Highways of the Sea Lab Report

Instructions: In the Highways of the Sea Lab, you will chart the traveling shoes and predict how ocean currents move. Record your findings below. You will submit your completed lab report.

(30 points possible)

Name and Title:

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Highways of the Sea Lab
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Objective(s):

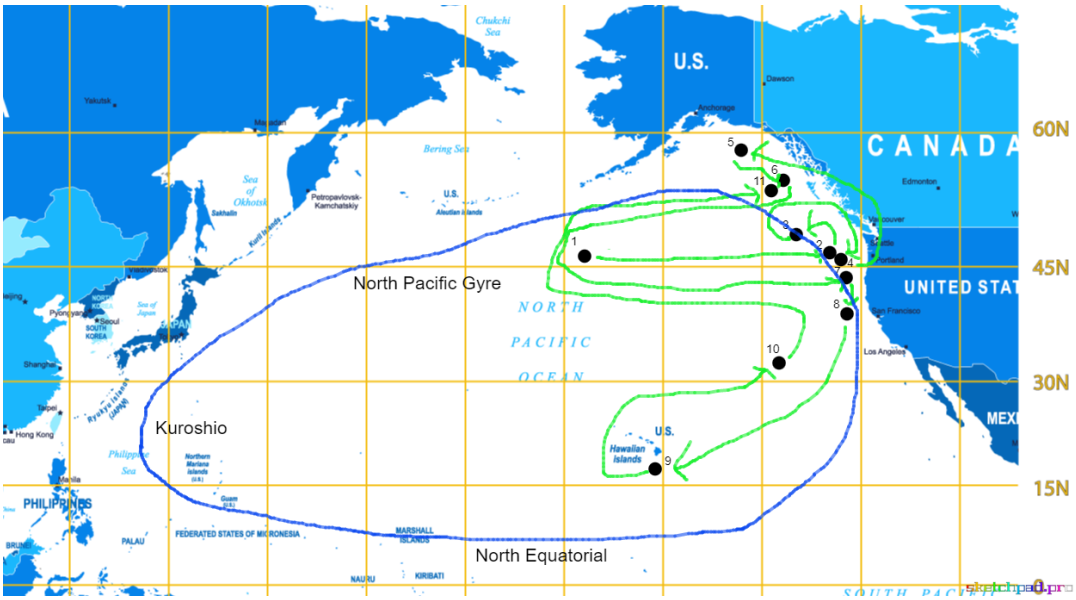
The main purpose of this lab was to find where items have gone in the ocean after falling overboard.

Hypothesis: (2 points)

If more shoes fall into ocean, then more locations will find shoes appearing on their shorelines.

Procedure: (8 points)

On the map below, locate and mark the locations of shoes provided in the data table. You may print your map and mark it by hand or copy it to a program to edit. Label each data point in chronological order from 1 to 11 on the map and connect the data points with arrows.



I did the best I could to plot everything accurately.

***Data**:*

	Event	Date	Latitude	Longitude
1	Nike shoe spill	May 27, 1990	48°N	161°W
2	200 shoes found	November 1990	49°N	126°W
3	100 shoes found	February 1991	53°N	131°W
4	200 shoes found	February 1991	47°N	125°W
5	250 shoes found	March 26, 1991	59°N	139°W
6	200 shoes found	May 18, 1991	55°N	130°W
7	150 shoes found	April 4, 1991	44°N	124°W
8	200 shoes found	May 9, 1991	40°N	124°W
9	Several shoes found	January 1993	19°N	155.5°W
10	Several shoes found	January 1994	32°N	132°E
11	Several shoes found	April 1996	54°N	133°W

Conclusion: (20 points)

1. Define the following terms: (2 points)
    a. **Current –** the movement of water from one location to another.
    b. **Gyre –** a system of circular ocean currents.

2. Using the map and the data points, what can you conclude about the general pathway the shoes took? (2 points)

    According to the map, the shoes travelled within the North Pacific Gyre.

3. Compare the pathway of the shoes to the map showing the major surface currents in the Pacific. Which current(s) did the shoes most likely encounter? Add these to your map above. (2 points)

    The shoes most likely encountered the North Pacific Gyre (like I said before). They also probably encountered the North Equatorial and Kuroshio currents as well.

4. Which data point is an outlier? What may have happened to this batch of shoes? (2 points)

    Points 9 and 10 (more specifically 9) appeared to be outliers. These batches of shoes must have gotten broken apart at a way different time than the others did.

5. How fast did the shoes travel? (4 points)
    a. From where the shoes spilled (48°N, 161°W) to where they first made landfall (49°N, 126°W), how many kilometers did they travel? How many days did they take to travel that distance? (You can use November 30 as the date found). What was their rate of travel in kilometers per hour?

I'm going to be honest here, I had to look up how to do this, I'm not much of a math person.

d = distance

t = time (days)

v = Rate of travel (km/h)

<u>How far (distance):</u>

$d = \sqrt{((49 - 48)^2 + (126 - 161)^2)} =$ 35.01 km

<u>How many days:</u>

t = 5 days + (30)*(3) + (31)*(3) = 188 days

188 * 24 = 4512 hours

<u>Rate of travel (km/h):</u>

v = 35.01 / 4512 = 0.00776026152 or 7.76×10^{-3} km/h

    b. From where the shoes spilled (48°N, 161°W) to where they were found in 1996 (54°N, 133°W), how many kilometers did they travel? How many days did they take to travel that distance (use April 30 as the date found)? What was their rate of travel in kilometers per hour?

Like I said before, I had to look up how to do this, I'm not much of a math person.

d = distance

t = time

v = Rate of travel (km/h)

l l

l l

v v

How far (distance):

$d = \sqrt{((54 - 48)^2 + (133 - 161)^2)} = 28.63$ km

How many days:

t = 5 days + (30)*(4) + (31)*(6) + 29 + (365)*(4)+ (366)*(1)= 2165 days

2165 * 24 = 51960 hours

Rate of travel (km/h):

v = 28.63 / 51960 = 0.000551108545 or 5.51×10^{-4} km/h

6. The shoes traveled faster than the rubber ducks and bath toys. Propose a hypothesis to explain the why the shoes traveled faster and develop a plan to test your prediction. (2 points)

Well, when I think of a shoe in real life compared to a bath toy, a shoe is much heavier than a bath toy is.

Therefore, since the shoes are heavier than the bath toys are, they will sink more. Because of the fact that they sink more than the toys, the shoes will travel faster.

To test this prediction, you can use a wave pool to put a shoe and a duck in. Then you can measure how fast each item moves from one point to another point.

7. The shoes floated low in the water, while the ducks floated high in the water. How could this fact have changed the course and speed of both the shoes and the ducks? (2 points)

When the shoes are lower, they do have a higher change of coming into contact with things like animals (which can slow them down). Since the ducks are higher, they have a lower chance of this happening.

8. Give a possible explanation why some shoes drifted northward along the coast while others drifted southward. (2 points)

It all depends on the location and the currents. Since there are all sorts of different currents in the ocean, some caught on to one while others caught on to another (each current going a different direction). Therefore, this is why the shows went different ways.

9. Your friend has invited you onto her family's boat for a day of fishing. After lunch on the boat, your friend wants to throw a bag of trash overboard. After researching the impact currents have on objects, explain what you would do in this situation and why. (2 points)

I would highly advise my friend not to toss that bag into the ocean, do it after we're done with boating. By throwing that trash into the ocean, you're throwing that into the habitat of many marine organisms. That trash can harm them. Also, that trash can be stuck in the ocean for a long time, which would bring trouble to all the place it goes (as it'll visit lots of places in the ocean).