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The Scientific Method and GIS Technology

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Generic Lesson Plan Template

You should submit this form in addition to any computer-generated files/documents/models to your group folder on Angel. Please create a .zip file and upload the group of files as a single archive.

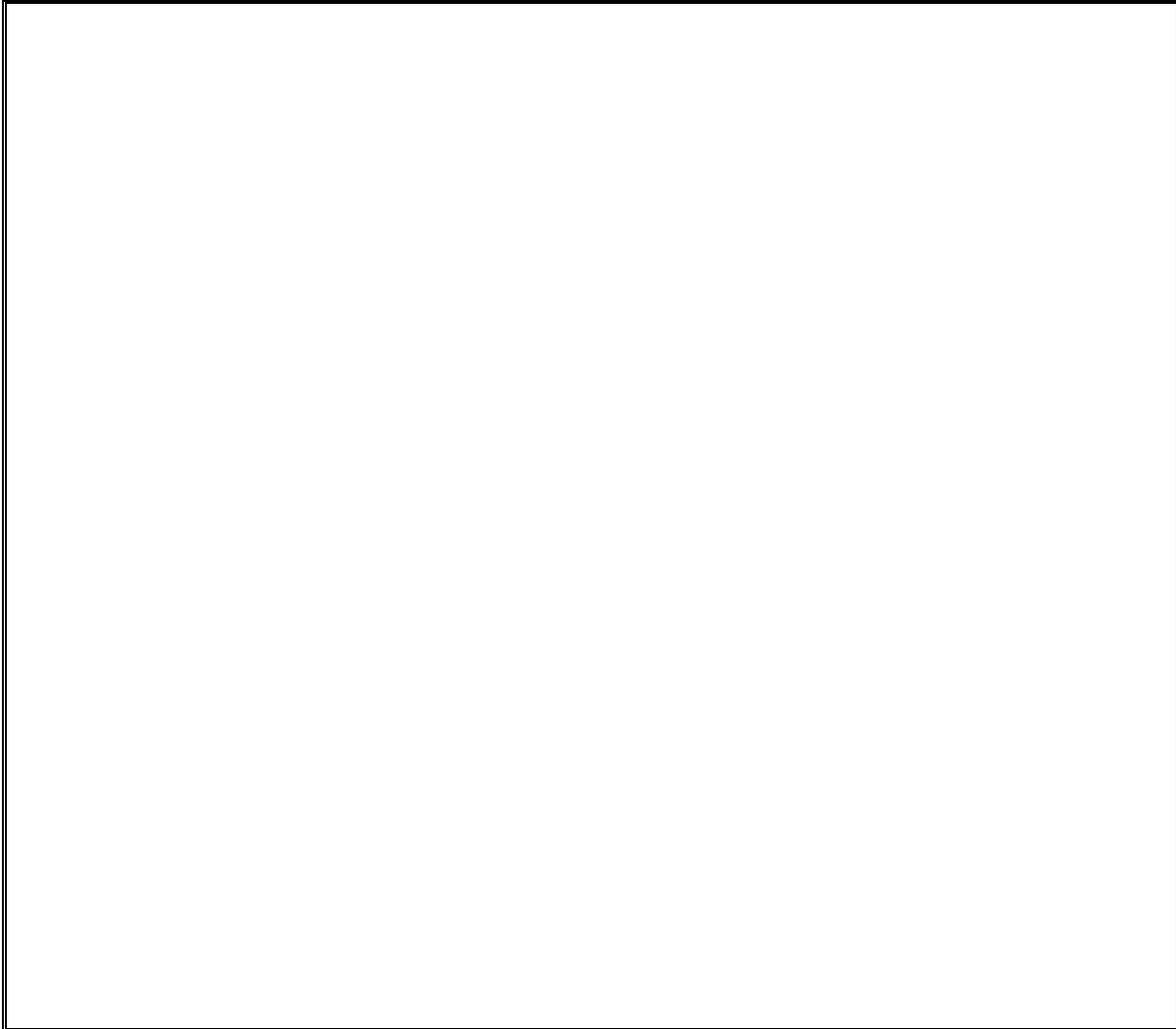
Name: lisa englert

Grade Level/Subject Taught: 8th grade General Science

Living Environment

Objective: Students will:

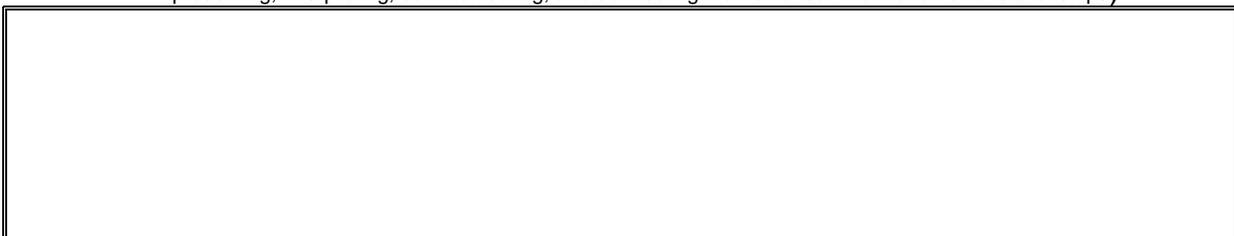
1. Apply the scientific method to examine real-life situations
2. Incorporate and integrate technological software when using the scientific method.



Please provide a rich **one-page, single-spaced**, description or a *vision* of your best thinking on a way or ways you might teach the planned lesson. (approximately $\frac{1}{2}$ page for the teacher role, $\frac{1}{2}$ page for the student role). Also, construct a tentative rubric that you might use with your students (see example)

Items to include in your lesson plan: (Choose your discipline/concepts from your own area).

1. *Write* the Mathematical Concept or “key idea” that modeling will be used to teach: (e.g. Students use mathematical modeling/ multiple representation to provide a means of presenting, interpreting, communicating, and connecting mathematical information and relationships)



and/or...

1b. *Write* the Science Concept or “key idea” that modeling will be used to teach: (e.g. Organisms maintain a dynamic equilibrium that sustains life).

Application of the Scientific Method as it pertains to studying real-life situations

Incorporation and Integration of technology into the Science classroom.

Materials:

Laptop (for instructor)

14 computers for students (minimum)

City of Rochester Street Software for ArcGIS

Student Directions and Student Worksheet

“...a rich **one-page, single-spaced**, description or a *vision* of your best thinking...”

Prompts:

1. How will you assess the prior knowledge of the student?
2. How will you begin the lesson?
3. What are the teacher and students doing every 5-10 minutes? (Teacher Actions and Student Actions)
4. How will you assess the learning for the lesson?

Using GIS/GPS_ I plan on having my students

1. Warm-up Activity: Students will work on a review activity matching the scientific method terms with their brief description (~10 minutes)
2. Spend ~ 5-10 minutes randomly selecting students to review and discuss answers
3. Pose the Essential Question: Does the distance a student lives from school have an affect on their absenteeism?
*Have students form a Hypothesis in their science journals that might answer the problem posed
*Introduce the GIS software ARCGIS Map that they will be using to explore data based on the essential question. They will be responsible for drawing conclusions based on the observations made from the data collected. Conclusions will be recorded in their journals.
4. Using the laptop and Notepad, instructor will demonstrate how to enter data of student addresses by having the data ready beforehand and assigning an attribute as A, B, C etc as follows:
1829 Lake Road, A
86 Conkey Avenue, B
In this way, students will have actual data without having their names attached to the data.
Notepad will enter data in text file so input will be recognized as x, y, attribute
This will take students ~ 30 minutes
5. Instruct students to go to ArcMap on their computers
*enter data from notepad
*overlay a Rochester City Street Map
*students will measure the distance from Douglass Middle School to each of the addresses by using the “measuring” tool in the ArcMap program
*Distances will be recorded in journal as A: 2 miles
B: 15 miles, for example
6. Instructor will provide absenteeism data in the following manner:

Distance Location:	Distance Measured:	#of days absent
A	2 miles	1
B	15 miles	8

Once again, this will allow for student anonymity.
This portion will take ~ 30 minutes
Instructor will be walking around the room monitoring student activity.
With 10 minutes remaining students will be instructed to save all data and maps created and shut down computers

As a homework assignment, students will be instructed to review data and think as to whether they

Can “prove” or ‘disprove’ their hypothesis. Activity will resume tomorrow

Name: _____

Date: _____

Instructor: Englert

homebase#: _____

The Scientific Method and GIS Technology

Computer Application Directions:

1. Set up your science journals as follows:

Location Address: Distance from Douglass: # of days absent:

1829 Lake Road, A

86 Conkey Avenue, B

Continue until you have the 28th address listed

2. Open Notepad (the text file allows the x,y and attribute to be entered as coordinates)
3. Enter all address data
4. Minimize Notepad
5. Open ArcMap in the Start Menu
 - *File: New
 - *Enter New Data from Notepad
 - *Overlap the Rochester City Street Map
6. Using the “Measuring” tool, measure the distance from each of the addresses listed and record in your science journal
- 7, Make Observations and conclusions

(software / modeling package(s))

****Example:**“I was thinking about beginning the class on [modeling X] by using the overhead to ask students what they know about X. From this brainstorming session, I might ask them to get into groups and discuss one or more of the ideas they gave me. After about ten minutes, I would have the students give their ideas on X and write them down on a transparency so they would be able to see them for the entire hour. From here, I would provide a 10 to 15 minute demonstration of the basics of using _____ modeling software. I would use an conceptual example that they would find familiar with such as getting a cold and how it is transmitted. From here, I would have students at the computer stations using a prepared guide or tutorial to get them started on basic software usage. I expect that in a short time a number of students would “catch on” rather quickly and be able to help others. By the third lesson, I suspect that most would be well on their way to development of their own or small group models using the _____ software. My plan of assessment would probably be a group model so they would gain more confidence in using the software in a meaningful way. After the second or third lesson, I would ask them to choose from a list of thematic or topic areas that fit the software nice and develop a model using the technology. As a product, I may have partners share their model and describe to other small groups how it works. The rubric I design would be general at first so that I might see what kinds of the products the student were capable of creating. From the prototypes, I would hone my rubric to make the modeling product as challenging as possible without making it too difficult.” Etc...