

How to do a Challenge project that
attempts to solve a problem
effectively?



WHY ARE YOU HERE?

- a. To get away from your brothers/sisters
- b. To go to a college campus
- c. Sitting in class is your idea of FUN.



Why we hope you are here!!

- You are a first year team and want to see how a proposal gets done.
- You understand that proposals take work.



Why we hope you are here!!

- You really do want to see a college campus.
- You want your project to be the best it can be.



How to Create that Proposal

(Here's where the first bit of work comes ...)

Always start with an interest or curiosity



Then Research, Research, Research



We'd like you to see what we did to get our proposal. We started with an ...

Idea or Curiosity

- **We were curious about Santibel Island, Florida.**
- **We created a simple preliminary question after watching the pictures of devastation from Hurricane Ian.**
- **We noticed people choosing to not leave Santibel Island. We were curious about how they get off the island because it is connected to Florida only by a bridge.**



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Idea or Curiosity

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Next
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Our starting question was

**Why was there no forced hurricane
evacuation of Santibel Island,
Florida?**

If this were your family, would you
have wanted the Mayor to
evacuate the city?



Next
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Albuquerque 5,284 feet above sea level.

5,000

Next slide

1,000

500

Santibel Island 3 ft

Sky Mile Tower Japan	Burj Khalifa Dubai	Shanghai Tower Shanghai	One World Trade Center	Taipei 101 Taipei	Petronas Tower Kuala Lumpur	Empire State Building	The Shard London	The Gherkin London
5,577ft	2,716.5 ft	2,716.5 ft	1775 ft	1670ft	1587ft	1453.4ft	1004ft	341.2ft

We read 13 articles trying to find the answer to our question. We found there were a lot of things we didn't know, so we had to research more.

(click on links to see the answers)

- What does the Category of a Hurricane mean?
 - What about the Height above sea level of Santibel Island?
- What kind of changes to Santibel Island did they implement after Hurricane Rita?
 - What is their plan?



Want to see Our preliminary references?

We are done looking at these answers



Saffir - Simpson hurricane sea level



Category 1

- Winds 74-95 mph (119-153 km/h)
- Some damage and power cuts



Category 2

- Winds 96-110 mph (154-177 km/h)
- Extensive damage



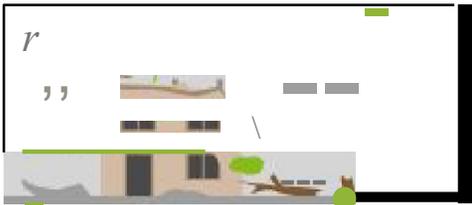
Category 3

- Winds 111-129 mph (178-208 km/h)
- Well-built homes suffer major damage



Category 4

- Winds 130-156 mph (209-251 km/h)
- Severe damage to well-built homes, trees blown over



Category 5

- Winds 157 mph (252+ km/h)
- Many buildings destroyed, major roads cut off

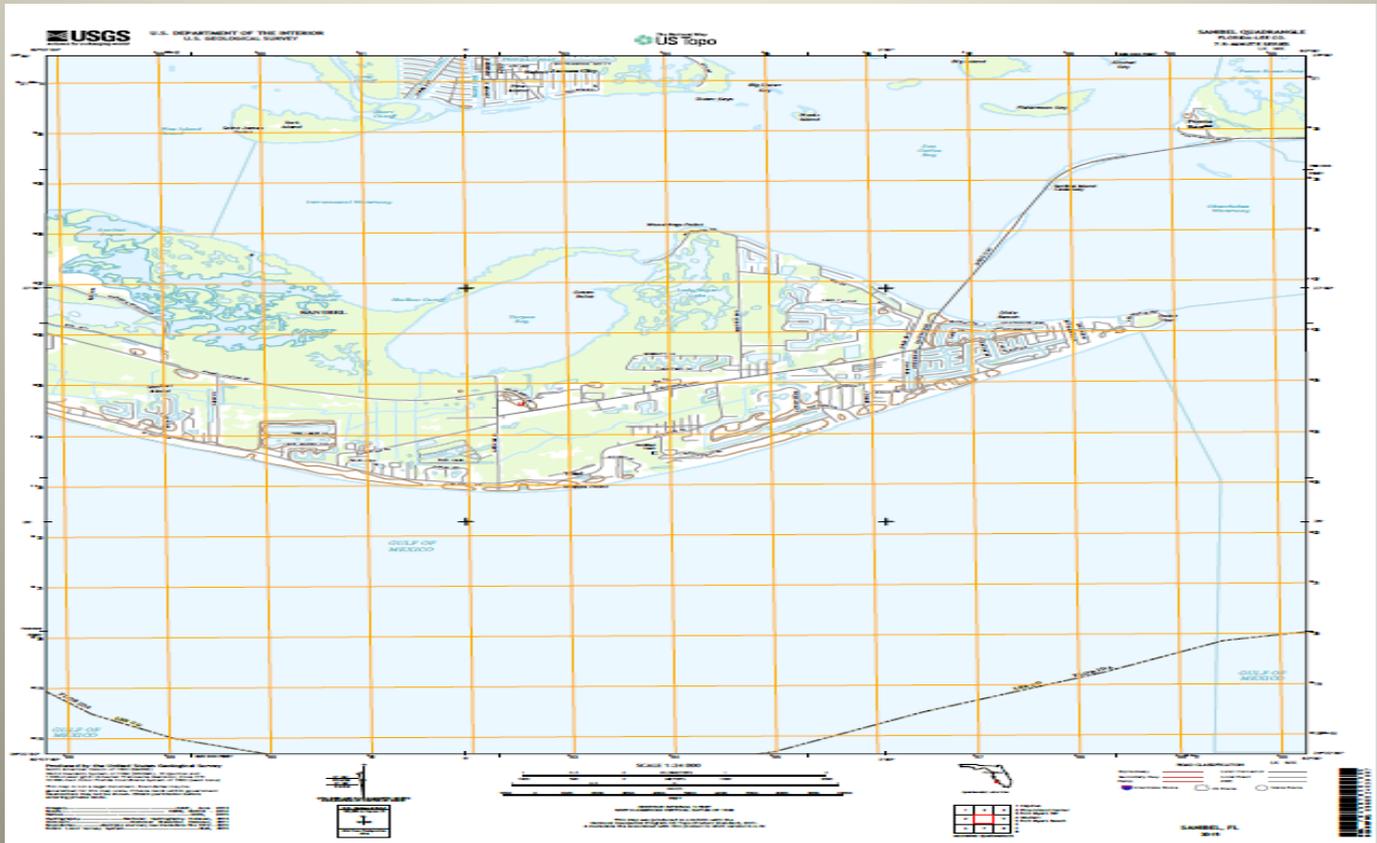
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If the elevation of Albuquerque is 5,280 ft above sea level then what is the elevation of Santibel Island, Florida?

- A. 1000 ft above sea level
- B. at sea level
- C. 3 ft above sea level
- D. 583 ft above sea level



Santibel's feet above sea level is different throughout the island



Guess what the average would be.

Next
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We found that

- **Santibel does have a plan but residents aren't forced to leave. Interesting—may be a project**
- **We found an article that said that the bigger problem was flooding and not the evacuation. It made sense, so we decided to look at flooding.**
- **We found an article that talked about flood solutions in China.**

We are done
with Data from
our Research



Here!

After reading articles, there were at a least 6 different ways we could create a project.

1. Propose and test an escape plan for Houston's water drain off similar to China's Sponge City plan using data from Hurricane Rita and Harvey and the topographical information of the city.

1. Two year study, Investigate areas of water flow at different elevations in Houston, create a model of that. Year Two: Compare areas of flooding to elevation maps, create a plan for solving flooding.



3. Test the Santibel Evacuation Plan

4. Investigate dikes like Holland uses to prevent storm surge in Texas Gulf region areas like Galveston.

5. Find a mentor to help us understand a study that created a model for Large City evacuation.

Study is too complicated to understand without a mentor.

6. Use crowd sourced data from the Sea Level Rise App to model storm surge increases from global warming in tidal areas of the United States



6. Use crowd sourced data from the Sea Level Rise App to model storm surge increases from global warming in tidal areas of the United States



We needed to choose which one sounded the most interesting to us and ask ourselves could we get enough information to complete this project by April?

Which one would your team choose?

What each team finds interesting is different.

We created a plan for how we will move forward

What will we test? What will we measure? Where will we find our data? What things are important to pay attention to? Can we simplify our plan?

Next
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Create the Proposal

Use our researched information to put together a problem statement and a question we plan to investigate.

Meet the Scientist

At the Meet the Scientist class on Sunday, professionals help us decide what the next steps are.



We are done looking at
Our Proposal



Our Research before we had a Proposal or Final Question

- Santibel Island is susceptible for flooding because of its flatness.₁
- Santibel Island was hit with Hurricanes in 2004 (Cheney, Frances, and Wilma) 2005 (Charly) 2008 (Fay) 2012 (Issac, Ian)
- Houston has 6,382 people living on it year-round and 160,00 in the winter tourist season.₂



- References for all this information:
- <https://www.mysanibel.com/departments/police-including-emergency-management/emergency-management/general-disaster-information>
- **2.**
[https://www.mysanibel.com/departments/police-including-emergency-management/emergency-management/tropical-storm-hurricane-including-hurricane-evacuation-reentry-](https://www.mysanibel.com/departments/police-including-emergency-management/emergency-management/tropical-storm-hurricane-including-hurricane-evacuation-reentry-passes)



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[passes](#)

3. https://riskfactor.com/city/Sanibel-Florida/1263700_fsid/flood

4.

https://floridadep.gov/sites/default/files/FINAL_nut_sanibel_08142017.pdf



12.

<https://www.mysanibel.com/content/download/15638/file/Sanibel%20Hurricane%20Action%20Plan%20Awards.pdf>

13.

<https://www.theguardian.com/public-leaders-network/2016/oct/03/china-government-solve-urban-planning-flooding-sponge-cities>

Proposal

Team ID: ASNM104

School Name: Any School in NM

Area of Science: Engineering, Weather

Project Title: Sponge City: Solution to Flooding

Santibel Island has been hit with 33 trillion gallons of water on Florida. Lack of rainwater drain- off, or flooding was the bigger issue. Flooding happens constantly, in small and large quantities, every time precipitation falls to earth. Under normal circumstances, rain or snowfall soaks back into the earth.



Next
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Proposal continued

It gets absorbed by grasslands, by parks, by lawns, by anywhere the soil is exposed.

Two factors can stop absorption. One is large quantities of rain in a short period of time. The ground becomes inundated, and the water spreads out with the topography. The second is covering over the ground so it cannot soak up water in the first place. And that's exactly what cities do—they build roads, parking lots, sidewalks, and asphalt to create impervious surfaces that resist the natural absorption of water.



In conditions like hurricanes that produce lots of rain, the island can't handle the rate and volume of water and flooding is the result.

Santibel Island stretches over 33.21 Square miles whereas Albuquerque covers 189.5 square miles.

The country of China proposed a national plan to control flooding called Sponge cities. They plan to create softscape areas instead of water-resistant concrete like a lot of big cities. So softscape areas use permeable materials and green spaces to soak up rainfall. Areas that take water away like irrigation ditches and rivers would then be interconnected.



Our question is: Would implementing sponge city protocols decrease the flooding that occurred in Santibel Island? Would that affect the tourist trade?

We propose to test a softscape plan for Santibel Island water drain off like China's Sponge City Plan using data from Hurricane Issac and Ida for rainfall amounts and the topographical information of Santibel Island. We will measure the water amounts in the areas that flooded for both Hurricanes before and after adding sponge city changes.



Team Members

Patty Meyer

Jenifer Hooten

Ben Fowler

Ann Gomez

Sponsoring Teacher(s)

Ms. Celia Bedelia

Project Mentor(s)

Drew Einhorn

Vince Meyer

Eric Meyer



Areas of Santibel Island that Flooded



<https://riskfactor.com/city/Sanibel->

[Florida/1263700_fsid/flood](https://riskfactor.com/city/Sanibel-Florida/1263700_fsid/flood)

Next
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What you should understand

- Proposals require research to make your project good.
- Don't give up, you can do this! Results that are not what you expected is still a good project.
- Meet the Scientist session leads you in the right direction to get your proposal looking like Ours.
- You have to like your topic, because you need work on it all year long.

Next
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China's flooding.

A problem to 450 million people



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What is Water Softscape

Softscape:



The "soft" components of the landscape. These might include grass, flowers, trees, shrubs, groundcovers, etc.

Hardscape:

The hard components of a city, like walkways, retaining walls, patios, driveways, street surfaces, parking lots.

Pavement, which is **hardscaping**, **prevents water from soaking into the soil**, softscaping materials allow water to soak into the soil.

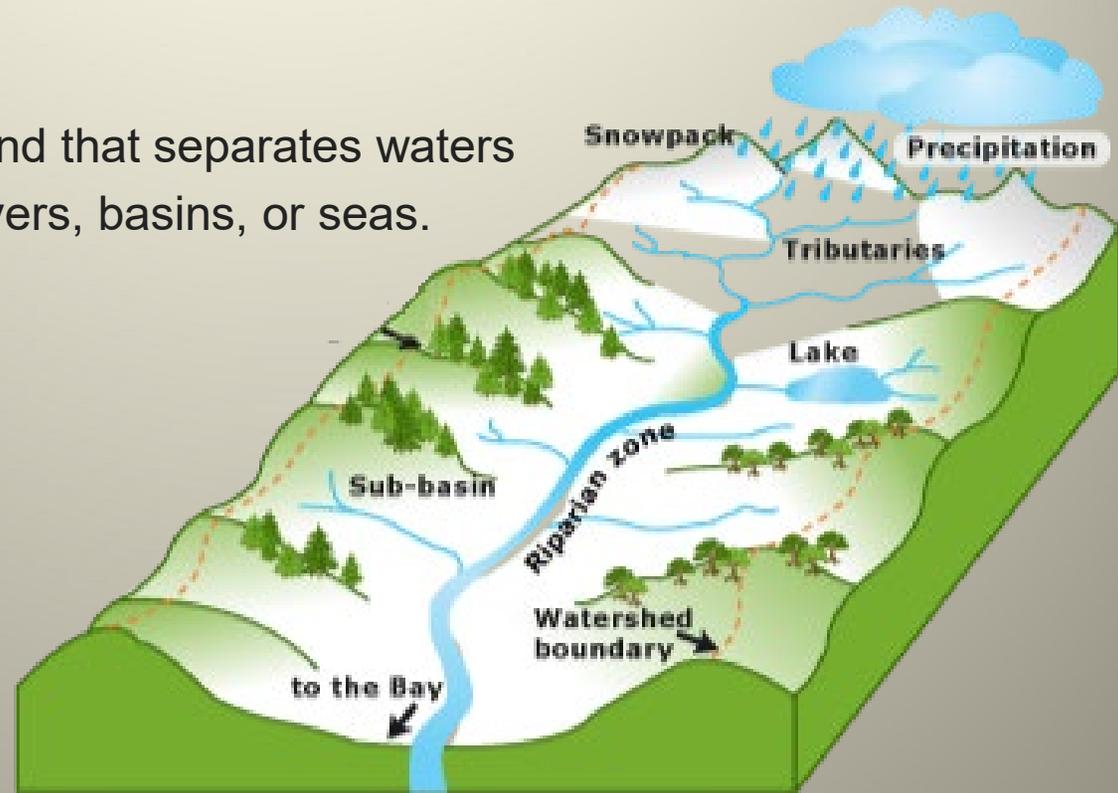


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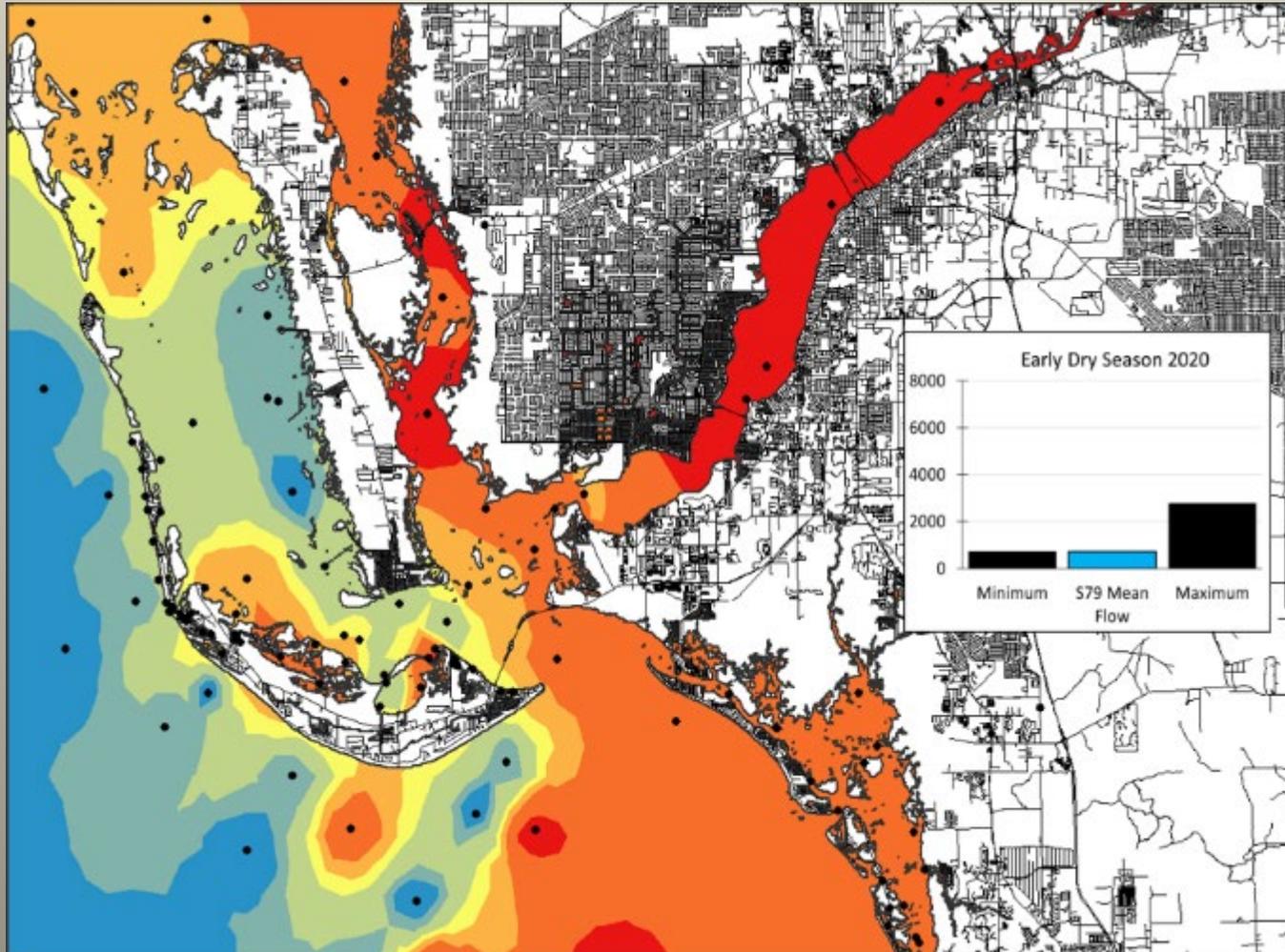
Watershed

an area or ridge of land that separates waters flowing to different rivers, basins, or seas.



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Santibel's Watershed Districts



The elevation of the land creates the boundaries of the watershed. Lots of places for water to pool in the city.

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China's Solution to Flooding

- 2.3 billion people affected by floods because more people move to the cities. As building increases for these people, it more hardscaped areas.
- In summer, climate change is bringing more rainfall and flooding since about 1990.
- By 2030, 80% of the cities in the Sponge city program must softscape 60% of the city.

Next
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We hope looking at our project helped you!

