Name: _____

Topographic Map Exercise

Go to the following link: **http://tinyurl.com/WeirCM2**. This will download a topographic map of Snowflake. Open the image.   This exercise will work better if you have a mouse with a scroll wheel. Use the scroll wheel to zoom in and out of the map. You can use ctrl+ to zoom in as well and ctrl- to zoom out. Use your table group to discuss the answers to the questions.

1. Explore the map.

2. What is the contour interval?

3. The map is broken down into a bunch of rectangles. Each rectangle has a red number in it so that the specific quadrant can be identified. Which quadrant has the highest elevation?

4. How high is the highest elevation?

5. What is the elevation change between one index contour line and another?

6. Look at quadrant 4 and 3. What is it about this location that would make city managers decide to place the Municipal Airport there?

7. Follow the Old Apache Railway north of town. What would make the railroad company choose that route?

8. Look at quadrants 15 and 14. There is a drainage pond there. Why is that the best location for the drainage pond?

9. Which three numbered quadrants have the steepest gradients? How were you able to tell?

10. Look for quadrants 1 and 12. Why do the lines get so close in the area near Silver Creek?

11. Overall, which direction does the map slope downward? To the: North, South, East, or West?

12. Find quadrant 22. How many feet is the gradient from the top of the highest point to the bottom of the lowest point?

13. Which direction do you think Silver Creek flows? How can you tell?

14. Approximate the gradient of Red Hill found in quadrant 14? So that we are consistent with our numbers start your scale on the "5" of 5000 and go straight north until you reach the top of the hill. Show your work.

15. After working on this assignment, in your own words describe why knowing the contours of an area be important to scientists and engineers?

Answer Key

1. **Explore the map.**
   a. I give the students about 5 minutes to explore before they begin.
2. **What is the contour interval?**
   a. 10 Feet
3. The map is broken down into a bunch of rectangles. Each rectangle has a red number in it so that the specific quadrant can be identified. Which quadrant has the highest elevation?
   a. Quadrant 4
4. How high is the highest elevation?
   a. >5942, four mile knoll
5. **What is the elevation change between one index contour line and another?**
   a. 50 feet
6. **Look at quadrant 4 and 3. What is it about this location that would make city managers decide to place the Municipal Airport there?**
   a. Relatively flat. Elevation change is only about 23 feet.
7. **Follow the Old Apache Railway north of town. What would make the railroad company choose that route?**
   a. They are using the shallowest gradient they can find.
8. **Look at quadrants 15 and 14. There is a drainage pond here. Why is that the best location for the drainage pond?**
   a. Lowest area in the region.
9. **Which three numbered quadrants have the steepest gradients? How were you able to tell?**
   a. 1, 12, North of quadrant 1
   b. Lines are super close together represent steep gradients.
10. **Look for quadrants 1 and 12. Why do the lines get so close in the area near Silver Creek?**
    a. The gradient is so steep. It is in a canyon.
11. **Overall, which direction does the map slope downward? To the: North, South, East, or West?**
    a. North
12. **Find quadrant 22. How many feet is the gradient from the top of the highest point to the bottom of the lowest point?**
    a. 171 feet
    b. Highest 5771 minus 5600
13. **Which direction do you think Silver Creek flows? How can you tell?**
    a. It flows North because that is the ultimate lowest distance on this map.
14. **Approximate the gradient of Red Hill found in quadrant 14? So that we are consistent with our numbers start your scale on the "5" of 5600 and go straight north until you reach the top of the hill.**
    a. This question really depends on how accurate students use the scale to help them solve this. Using rulers would be a great way. We know the elevation gain is 72 feet. I am estimating 800 ft distance from the "5" straight north to the top.. 72 divided by 800 is .09 or a 9% gradient.
    b. I use this question to discuss road signs. When you see a yellow gradient sign they are usually about 6 percent, so this hill is much steeper than that.
15. **After working in this assignment, in your own words describe why knowing the contours of an area be important to scientists and engineers.**
    a. They can tell which direction water will flow, which direction is downhill, and all this helps know where to build.

Teacher Reflection and Procedures

- I begin this lesson by having students read the second section of this link. http://http://earthscience.xyz/Maps
- We discuss the vocabulary and this section as a class to make sure they understand it.
- Students will need to have access to the internet to download the map. You can also have it downloaded to a usb drive and then load it on each computer. I have tried to use printed versions, but this doesn't allow students to zoom in and out so it works best with computers.
- Also the file is a .tiff. I can't imagine a computer not being able to open it, but try it before completing the assignment.
- I allow this to be turned in as a paper or for those who prefer typing can create a copy of the activity and use Google Docs to complete the assignment.
  - If this is an option you want to explore, here is the link to the doc.
  - Link will be available with purchase.
- My students are from Snowflake AZ so the map is of their town, however most of these questions can work for any map, so if you would like to find an alternative map, that would be great as well.
- I let students work on this assignment with their table group so that they can collaborate and discuss their answers to pick the best ones. I do have every student complete the assignment however and turn it in. I tell them NOT to divide and conquer the assignment but discuss it together.