Name: _____

7th Grade Science Laboratory Final

There are 3 sections to this final and you will rotate between stations in order to complete these tasks. Please go to the station you are assigned to first, beginning with that section of this packet.

Station 1:

Oil Spill Clean-up

In the following part of the exam, you will model an oil spill and test materials for cleaning up the spill. This experiment will help you understand why it is such a difficult task. All of the tools you will need are laid out at the station, please read through the materials list to familiarize yourself.

Materials:

one baking dish

water

blue food coloring

vegetable oil

pure cocoa powder

teaspoon

stir rods

beaker

sorbents (paper towel, cotton balls, rag, string, nylon pot scrubber, sponge, styrofoam cup, garden peat moss, Shredded Wheat)

1 squirt of liquid dishwashing detergent

forceps

Procedure:

Begin by preparing your fresh water and crude oil.

1. To prepare the fresh water:
    - Fill baking dish with cold tap water to within 1 cm of rim.
    - Add 5-6 drops of food dye.
    - Mix dye and water with a stirring rod.
    - Let solution settle.
2. To simulate crude oil:
    - Place 3 tbsp. of vegetable oil in beaker.
    - Add 2 tbsp. of cocoa powder.

- Mix cocoa powder and oil thoroughly with a stir rod.

3. To contaminate fresh water:

   - Very slowly pour simulated crude oil from a height of 1 cm onto the top of the fresh water dish. If you pour the oil too quickly, the experiment won't work - start over!

Record your observations. What happened to the oil when you dropped it on the fresh water/ocean?_____

_____

_____

_____

To test the sorbents:

Choose 3 sorbents to test. You will test them one at a time and record your observations in the data table. Before beginning, write a hypothesis about which of the 3 sorbents you selected will clean up oil best.

Hypothesis:

_____

_____

_____

Now test your sorbents.

Data Table:

Sorbent type	How much oil did the sorbent clean up? Estimate a percent or fraction.	Fast or slow absorbing?	Does the sorbent pick up water too?	Does the sorbent sink or float?

1. Of the sorbents you tested, which one worked the fastest? Which one worked the best overall?

_____

_____

2. Besides what is on the table, name two other absorbent materials you could use as sorbents.

_____

_____

3. How would you pick up the oil-contaminated material (sorbents) in a "real" oil spill in fresh water/the ocean?

_____

_____

4. Considering the tons of toxic trash produced, how would you dispose of the oil-contaminated material in a "real" oil spill?

_____

_____

_____

5. Now add 2-3 drops of detergent to the oil-contaminated freshwater. Describe what you observe happening.

_____

_____

_____

6. Would detergent be a reasonable tool to use in a real oil spill? Why or why not?

_____

_____

_____

Conclusion:

Look back at your original hypothesis. Now write a conclusion statement that recommends materials and methods for cleaning up oil spills based on your findings.

_____

_____

_____

_____

_____

_____

_____

_____

_____

Clean up: Dispose of your oil spill, rinse your pan, and organize your materials for the next group.

Station 2:

Data Analysis

In this section, you will be examining data about the effects of oil spills. This is real data collected after the Exxon Valdez spill in 1989. You will answer questions about the data and demonstrate your graphing ability.

There are several numbered graphs at your station. Graph 1 shows the average number of snails per meter on rocks near the spill site. Observe how their numbers change from year to year.

1. Snails that came in contact with the oil had the lowest population in what year?

   _____

2. Which population recovered most quickly, the oiled snails that were washed or the unwashed snails? _____

3. Which group has the highest population per meter in 1996?

   _____

4. Based on this data, do you think washing snail habitats after an oil spill helps the snails? Why or why not?

   _____

   _____

   _____

   _____

Now look at Graph 2. This shows how thickly a type of seaweed covered rocks near the spill site in the years after the accident.

1. Based on the data you have, estimate the percentage of the rock surface that was covered with rockweed right before the spill. _____
2. In what year did the oiled and washed population of rockweed appear closest to its levels before the spill? _____
3. Do you think the rockweed near the spill had recovered by 1996? Why or why not?

   _____

   _____

   _____

Many other organisms were probably affected as well. The Exxon Valdez spill appears to have had an impact on the salmon fishing industry as well. Create a bar graph on the following page for the number (in millions) of pink salmon harvested each year after the spill. Be sure to label your axis.

Year	Pink Salmon Harvest (Millions of Fish)
1990	43
1991	36
1992	8
1993	3
1994	37
1995	15
1996	25
1997	25

Station 3:

Cleaning Oiled Feathers
In this experiment, you'll look at the way oil affects bird feathers and try out different cleanup methods to find out which works best.

Materials

- 3 Clean, dry feathers
- Three bowls or basins
- Vegetable oil
- Dish-washing detergent
- Hot and cold water

Prediction: Write a prediction about what happens to birds and their feathers when they land on an oil slick. How are they affected?

_____

_____

_____

Procedure

1. Choose some feathers from the materials at your station, then try to answer the following questions:
    a. What kinds of water birds can you think of?

    _____

    _____

    b. What kinds of things do water birds do?

    _____

    _____

    c. What do feathers do for water birds?

    _____

    _____

2. At your station is a container with vegetable oil and water in it. Dip your feathers in the oil to imitate what happens when a bird lands on an oil slick.

3. Take a look at the feathers now and write down your observations. What happened to the feathers?

_____

_____

_____

Based on what you saw, how do you think this might affect a water bird wearing these feathers?

_____

_____

_____

4. Now try three methods of cleaning feathers. There are 3 washing stations set up. Whatever washing technique you choose, use the same methods at each station.
    a. Cold water washing: try washing some of the oiled feathers in cold water. Write down your observations.

    _____

    _____

    b. Hot water washing: try washing some of the oiled feathers in hot water. Write down your observations.

    _____

    _____

    c. Washing with detergent: try washing some of the oiled feathers in the warm soapy water. Write down your observations.

    _____

    _____

Conclusion:

Now write a conclusion that discusses how oil spills affect birds and what the best method to clean the birds would be.

_____

_____

_____

_____

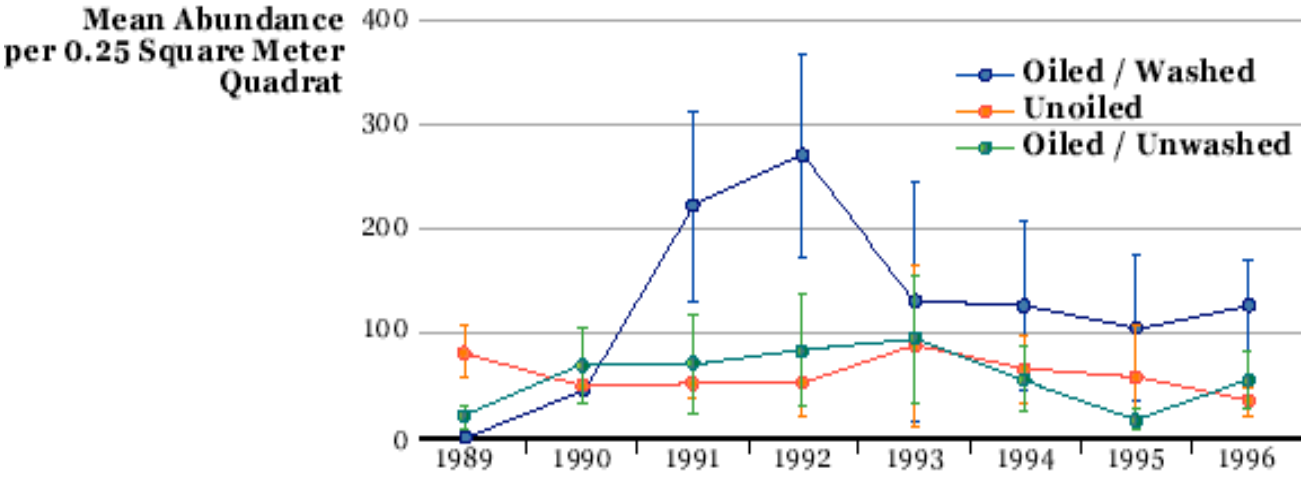
_____

For teachers:

Below is the data I based my graph reading section on. I reformatted the graphs by hand to try and prevent confusion. These graphs and more information can be found on the NOAA website. http://oceanservice.noaa.gov/education/stories/oilymess/oily04_transition.html

Graph 1

Shows the average number of snails per meter on rocky sites.



Graph 2

Shows the percentage of rock surface covered with rockweed.