

## Lost at sea – the amazing journeys of rubber ducks around the world Studying ocean currents following the Friendly Floatees ocean spill

In January 1992 the container ship *Ever Laurel*, after leaving Hong Kong harbour, was caught in a severe storm. One of its shipping containers, full of rubber toys, fell overboard and nearly 29,000 floating toys called Friendly Floatees spilled into the ocean. These included yellow ducks, blue turtles, red beavers and green frogs. As they drifted away, their long and amazing journeys around the world began, beginning an unintentional experiment on surface sea currents.



Oceanographer Curt Ebbesmeyer with the Friendly Floatees.  
Photo by Jim Ingraham/NOAA Fisheries  
<http://oceanmotion.org/html/research/ebbesmeyer.htm>

Some months later the toys began reappearing. Hundreds of ducks and other Floatees washed up on beaches of Alaska on the west coast of North America, in August/September 1992; more and more were found in the same area until the following summer. In 1995 a Floatee finding was

reported on the coast of Washington State in the USA and, in 1996, another was found on the Hawaiian Islands.

Eventually the case of the Friendly Floatees attracted the attention of oceanographers, when they realised that they could be used to plot the paths of surface ocean currents. The Floatees gave evidence for the “Five Gyres” and of the “plastic islands” in different oceans. The toy company (*The First Years, Inc.*) even offered a reward for the findings. In the 2000s, after a long “silence”, more Friendly Floatees showed up unexpectedly in the Atlantic Ocean along the east coast of Maine in the USA and finally, in 2003-2007 on beaches in Scotland and England in the UK.

This activity asks pupils to map the locations of some of the findings in chronological order and so to predict the possible routes followed by the toys, with the help of a map of surface ocean currents.

Give pupils the location of the first two steps of the ship’s journey:

1. Hong Kong, China, early January 1992, latitude 21°N, longitude 110°E (start)
2. North Pacific Ocean, January 10, 1992, latitude 45°N, longitude 178°E (toy container lost at sea)

Using the printed world map on page 4, ask the pupils to mark each of the two locations, and add the date. Then ask them to predict the possible route of the floating toys. Are they likely to stay in the North Pacific Ocean? Could they move to the South Pacific Ocean or to other ocean basins?

Then give the pupils the table below showing the locations of the Friendly Floatee findings and ask them to mark them on the map in chronological (time) order.

Date	Location name	Latitude	Longitude
November 1992	Sitka, Alaska, USA	57°N	136°W
December 1992	Sitka, Alaska, USA	57°N	136°W
February 1993	Chichagof Island, Alaska, USA	58°N	137°W
April 1993	Yakutat, Alaska, USA	60°N	140°W
May 1993	Cordova, Alaska, USA	62°N	145°W
May 1994	Shumagin Island, Alaska, USA	55°N	170°W
June 1994	St. Paul’s Islands, Alaska, USA	57°N	170°W
June 1995	Olympic Peninsula, Washington, USA	46°N	124°W
July 1996	Kure Island	28°N	176°W
March 1997	Lanai Island	21°N	157°W

Between the first two steps (i.e. Hong Kong harbour and the location of the loss of the container) and the first coastal findings, the longitude data change from East to West.

- Ask the pupils to explain the reason for this change.
- Ask them to draw on their map the possible paths of the toys from the location of the loss of the container to the locations of the single findings.

Show pupils a map of ocean surface currents (e.g. [https://it.m.wikipedia.org/wiki/File:Ocean\\_current\\_2004.jpg](https://it.m.wikipedia.org/wiki/File:Ocean_current_2004.jpg)) and ask them to draw the likely routes of the toys, taking into account the directions of the ocean currents,

- Are the new routes straight or curved?

- Do they travel clockwise or counter clockwise?
- Ask the pupils possible reasons for the patterns of the currents.

In 1994, 1998, 2001, and 2004, more toys appeared on the Sitka beaches in Alaska, showing that some had travelled around a circular current (gyre) in the North Pacific Ocean up to four times.

- Ask the pupils to calculate the average number of years needed by the toys to complete a full rotation (gyre).

In 2003 more new findings were reported from the locations in the table below.

Date	Location Name	Latitude	Longitude
July 2003	Maine coast, USA	44°N	68°W
August 2003	Aird, Isle of Skye, UK	57°N	6°W
July 2007	Devon coast, UK	51°N	4°W

Ask the pupils to mark the new locations on the map in chronological order.

Ask them to imagine how Floatees could have reached the Atlantic Ocean. How could the toys have moved through the frozen Arctic?

After the 2007 report, no new findings were reported by the media. Ask the pupils for ideas about the possible fate of the toys, taking into account their weathering due to seawater, waves, sun and ice.

### The back up

**Title:** Lost at sea – the amazing journeys of rubber ducks around the world.

**Subtitle:** Studying ocean currents following the Friendly Floatees ocean spill.

**Topic:** Using a real case to study ocean surface currents.

**Age range of pupils:** 12 years upwards

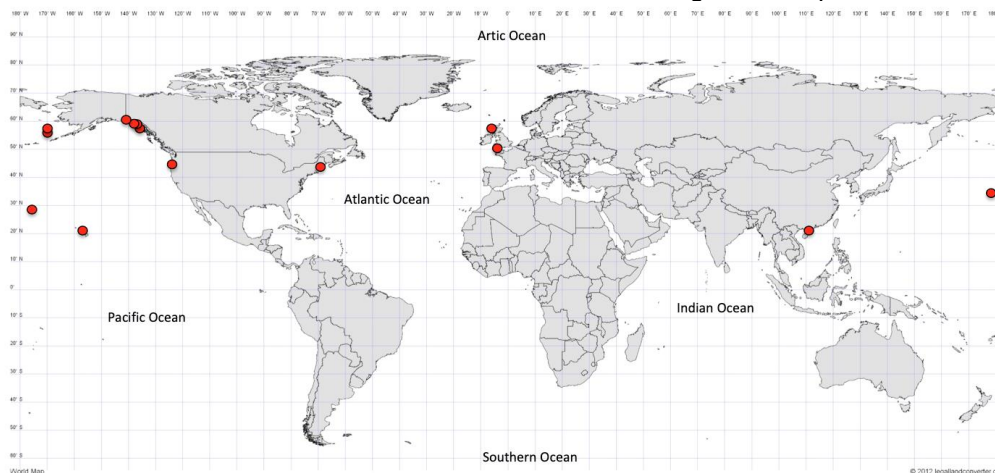
**Time needed to complete activity:** 50 mins

**Pupil learning outcomes:** Pupils can:

- use the geographical coordinate system to locate a place on a map;
- describe the existence of ocean surface currents;
- predict the routes of ocean surface currents;
- test their hypotheses and explain about the Coriolis effect;
- explain about the connection of all oceans through ocean currents.

**Context:**

The activity provides an opportunity to address the topic of ocean circulation by means of a real case reported by the media, and to promote awareness of the connections between local and global sea pollution.



World map with the locations quoted in the text  
Image: [wiki-travel.com](http://wiki-travel.com), free of use

**Following up the activity:**

Teachers can use the activity also to address the problem of marine litter, and particularly, of plastics and micro-plastics in the marine environment.

**Underlying principles:**

- Despite the different names of the oceans, there is only one water mass circulating throughout the Earth’s surface.
- Major ocean currents rotate, due to the Coriolis effect caused by the spinning of the Earth.
- Ocean currents transport energy and matter in all oceans.
- Plastics and other floating litter are transported by surface currents and gyres can produce the well-known ‘plastic islands’.

**Thinking skill development:**

Through this activity pupils will face cognitive conflict due to the different ocean names (Atlantic, Pacific, Indian, Arctic and Southern) and discover that ocean basins are all connected by water currents. From the study, they will understand that all kinds of matter (litter and other pollution, CO<sub>2</sub>) entering the sea will be distributed around the world (bridging). Moreover they will have the opportunity to reflect on their habits about waste management and disposal (metacognition).

**Resource list:**

- world map (format A4)
- table with the locations of the Friendly Floatees findings
- pencils
- access to a map of ocean surface currents

**Useful links:**

[https://www.weather.gov/jetstream/currents\\_max](https://www.weather.gov/jetstream/currents_max) (interactive ocean currents map).  
<https://earth.nullschool.net/#current/ocean/surface/currents/orthographic=-107.99,67.91,360> (ocean current dynamic visualisation tool).

**Source:** Giulia Realdon, modified from Laura Eidietis, Sandra Rutherford, Margaret Coffman and Marianne Curtis (2008) Duck, Duck, DATA! Eastern Michigan University and University Corporation for Atmospheric Research  
[https://www.windows2universe.org/teacher\\_resources/ocean\\_education/DuckDuckData.pdf](https://www.windows2universe.org/teacher_resources/ocean_education/DuckDuckData.pdf).

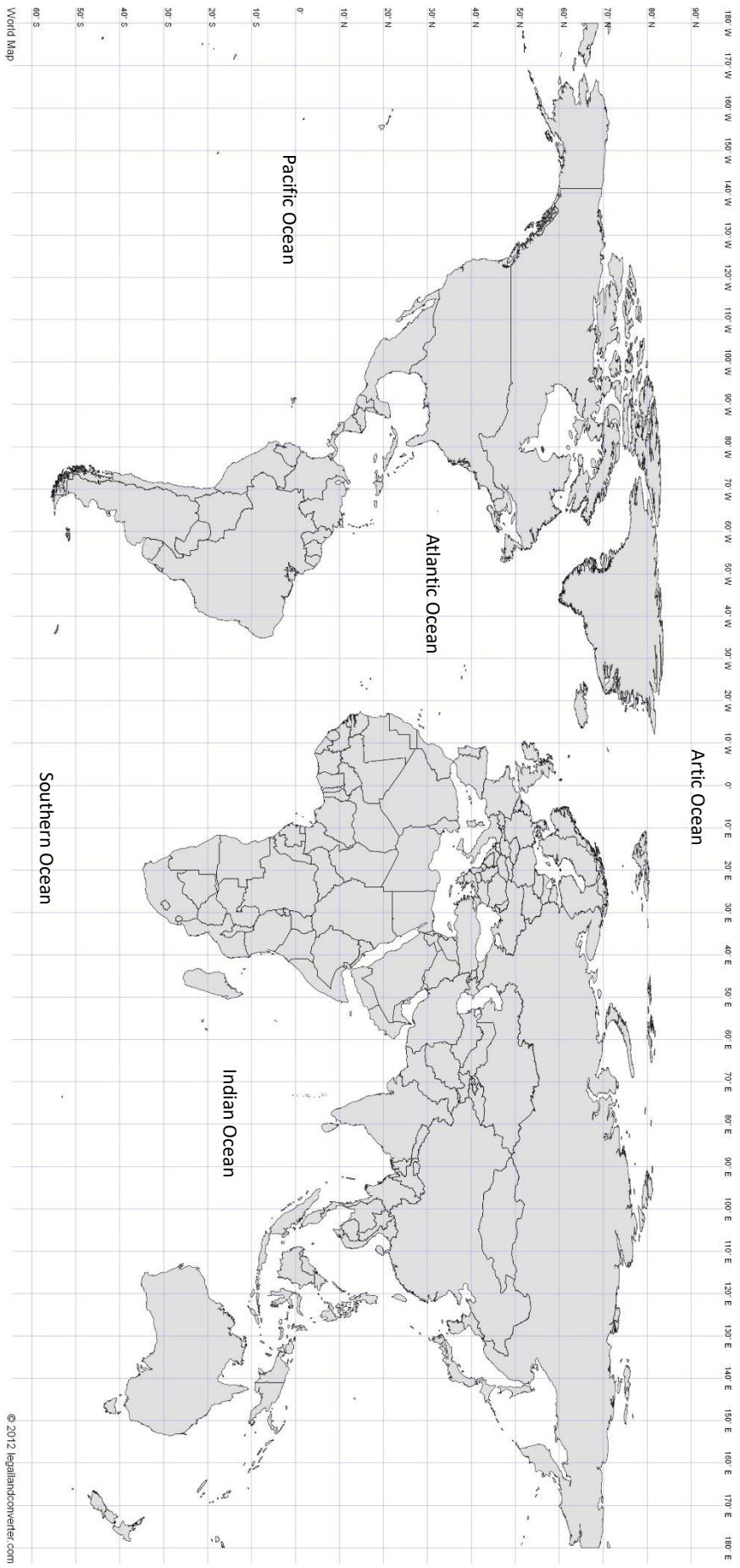
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**Full table of the findings of the Friendly Floatees**

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# WORLD MAP



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World Map (Miller Cylindrical Projection): [wiki-travel.com](http://wiki-travel.com), image free of use