DYNAMIC PLANET

EARTH'S FRESH WATERS
2012 EVENT TRAINING POWERPOINT

PRESENTED BY:

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PRESENTATION OBJECTIVES

Discuss rule changes and event parameters for the 2012 Dynamic Planet Event

Demonstrate instructional strategies that may be used to create an event training program for event trainers and students

Identify resources that may be used to help prepare students for the 2012 Dynamic Planet Event

EVENT DESCRIPTION

The theme of the 2012 Dynamic Planet competition will be Earth's fresh waters.

Stream Drainage Systems

Lakes and Wetlands

Groundwater

Karst Features

Pollution

EVENT DESCRIPTION

Earth's Fresh Waters is one of four rotating, two-year events of the Dynamic Planet event.

2011-2012: Earth's Fresh Waters

2013-2014: Glaciers

2015-2016: Oceanography

2017-2018: Earthquakes & Volcanoes

WHAT STUDENTS WILL DO

Students will be presented with one or more tasks requiring the use of science process skills to complete tasks related to the study of Earth's fresh waters including:

- Identification and interpretation of stream geology features of USGS topographic maps
- Construct a simple water table contour map and use it to indicate the direction of groundwater movement

ACTIVITY 1
IDENTIFYING FRESH WATER GEOLOGY FEATURES ON USGS TOPOGRAPHIC MAPS

In this activity, you will:

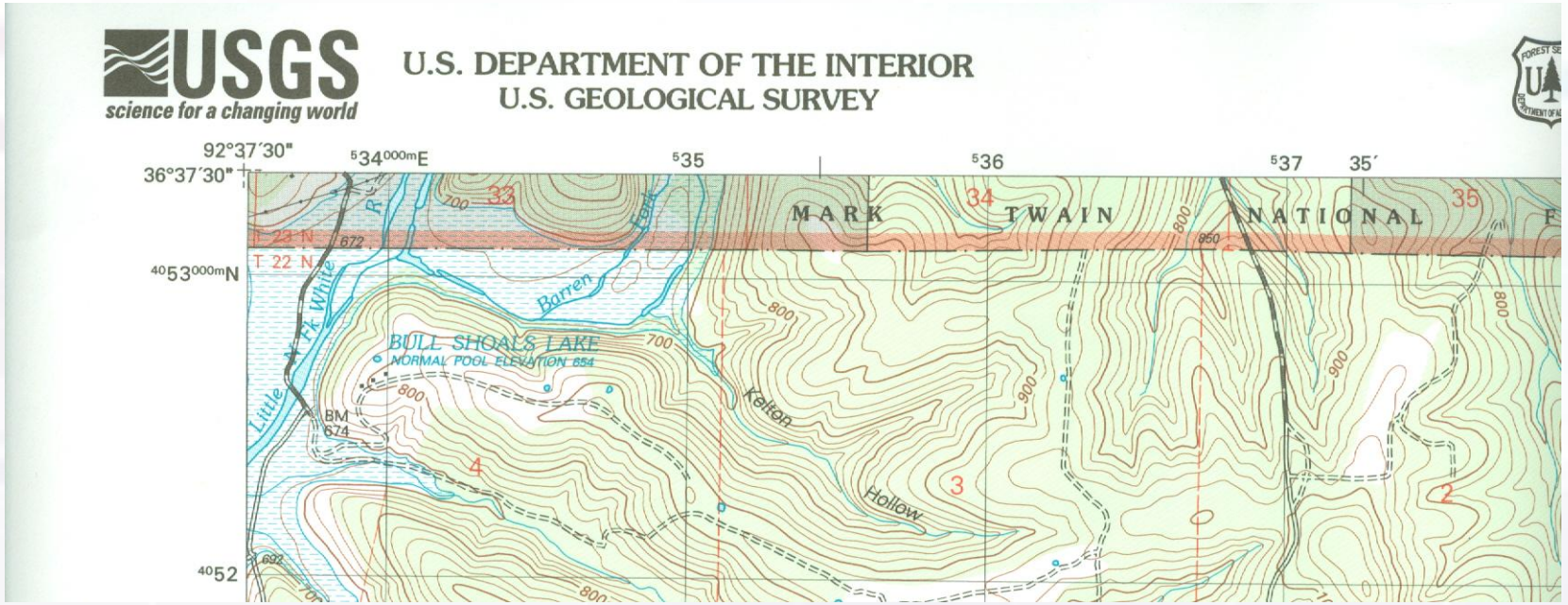
- Use USGS Topographic Maps to locate and identify freshwater geology features including valley shapes, drainage patterns, erosional and depositional features

Materials Needed:

- USGS Topographic Map
- USGS Topographic Map Key

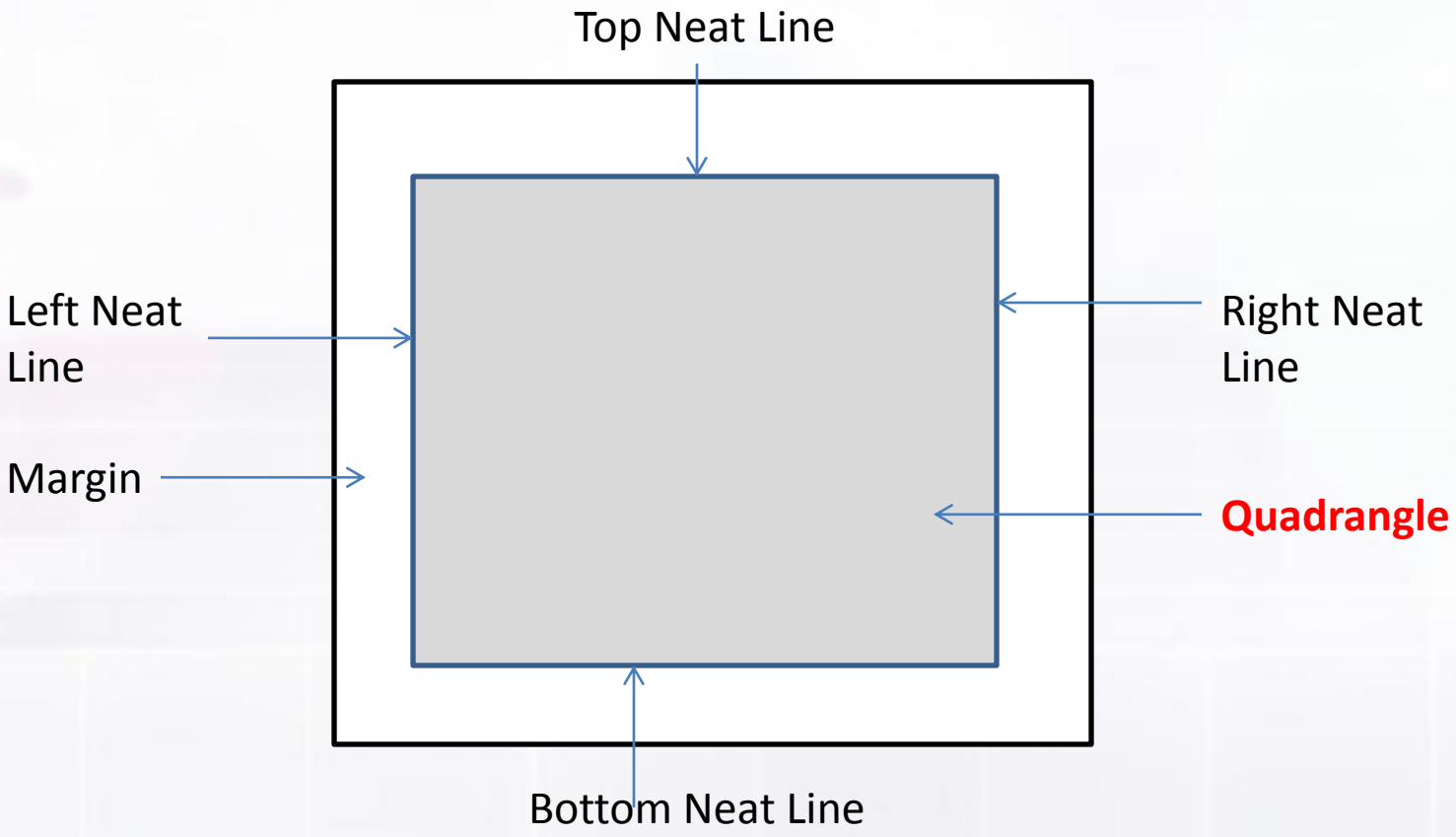
IDENTIFYING FRESH WATER GEOLOGY FEATURES ON USGS TOPOGRAPHIC MAPS

Orient your USGS topographic map so that the USGS logo is in the upper left corner.



IDENTIFYING FRESH WATER GEOLOGY FEATURES ON USGS TOPOGRAPHIC MAPS

The borders of the Quadrangle are bounded by four neat lines-right, left, bottom, and top



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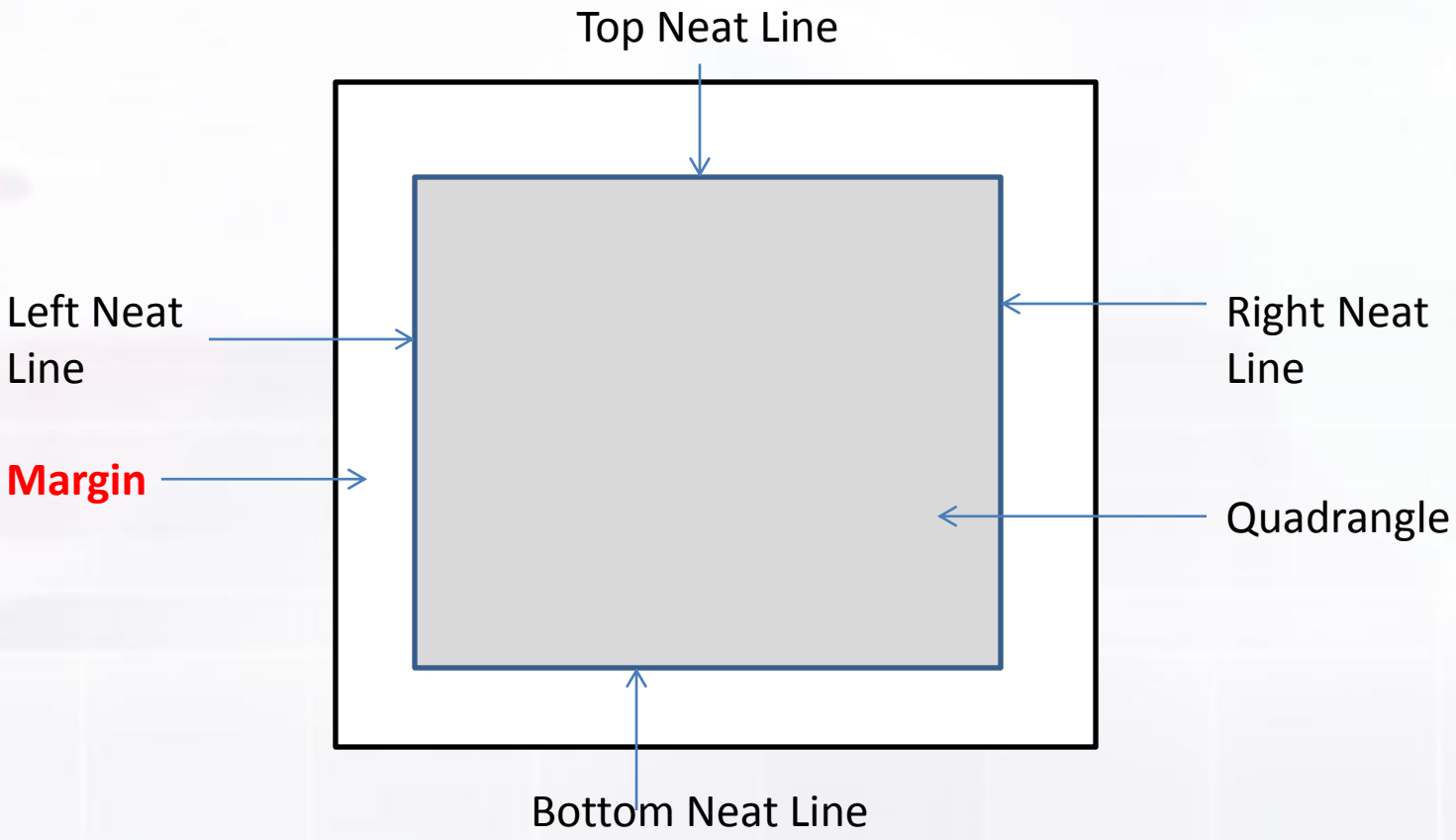
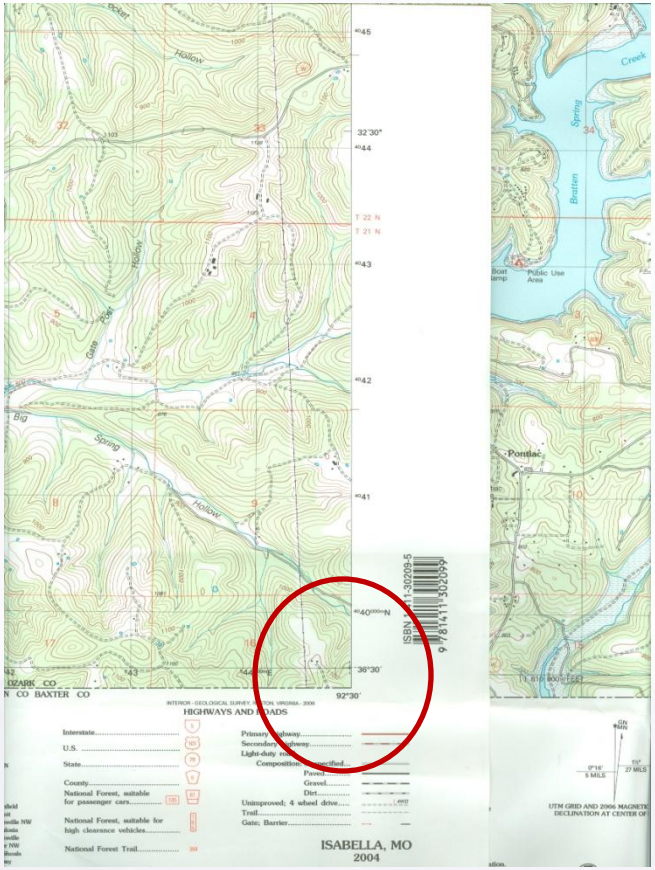


IDENTIFYING FRESH WATER GEOLOGY FEATURES ON USGS TOPOGRAPHIC MAPS

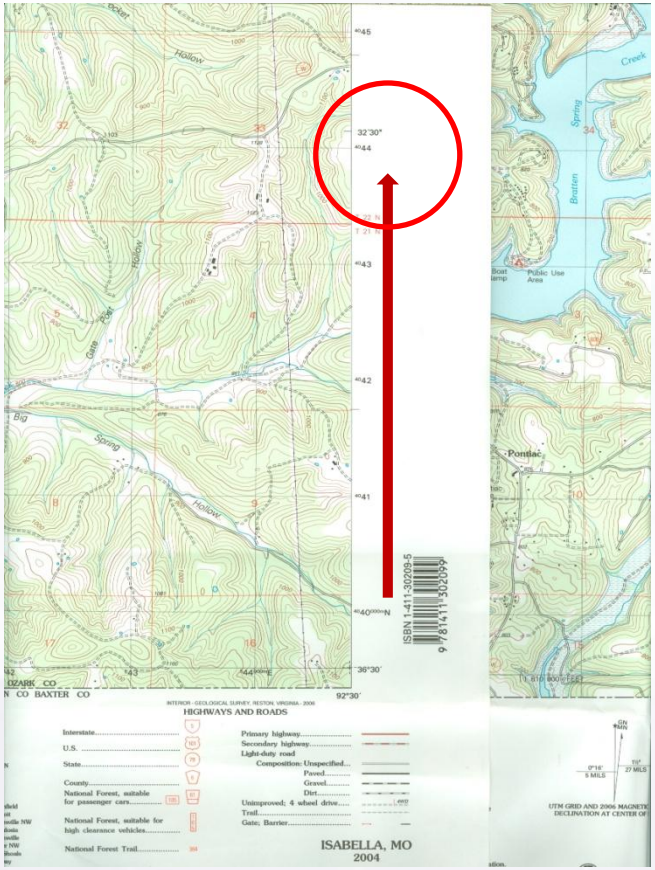
Place your finger on the bottom right corner of the quadrangle where the bottom and right neat lines meet



IDENTIFYING FRESH WATER GEOLOGY FEATURES ON USGS TOPOGRAPHIC MAPS

Now move your finger up along the right neat line until you reach a minute measurement (32’30” on the Isabella, MO topographic map)

On the Big Goat Mountain, WA Map that measurement will be 2’30”



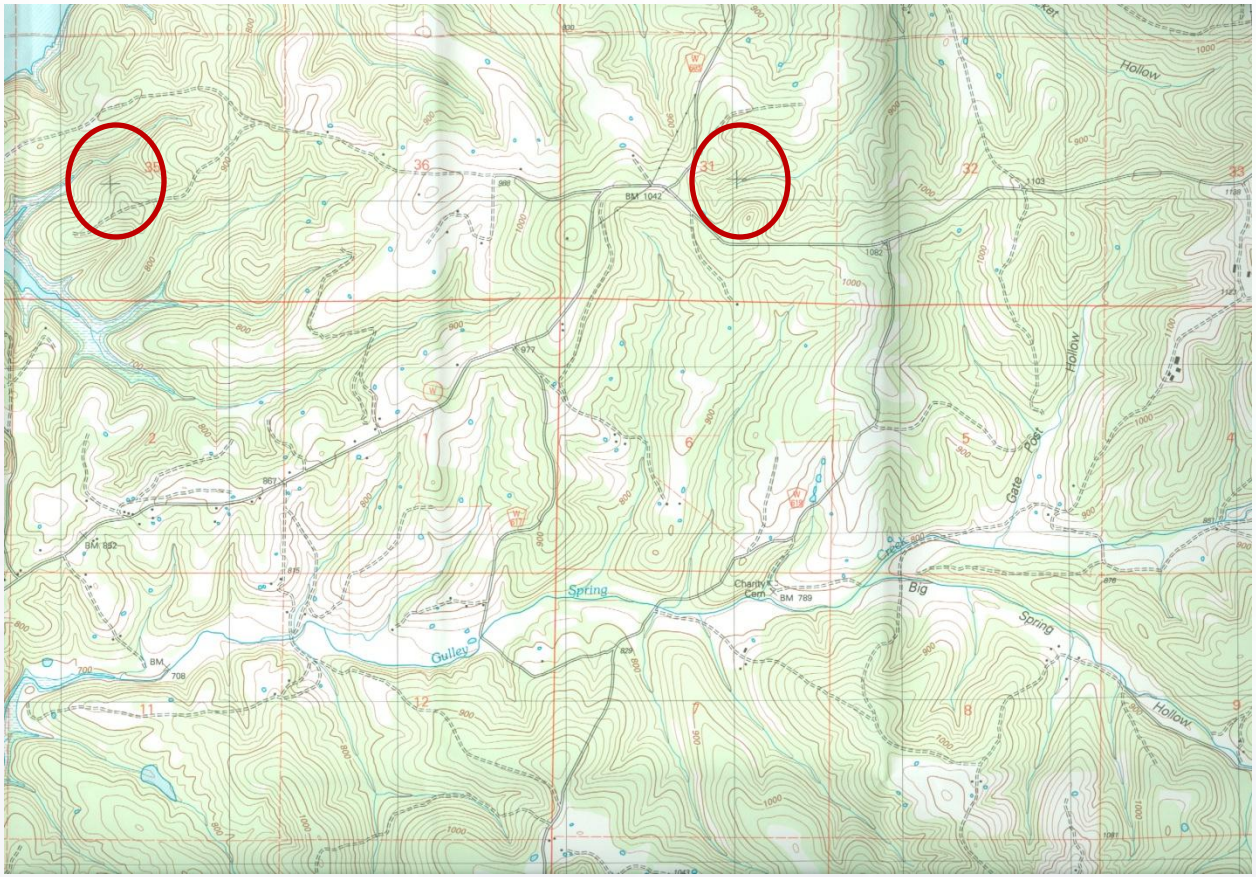
IDENTIFYING FRESH WATER GEOLOGY FEATURES ON USGS TOPOGRAPHIC MAPS

Now move your finger left in a straight line across the quadrangle until you see the same minute measurement (32’30” on the Isabella Quadrangle) on the left neat line.

2’30” on the Big Goat Mountain Quadrangle

IDENTIFYING FRESH WATER GEOLOGY FEATURES ON USGS TOPOGRAPHIC MAPS

Note the two crosshairs in the bottom third of the quadrangle as you moved across the map.



IDENTIFYING FRESH WATER GEOLOGY FEATURES ON USGS TOPOGRAPHIC MAPS

Return to the 32’30” measurement on the right neatline.

Move your finger upwards towards the next minute measurement which on the Isabella Quadrangle is 35’

On the Big Goat Mountain Quadrangle, that will be 5’

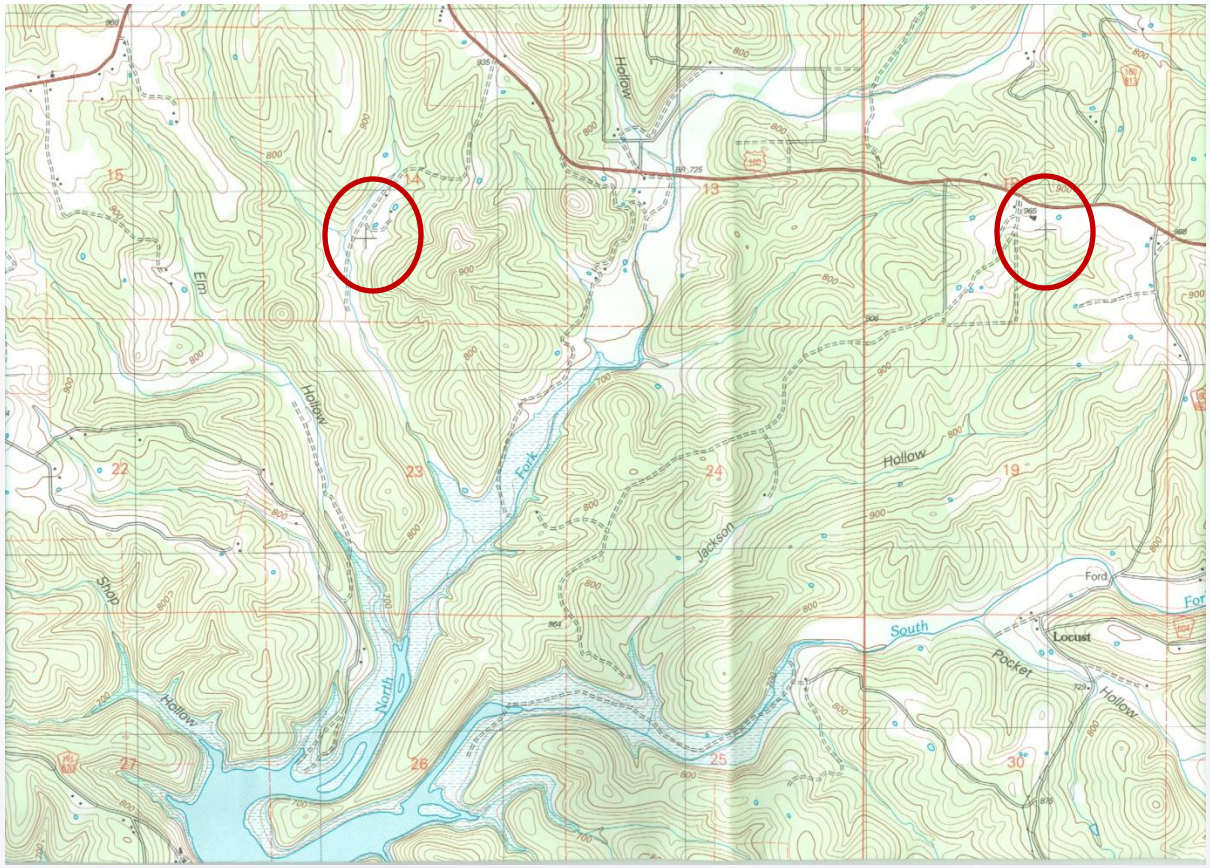
IDENTIFYING FRESH WATER GEOLOGY FEATURES ON USGS TOPOGRAPHIC MAPS

Now move your finger left in a straight line across the quadrangle until you see the same minute measurement (35’) on the left neat line.

5’ on the Big Goat Mountain Quadrangle

IDENTIFYING FRESH WATER GEOLOGY FEATURES ON USGS TOPOGRAPHIC MAPS

Note the two crosshairs in the upper third of the quadrangle as you moved across the map.



IDENTIFYING FRESH WATER GEOLOGY FEATURES ON USGS TOPOGRAPHIC MAPS

You can now use these four sets of crosshairs to separate the quadrangle into nine ‘mental sectors’ that can be used to identify the location of features on the map.

1	2	3
4	5	6
7	8	9

IDENTIFYING FRESH WATER GEOLOGY FEATURES ON USGS TOPOGRAPHIC MAPS

Note the location of Wilkinson Knob in Sector 1 of the Isabella Quadrangle

Look for Graham Harbor Creek Campground in Sector 1 of the Big Goat Mountain Quadrangle

IDENTIFYING FRESH WATER GEOLOGY FEATURES ON USGS TOPOGRAPHIC MAPS

Note the location of the town of Locust in Sector 6 of the Isabella Quadrangle

Find the Safety Harbor Campground in Sector 6 of the Big Goat Mountain Quadrangle

IDENTIFYING FRESH WATER GEOLOGY FEATURES ON USGS TOPOGRAPHIC MAPS

In what Sector is Pontiac, Missouri found in the Isabella Quadrangle?

7

In what Sector is Deep Harbor found in the Big Goat Mountain Quadrangle?

4

IDENTIFYING FRESH WATER GEOLOGY FEATURES ON USGS TOPOGRAPHIC MAPS

In what Sector is the village of Isabella found in the Isabella Quadrangle?

4

In what Sector is Corral Creek campground found in the Big Goat Mountain Quadrangle?

5

IDENTIFYING FRESH WATER GEOLOGY FEATURES ON USGS TOPOGRAPHIC MAPS

Here's an example of a question written using mental sector as a determinant in a feature's location:

What type of river, lake or canal is Big Spring Hollow located in Sector 9?

Perennial Stream

IDENTIFYING FRESH WATER GEOLOGY FEATURES ON USGS TOPOGRAPHIC MAPS

On large lakes and bodies of water, some of the information you will need is located on the watershed itself:

What is the normal pool elevation of Bull Shoals Lake as indicated in Sector 7?

654’ (above sea level)

IDENTIFYING FRESH WATER GEOLOGY FEATURES ON USGS TOPOGRAPHIC MAPS

Now complete the questions for Activity 1 on your own. Questions for both quadrangles are found on the Activity 1 sheet.

Use your USGS Topographic Map Key to identify the features

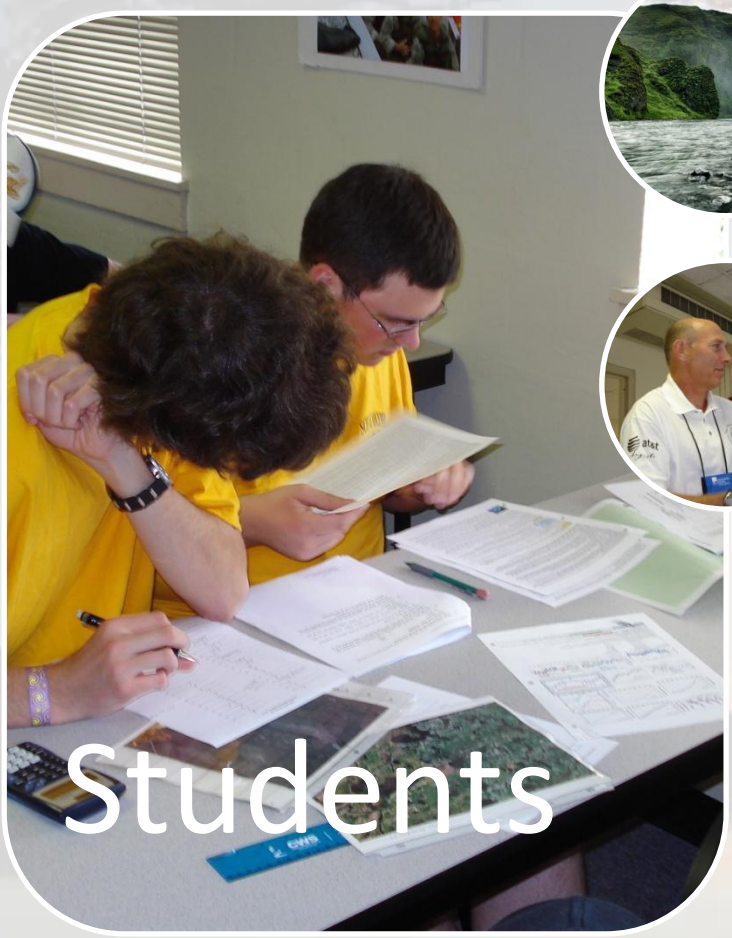
Answers for Isabella, MO Quadrangle

1. Sector 7
2. Woodland
3. Perennial Lake/Pond
4. West-Southwest
5. Section Numbers (Township)
6. Intermittent Lake/Pond
7. 789’
8. Sector 7
9. Perennial stream
10. Campground

Answers for Big Goat Mountain, WA Quadrangle

1. Sector 3
2. Woodland
3. Intermittent Streams
4. North-Northeast
5. Federally Administered Park
6. Northeast
7. Rock Bare/Awash
8. Sector 9
9. Perennial stream
10. 5, 450’

ELEMENTS OF A SUCCESSFUL TRAINING PROGRAM



Event Content

Coach

TASK ANALYSIS

First, identify the key event topics outlined in the Dynamic Planet event rules. Be sure that you have the **current** year rules.

Stream Drainage Systems

Lakes and Wetlands

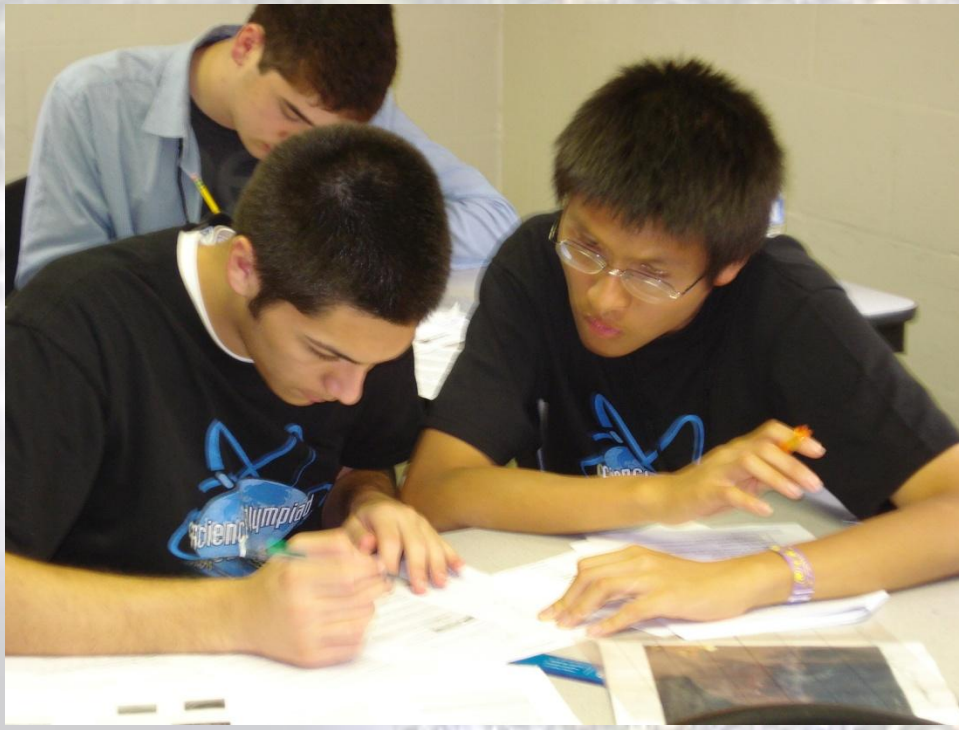
Groundwater

Karst Features

Pollution

TASK ANALYSIS

Next, for **each** Key Event Topic, determine what a student must know or be able to do to successfully complete the event requirements



TASK ANALYSIS

Next, Identify materials, work conditions and other resources needed by the student to learn about each key event topic

TASK ANALYSIS

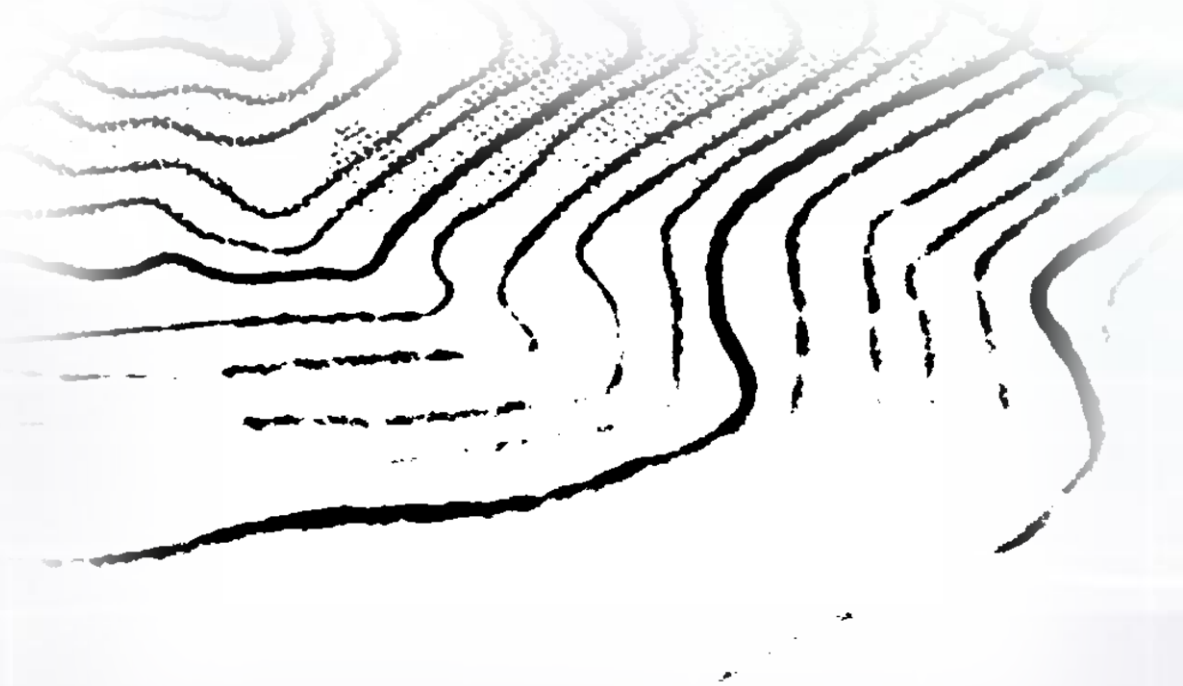
To complete your Task Analysis, establish minimum performance expectations for **each** of the Key Event Topics

TASK ANALYSIS

ACTIVITY 2
Construct a Simple Groundwater Contour Map

In this activity, you will:

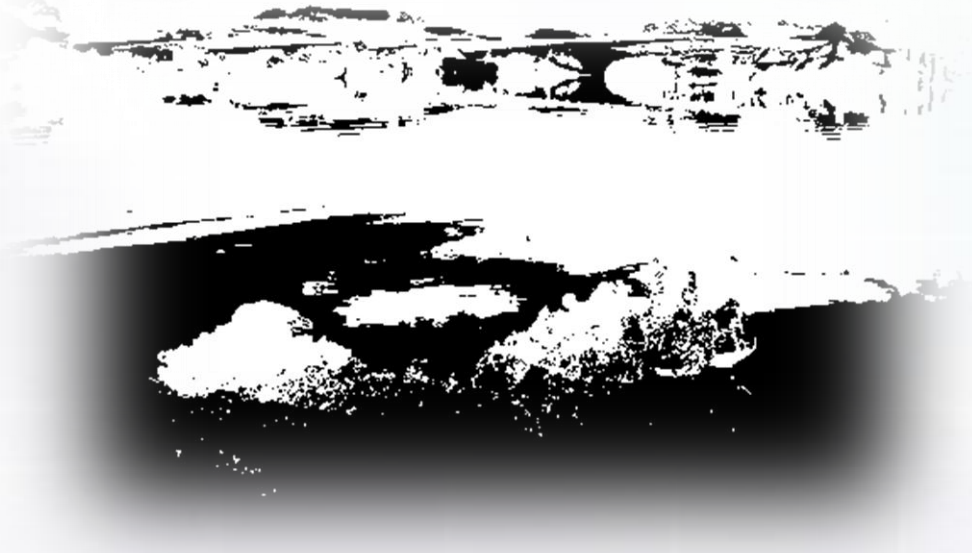
Construct a simple water table contour map and use it to indicate the direction of groundwater stream flow



Construct a Simple Groundwater Contour Map

Groundwater usually flows in the same direction that land slopes, often towards a nearby lake or stream.

By determining the slope or plane of the water table, we can estimate how groundwater will flow at a certain location



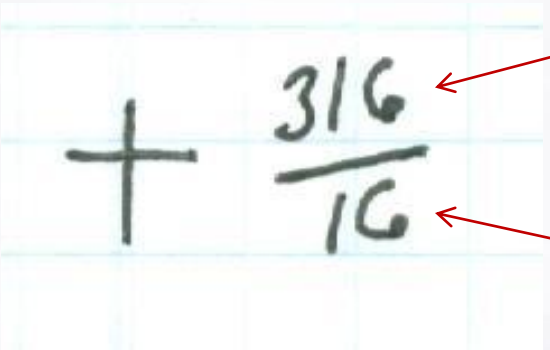
Construct a Simple Groundwater Contour Map

STEP 1:

Orient the activity sheet and note the location of the sample wells indicated by the example below

The top number is the land elevation (above sea level).

The bottom number is the depth to the water table



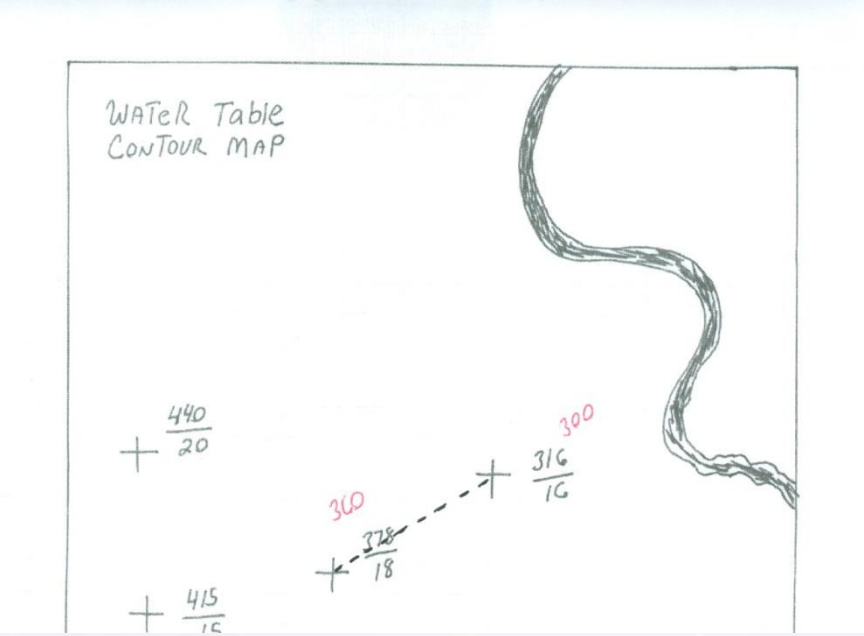
Construct a Simple Groundwater Contour Map

STEP 2:

Locate wells 316/16 and 378/18 in the upper center of the map.

Subtract the depth to the water table from land elevation for both wells.

This represents the Static Water Level (SWL) of the monitoring site. Write the SWL next to the well.



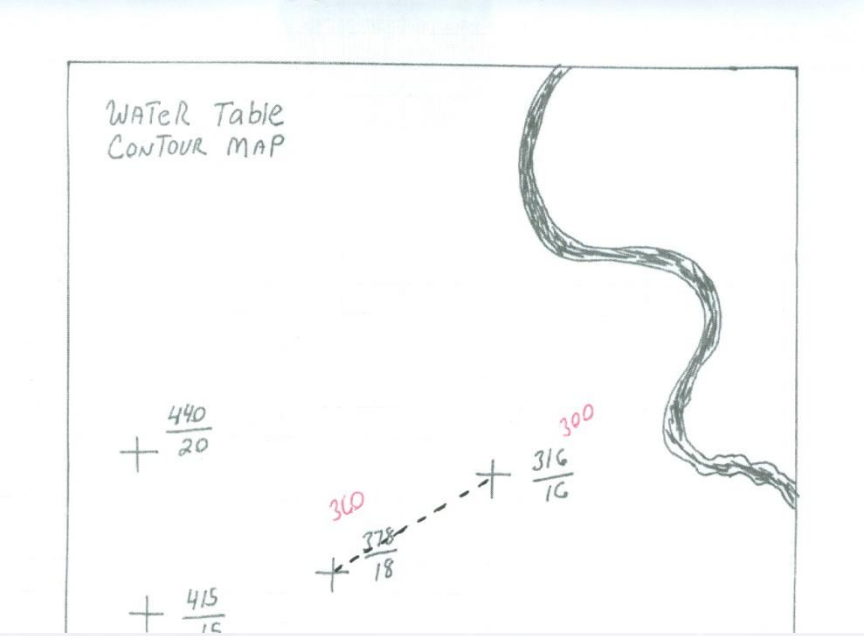
Construct a Simple Groundwater Contour Map

STEP 3:

Construct water table contour lines by doing the following for each adjacent pair of monitoring sites

STEP 3-TASK 1

Draw a dashed line between the two adjacent wells.



Construct a Simple Groundwater Contour Map

STEP 3-TASK 2

Subtract the smaller of the two SWLs from the larger. This is the difference in water table elevation (in feet) between the two wells.

STEP 3-TASK 3

Calculate the number of subdivisions needed by dividing the difference in water table elevations by 10

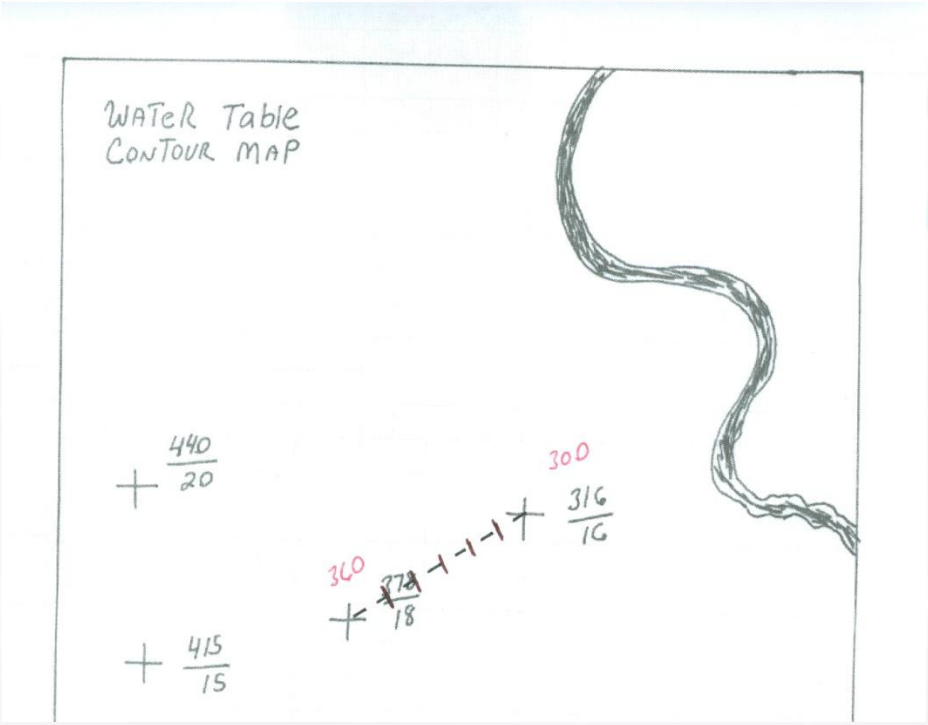
Construct a Simple Groundwater Contour Map

STEP 3-TASK 4

Calculate the distance between subdivisions by dividing the distance between the wells by the number of subdivisions needed

STEP 3-TASK 5

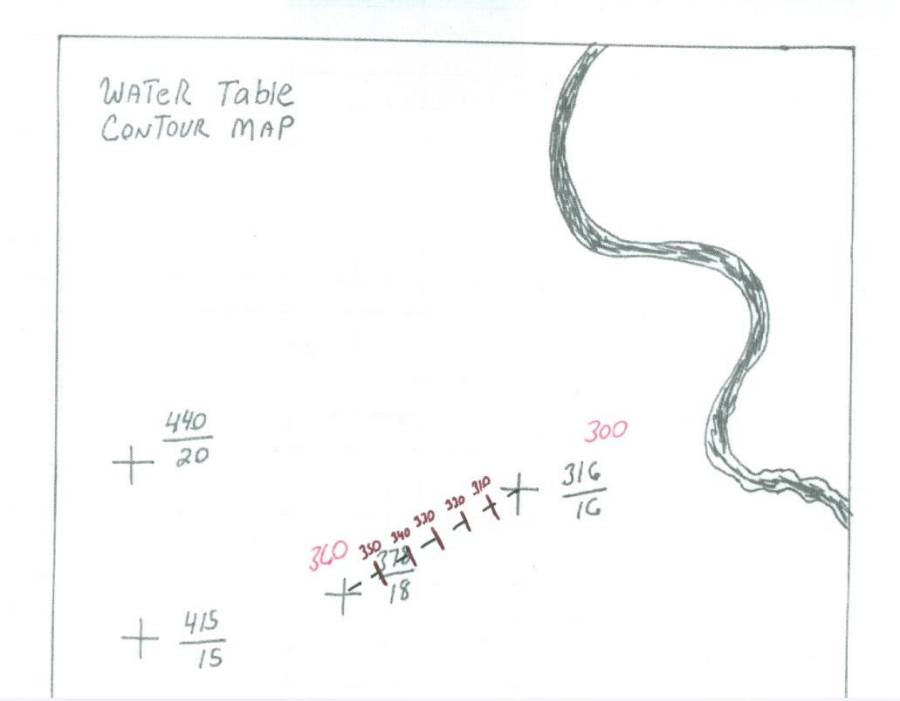
Divide the line between the two wells into units representing 10’ (feet) intervals. Draw vertical lines to indicate the intervals



Construct a Simple Groundwater Contour Map

STEP 4

Next, label each of the subdivision marks with the appropriate SWL as shown

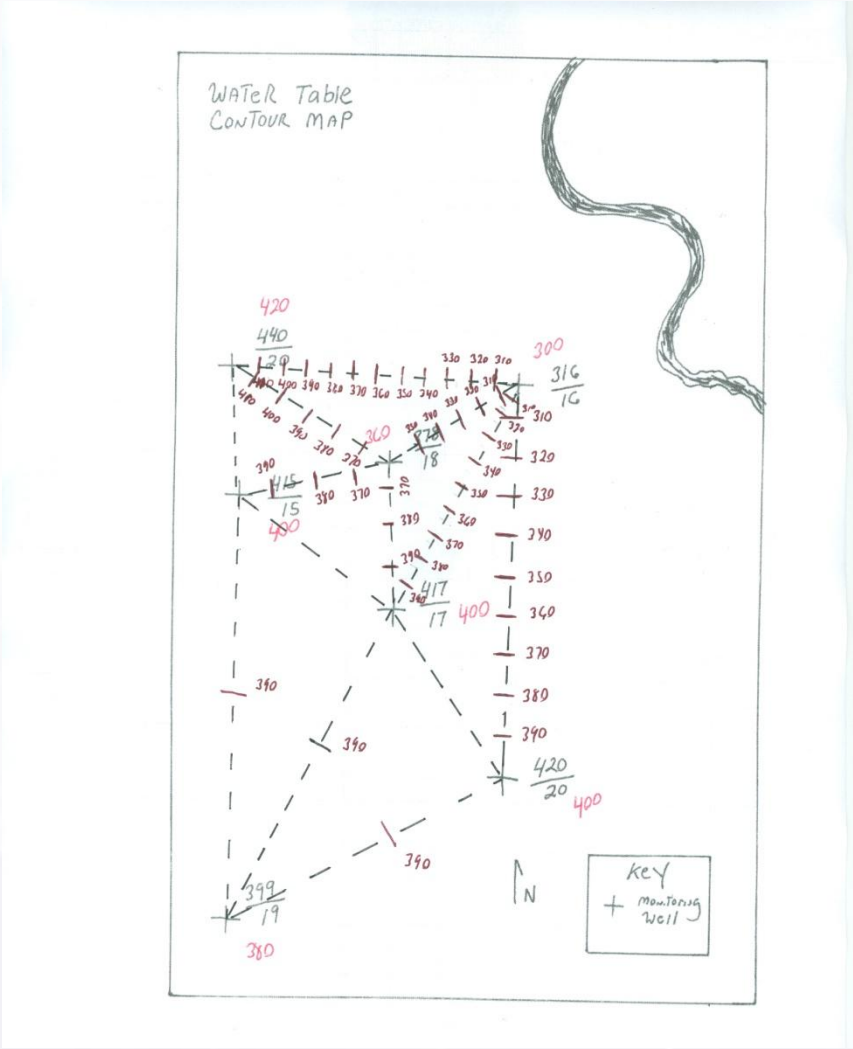


Construct a Simple Groundwater Contour Map

STEP 5

Repeat steps 1-4 for each pair of adjacent wells.

Your map should look something similar to what appears on your Activity 2 Handout



Construct a Simple Groundwater Contour Map

STEP 6

Overlay your map with tracing paper or a transparency

Mark a small dot for each SWL measurement on the tracing paper or transparency.

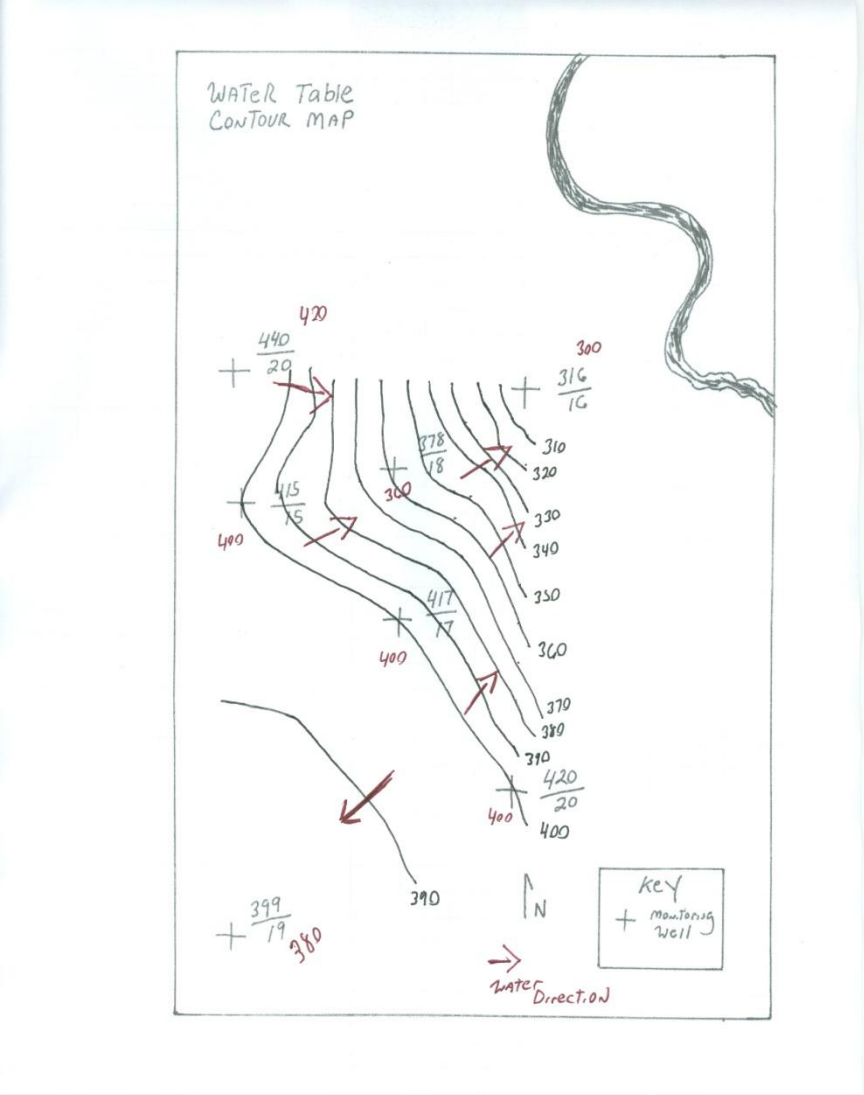
Connect equivalent SWLs with light pencil lines. These lines represent the contour of the water table elevation

Construct a Simple Groundwater Contour Map

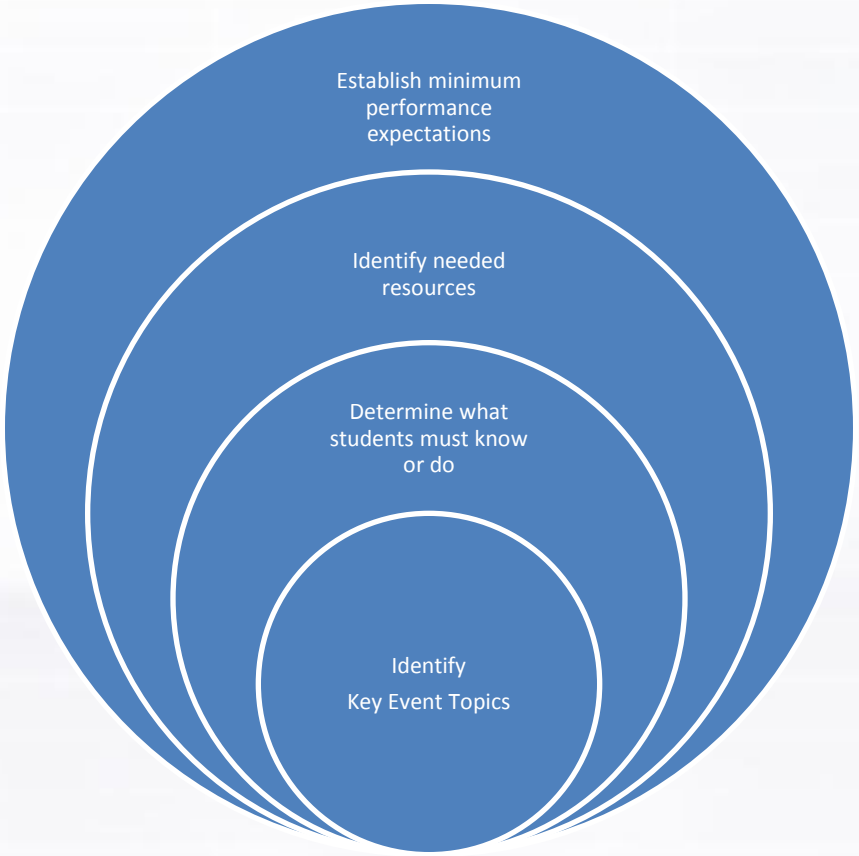
STEP 7

Polish up your contour lines by rounding the sharp corners.

Your final drawing should look something like this.



REVIEW OF TASK ANALYSIS



REVIEW OF TASK ANALYSIS

Identify the key event topic outlined in the Dynamic Planet event rules that you will focus your practice session on

Stream Drainage Systems

Lakes and Wetlands

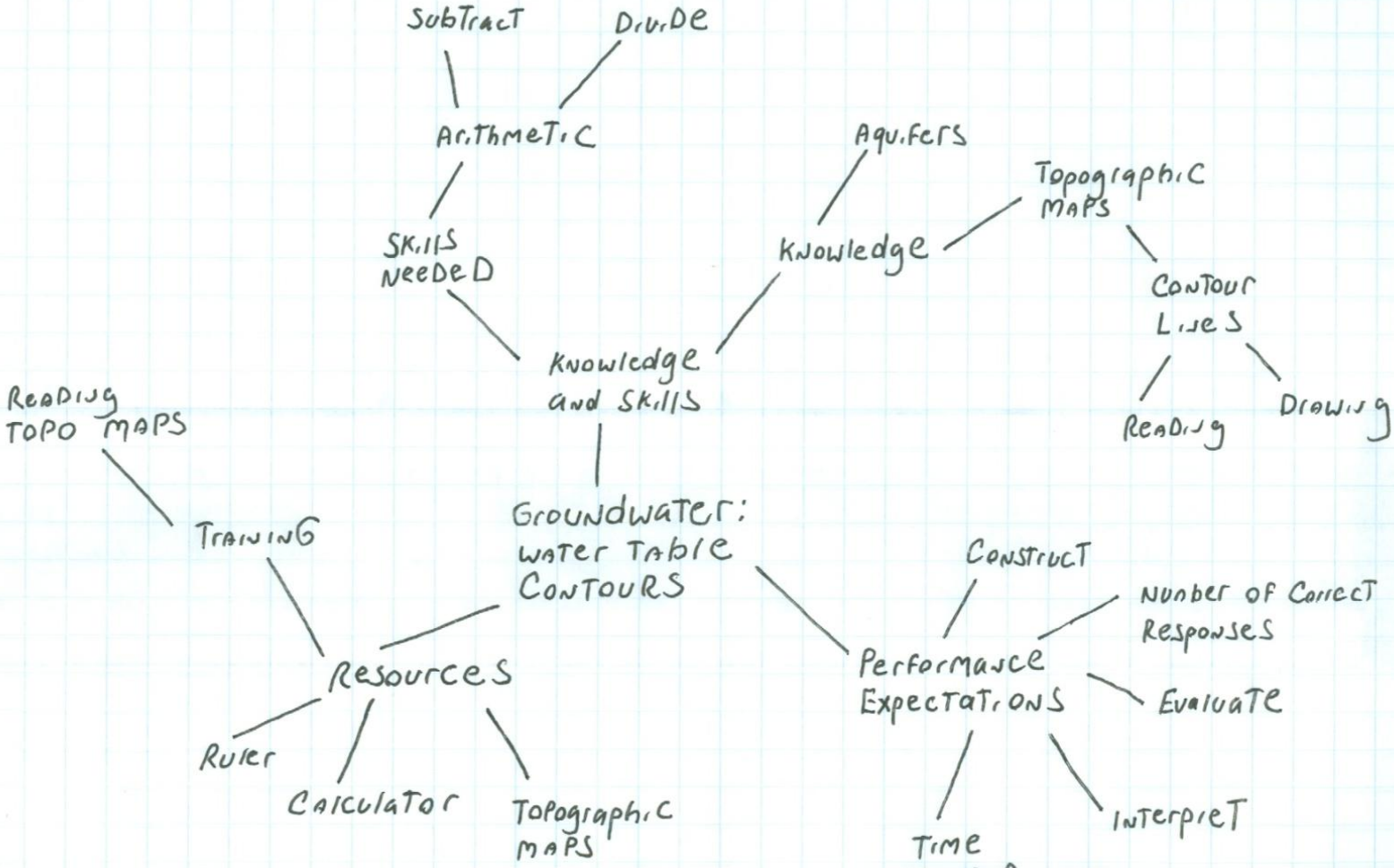
Groundwater

Karst Features

Pollution

REVIEW OF TASK ANALYSIS

Determine what a student must know or be able to do to successfully complete the event requirements



Mind MAP FOR
INSTRUCTIONAL Design

WATER Table CONTOURS ACTIVITY

REVIEW OF TASK ANALYSIS

Identify resources needed by students to learn each key topic and acquire them

REVIEW OF TASK ANALYSIS

Establish minimum performance expectations for each Key Event Topic

RESOURCES FOR DYNAMIC PLANET

- 2012 Dynamic Planet Training Handout
- 2012 Division B and C Test Packet CDs
- *Laboratory Manual in Physical Geology* Eighth Edition 2009 American Geological Institute and National Association of Geoscience Teachers Edited by Richard M. Busch and illustrated by Dennis Tasa
  Pearson Publishers

RESOURCES FOR DYNAMIC PLANET

- Any Earth Science or Environmental Science textbook

RECOMMENDED RESOURCES: Websites: http://water.usgs.gov/; http://www.fgmorph.com/; http://www.filter.ac.uk/database/insightrecord.php?id=48; www.epa.gov/watertrain/pdf/limnology.pdf; http://ga.water.usgs.gov/edu/earthgw.html; http://water.usgs.gov/ogw/. Books: Tarbuck, Edward J. and Frederick K. Lutgens, *Earth Science*. Prentice Hall, 2006.ISBN-10: 0131258524; Leopold, Luna B., *Water, Rivers and Creeks*. University Science Books, ISBN 978-1-891389-66-5

RESOURCES FOR DYNAMIC PLANET

- Stream drainage systems: http://www.tulane.edu/~sanelson/geol111/streams.htm
- Hydrologic Cycle: http://www.srh.weather.gov/jetstream/atmos/hydro_cycle.htm
- Lotic ecosystems: http://en.wikipedia.org/wiki/Lotic_ecosystems#cite_note-Gill-2

RESOURCES FOR DYNAMIC PLANET

Basics of Stream Ecology:
http://chamisa.freeshell.org/ecology.htm
Earth's Water – Groundwater topics:
http://ga.water.usgs.gov/edu/mearthgw.html
Lake Formation:
http://www.waterencyclopedia.com/Hy-La/Lake-Formation.html
Manning's Equation
http://www.fsl.orst.edu/geowater/FX3/help/8_Hydraulic_Reference/Manning_s_Equation.htm

RESOURCES FOR DYNAMIC PLANET

Lake formation
http://answers.yahoo.com/question/index?qid=20070627192339AAW7NTN
Water budget
http://zimearth.pbworks.com/f/Stream+Discharge+and+Water+Budget.pdf
Drainage patterns
http://www.uwsp.edu/geo/faculty/ritter/geog101/textbook/fluvial_systems/drainage_patterns.html

RESOURCES FOR DYNAMIC PLANET

Meandering rivers: lots of diagrams and activities (Outstanding/PDF)
http://www.chemcool.com/earth%20science/W%20%20aim%203.pdf

SUMMARY

- Identified important changes to the 2012 Dynamic Planet Event Rules
- Used a simple Task Analysis to assist you in creating a training program for students and coaches
- Demonstrated sample activities and identified resources that can be used with students in preparing for the 2012 Dynamic Planet Event