**Student Research Plan**

**Name             Shannon Cattie                                 Period 2**

**Proposed title (subject to change):**

Jetties: Help or Hurt?

**Problem to be posed or question asked:**

Do the Jetties at the beach actually help keep the sand on the beach, or do they allow it to be sucked out to sea?

**My hypothesis or hypotheses:**

If the beach has a jetty, then it will lose more sand.

**Materials I will supply**:

I will supply a beach (sand, water, wave generator, and tub to hold it in) and the jetty (rocks).

**Materials to be supplied by Mr. Cushing (think of the equipment you will need)**:

I do not think that I will need to use any supplies from you.

**Materials from other sources (explain)**:

None

**List all chemicals that will be used along with any special handling, storage or disposal:**

There will be no chemicals used in this project.

**Planned procedure**:

1. Create three identical beaches. Each beach will have the same amount of sand that reaches to the same point in the container. Also, each beach will have the same amount of water and a wave generator for each. The wave generator will be on the same power for each. There will be only one difference between the beaches, two will have a jetties and the other will not.
2. Over a course of two weeks, watch where the sand goes, or doesn’t go. Each night at the same time and place, take a picture to show the difference of the sand progression.
3. After two weeks, check the results and see if the jetty actually kept the sand in.

**What is your independent variable?**

            My independent variable is the jetty.

**What is your dependent variable?**

My dependent variable is the erosion.

**What is your control?**

My control is the beach without the jetty.

**What are your Constants?**

            My constants are the amount of sand and water, and the power of the wave generator.

**Please explain the planned timing of your experiment – how long do you expect it to take and when you will work on it.**

            I believe each experiment should take about two weeks to fully let the sand situate. That would mean that it would take about a month to complete the project, since I should do the experiment three times to make sure the information is correct. I will work on it after school at my house where the beaches will be located.

**Please cite at least five references you have consulted while conducting preliminary research.**

1. A little about jetties: <http://www.britannica.com/EBchecked/topic/303301/jetty>
2. More about jetties and how they are made (chapter 2) : <http://books.google.com/books?id=5bwMO6SOlT4C&pg=PA3&lpg=PA3&dq=how+are+stone+jetties+made&source=bl&ots=4P864r5cWE&sig=p0lP-gjFAuXypp2hcn57DtFSDJ4&hl=en&ei=n5uzTOKtKsWBlAehvIDlDw&sa=X&oi=book_result&ct=result&resnum=4&ved=0CBwQ6AEwAw#v=onepage&q=how%20are%20stone%20jetties%20made&f=false>
3. Beach erosion: <http://www.scientificamerican.com/article.cfm?id=what-causes-beach-erosion>
4. More about beach erosion: <http://oceanworld.tamu.edu/resources/oceanography-book/coastalerosion.htm>
5. About waves and their effects on beaches: <http://oceanworld.tamu.edu/resources/oceanography-book/beachprocesses.htm>

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Project title: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**(Do not use this page as part of your final research plan for your research plan attachment)**

Please circle any of the following that apply to your project.  Unless you have prior approval from me, a project containing any of these elements will be rejected.  Approved projects containing any of these elements are subject to additional scrutiny, paperwork and deadlines before experimentation may begin.

Human subjects

Controlled Substances

Non-human vertebrate animals

Recombinant DNA

Pathogenic agents (bacteria)

Human or non vertebrate animal tissue

Hazardous chemicals

Dangerous equipment (welders or lasers)

Firearms

Radioactive substances

Radiation

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Student Signature                                                   Date