

Name _____

USING GIS AND MATHEMATICAL MODELS AS DECISION MAKING TOOLS

A CASE STUDY OF CHOPTANK BASIN

Go to : <http://bhaskaran.weebly.com/teach.html>

What is GIS?

Watch the video to learn about GIS and list three new things you learned about GIS and one question you have about GIS.

I learned

A question I have

Click the Choptank Basin: NOAA's Habitat Focus Area button

Answer the following questions

- What are some unique characteristic of the Choptank Watershed?
- Why was the Choptank identified as a Habitat Focus Area?

Scenario

NOAA has identified the Choptank as a Habitat Focus Area. Assume that you work for NOAA and your goal is to analyze the land use and water quality data for Greensboro, a sub watershed within the Choptank basin and design an implementation plan to improve the water quality.

Complete the five steps to design and develop your implementation plan.

Step 1: Graphing Land Use

Click on the Greensboro 2011 Land Use map.

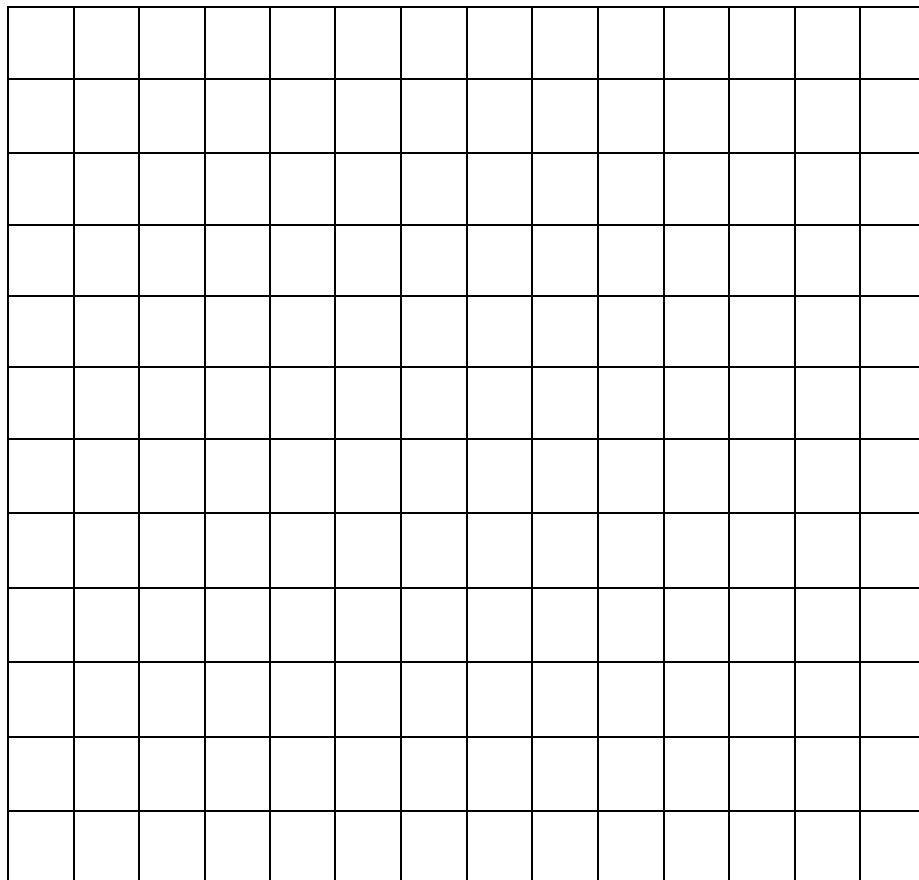
Click on each land use category in the legend and record the Area(Hectares)

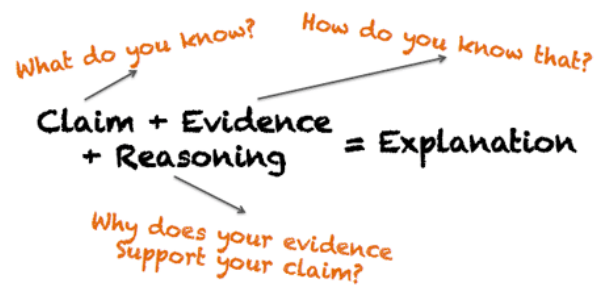
Calculate the percentage of each type of land use

Graph your data (label the X and Y axis)

Land use category	Area(Hectares)	Percentage
Agriculture		
Forest		
Other		
Park		
Water		
Poultry operations		
Road		
Structure		
Total	-----	----- *Hint: This should add up to 100

Graph Title: _____





Step 2: Claim, Evidence and Reasoning (CER)

Write a paragraph to answer the following question. Use the CER format to write your answer.

Question

The Choptank basin is a unique ecosystem. Is there a relationship between population growth, the land use and water quality? Provide evidence of the types of relationships that exist. How significant are these relationships. Discuss why it is important to setup a Habitat Focus Area. Include vocabulary terms and concepts assigned and/or discussed in class.

Step 3: Ways to improve water quality

Take the BMP tour, read the descriptions and identify three BMPs that can be implemented in our school’s property to improve water quality. Justify your choice.

BMP Type	Justification

Step 4: Using GIS and Models

1. Download the Greensboro Watershed BMP Model file.
2. In groups use the Greensboro Watershed BMP Model to identify and calculate the cost and area of different BMPs that can be implemented to reduce nutrient (N and P) loads in Greensboro by 25%. *(Hint: You may have to run the model multiple times)*
3. ***Print your completed model and attach it to your final report***

Reflection on using models

At first I thought _____, but now I know _____

Some ideas I have squared away are _____

One thing I have circling around is _____

I am amazed/puzzled by _____

These results make me think _____

4. Click on the 2009 Greensboro BMP map
5. Using the map as base, identify suitable locations to implement BMPs in Greensboro. *(Hint :Look at the BMP tour for BMP types)*
6. Use the Measure tool to identify the locations and calculate the area in hectares. *(Hint: Use the icons in the tool bar to interact with the map)*
7. For each location identified discuss potential issues in implementing the BMP and propose possible solutions

Step 5: Creating and Communicating

Compile the data gathered from the previous steps and communicate your implementation plan for the Greensboro watershed by writing a two page report.

Use the following template to write your report.

REPORT TEMPLATE

Abstract: gives a very brief indication of:

- the aim of the report
- what you did
- what you found
- what you concluded.

Introduction: provides the context for the report

- states why the topic is important or useful
- explains any abbreviations or special terms.

Method: sets out what you did in sequence

- explains how you did it
- indicates what materials, techniques or equipment you used
- provides sufficient information for the reader to replicate the study.

Results: presents what you found

- includes clearly titled tables, figures, model printout

Discussion

- explains what the results mean
- indicates whether the results were consistent or inconsistent with your expectations
- explains what possible sources of error there are
- explains what possible problems encountered
- indicates suggestions for future.

Conclusion

- briefly restates the main results
- briefly explains the significance of the findings.

References

- provides a list of sources of information which you have used, following the referencing conventions

(Adapted from : <http://www.monash.edu.au/lls/llonline/writing/science/7.xml>)