – Scale Worksheet

Name:_____ Date:_____

Scales

1) You already know that different maps use different scales, but just how far is 250,000 inches? In the table below, convert the new scale into miles, yards, and feet.

Scale 1 inch to:	**1 inch = how many *miles*?**	**1 inch = how many *yards*?**	**1 inch = how many *feet*?**
250,000 in.			
62,500 in.			
24,000 in.			
10,000 in.			
1,000 in.			
12 in.			

2) If you were going to draw your classroom on a piece of paper, what would be a good scale to use and why? (You can make up your own if you would like.)

3) If you were going to draw your school on a piece of paper, what would be a good scale to use and why?

4) If you were going to draw your town on a piece of paper, what would be a good scale to use and why?

Lesson 5: Activity 2 - The Trouble with Topos

This activity is planned for 28 students.

Activity Materials List —

- 28 Topographical Worksheets 1
- 28 Topographical Worksheets 2
- 28 Scale Worksheets

Activity Equipment and Tools List —

- Pencils
- Calculators

Activity Cost Estimate —

Less than $5 total (if using school-owned or borrowed calculators)

Activity Attachments —

Worksheet Handout 1

Worksheet Handout 2

Scale Worksheet

Activity Time Estimate —

30 minutes

Activity Procedure —

Before the Activity

Read through all the steps of the activity. Print out Worksheet Handout 1 and Worksheet Handout 2 for each student.

With the Students

Part 1

1. Ask students if they have ever used a topographical map before. What do they look like? How are they helpful? Discuss the features of topographical maps as are discussed in the background section of the Lesson 5.
2. Give each student Worksheet Handout 1.
3. Tell them they have 3 minutes to connect the four pictures.
4. When each student has finished, have him or her compare answers with a partner.
5. Now have them mark or circle the highest point on each topographical map.

Part 2

1. Give each student Worksheet Handout 2 and 5 minutes to connect the three pictures.
2. When each student has finished, have him or her compare answers with a partner.
3. Next, have them mark or circle the highest and lowest point on each topographical map. Give the students 5 minutes to finish the second part of the worksheet.

Part 3

1. Give each student the Scale Worksheet.
2. Ask the students to convert each scale into miles, yards, and feet. (You may need to remind students that there are 5,280 feet in one mile.)
3. Students will then predict and explain what scales would be best for fitting a classroom, school, or town on a piece of paper.

For an extension, students can convert to metric (1 km=39370 in., 1 meter= 40 in. (approx)). Using the original scale of 1 in. to X in., students can also calculate what 2 in. would be worth. How about 10 in. or 100 in.?

Summary

Ask students what they have learned from this activity. Record answers on the board.

Math Skills Reinforced —

6^{th}, 7^{th} and 8^{th}: Students will convert from one unit of measure to another and understand how scaling works.

Activity Troubleshooting Tips —

For the scaling worksheet (Part 3), you may need to write the math conversions on the board for students: 1 mile=5,280 ft., 1 foot=12 in., 1 yard=36 in. For advanced students, you may have them figure out the conversions on their own.

Activity Desired Student Outcomes —

After this activity, students should know how to identify major features in topographical maps.

Activity Assessment & Evaluation —

Pre-Activity Assessment

- Discussion Questions: Ask students if they have used a topographical map, what one looks like, and how to use it. Discuss the features of topographical maps as discussed in the background section of Lesson 5.

Activity Embedded Assessment

- Worksheets: Have students follow along with the activity using the attached worksheets.

Post-Activity Assessment

- Discussion Questions: Ask students what they have learned from this activity. Record answers on the board.

Suggestions to Scale Activity for Grades 6 to 8 —

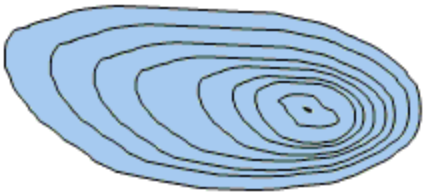
- 6th Grade: Have students do first worksheet only.
- 7th and 8th Grade: Conduct activity as is.

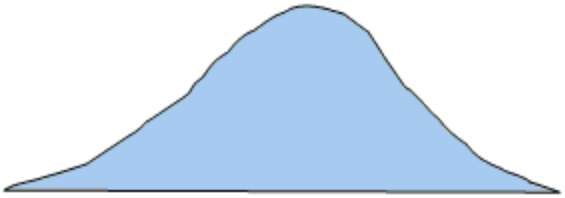
Lesson 5: Activity 2, Worksheet 1 - The Trouble with Topos

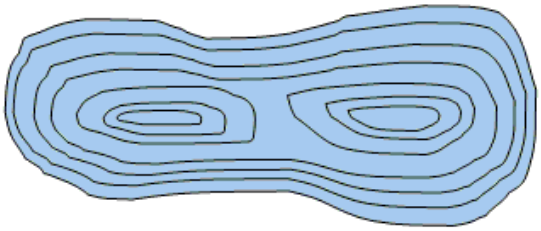
Student Name:_____ **Date:**_____

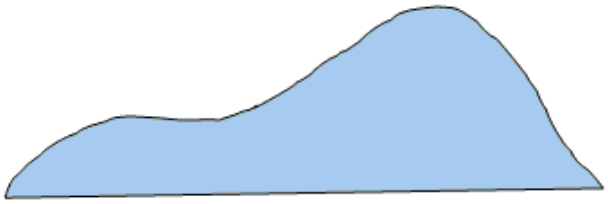
Part 1: Connect the topo maps on the left with the matching left-to-right elevation cross-section on the right.

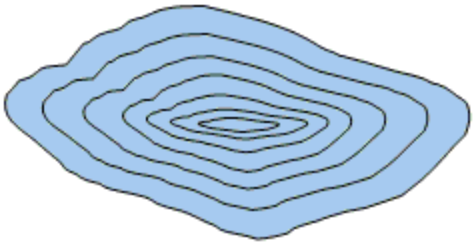
Part 2: Mark the highest point in each topographical map.

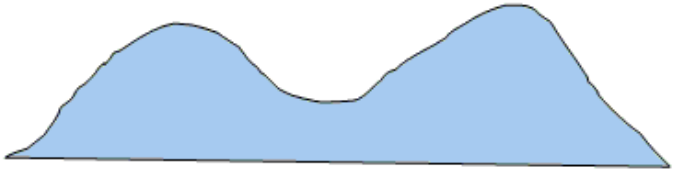


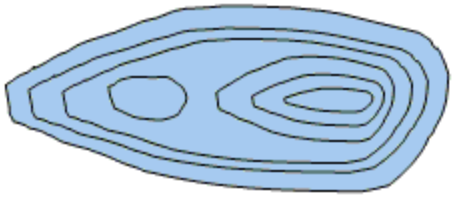


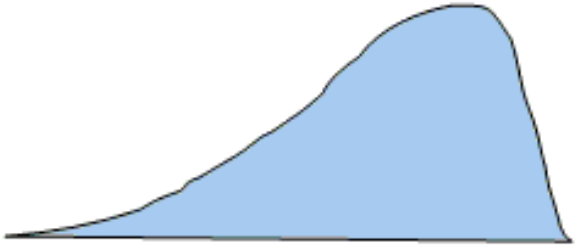






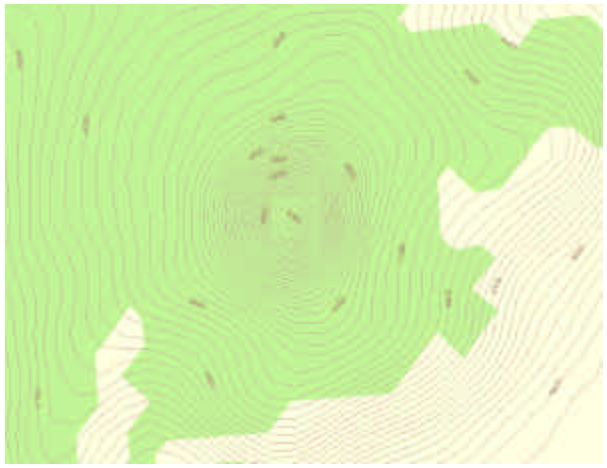






Lesson 5: Activity 2, Worksheet 2 - The Trouble With Topos

Student Name:_____ **Date:**_____



Topographical maps courtesy of DeLorme: © 2002 DeLorme (www.delorme.com) Topo USA ®

Devils Tower image source: http://www.npwrc.usgs.gov/resource/1998/agate/nearby.htm

Crater Lake image source: http://tapestry.usgs.gov/features/30craterlake.html

Mount Saint Helens image source: http://mt2002.er.usgs.gov/mt2002/SourcePhotos/Mt.-St.-Helens.jpg

Lesson 5: Activity 2 – Scale Worksheet

Name:_____ Date:_____

Scales

1) You already know that different maps use different scales, but just how far is 250,000 inches? In the table below, convert the new scale into miles, yards, and feet.

Scale 1 inch to:	**1 inch = how many *miles*?**	**1 inch = how many *yards*?**	**1 inch = how many *feet*?**
250,000 in.			
62,500 in.			
24,000 in.			
10,000 in.			
1,000 in.			
12 in.			

2) If you were going to draw your classroom on a piece of paper, what would be a good scale to use and why? (You can make up your own if you would like.)

3) If you were going to draw your school on a piece of paper, what would be a good scale to use and why?

4) If you were going to draw your town on a piece of paper, what would be a good scale to use and why?