



ECHO'S NEWTON TAKES A SPIN!

Lake Champlain to  
the World's Lakes!

math



Map Source: Lehner, B. & P. Doll (2003). Birkett, C.M. & I.M. Mason (1985). Commonwealth of Australia-Geoscience Australia (1990), ESRI (2003).

Major World Lakes

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My Name

# Graph It!

1. Lake Peipsi is the largest **transboundary** lake in Europe. Make a pie chart to show how 44% of the Lake belongs to the Republic of Estonia and 56% to the Russian Federation.

2. What countries and states share Lake Champlain?

- A. \_\_\_\_\_
- B. \_\_\_\_\_
- C. \_\_\_\_\_
- D. \_\_\_\_\_

3. The approximate Lake Champlain water levels from the Rouses Point, NY gage in 2005 are listed below. Graph the data to see if you can find a pattern. Don't forget to label the x and y axis.

January = 96.5 ft.	July = 97.0 ft.
February = 96.0 ft.	August = 96.5 ft.
March = 95.7 ft.	September = 95.5 ft.
April = 98.5 ft.	October = 96.5 ft.
May = 98.3 ft.	November = 98.8 ft.
June = 97.4 ft.	December = 99.5 ft.

A. Do you think we broke any records?

\_\_\_\_\_

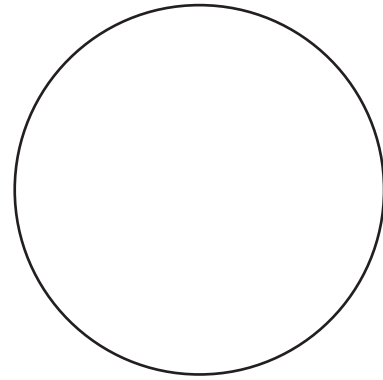
B. What was the average lake level?

\_\_\_\_\_

4. Chart the depths of the following lakes in the pool graphic. Don't forget your labels!

Baikal	5,712 ft.
Champlain	420 ft.
Crater Lake	1,949 ft.
Issyk-kul	2,303 ft.
Malawi	2,316 ft.
Tanganyika	4,826 ft.
Toba	1,736 ft.

TITLE: \_\_\_\_\_



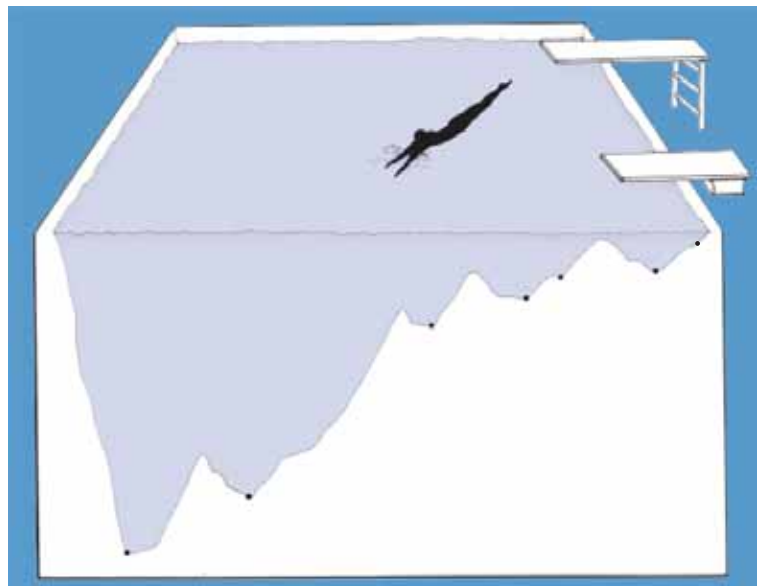
KEY:



\_\_\_\_\_



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## Hanging Around Or On The Go?

1. Water takes about 3.3 years to flow through Lake Champlain, but 330 years to flow through Lake Baikal (Russian Federation). This is known as the water's **residence time**. Can you think of two reasons why this happens so quickly in Lake Champlain, but takes so long in Lake Baikal, the largest freshwater lake by volume?

A. \_\_\_\_\_

B. \_\_\_\_\_



## Math Madness!

Try these whacky math problems to discover real data about the World's lakes.

1. The land elevation of Lake Titicaca (Peru, Bolivia), the highest navigable lake in the world is:

$$(3000 \times 3) + 1844 + 1659 = \boxed{\phantom{0000}} \text{ ft.}$$

2. Great egrets were found nesting along Lake Champlain for the first time in:

$$(11,287 + 529 + 208) \text{ divided by } 6 = \boxed{\phantom{0000}}$$

3. The percent of the world's liquid surface freshwater held in Lake Baikal is:

$$26,980 \text{ divided by } 71 \text{ divided by } 19 = \boxed{\phantom{0000}} \%$$

4. The length of the *Lois McClure*, the sailing canal boat built by the Maritime Museum that sailed from Lake Champlain to New York City, in 2005 is:

$$(7 \times 5 \times 2) + (2 \times 3 \times 3) = \boxed{\phantom{0000}} \text{ ft.}$$

5. The approximate age of Lake Superior, measured in years (just like Lake Champlain) is:

$$10 \times 10 \times 10 \times 10 = \boxed{\phantom{0000}}$$

**Did you know? The Great Lakes contain one-fifth of the World's liquid, surface freshwater!**

## Collecting Data

Scientists, students and other lake lovers collect data from lakes all around the world. **Meteorologists** use lake and river level data to warn people when there might be a flood. **Aquatic biologists** use **macroinvertebrate** data to know if there's enough food in the stream for the trout they are release from nearby hatcheries. Do you use tools to collect data in your neighborhood (maybe outdoor thermometers or rain gauges)? How do you use the data you collect? Would a farmer use the data any differently?

Psst... you can use the U.S. Geological Survey instruments to collect Lake data at ECHO! Go to the Lake side of ECHO and look for the sign that shows you how to collect the data. Or, check out the data online at: [vt.water.usgs.gov/echo\\_gage/](http://vt.water.usgs.gov/echo_gage/).

## Wanted: Problem Solvers!

1. If the speed of a Lake Champlain ferry averages 10 miles per hour and the trip is 20 minutes long, how many miles does the ferry travel on a one way trip from Charlotte, VT to Essex, NY?

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2. Lake Baikal is the deepest lake in the world at 5,712 feet deep. If a submarine dives in a straight line to the bottom at a speed of 15 feet/second, how many minutes will the submarine take to reach the bottom?

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3. A simple equation to measure a Lake's surface area is:

$$\text{Length (miles)} \times \text{Width (miles)} = \text{Area (miles}^2\text{)}$$

A. Lake Champlain is 120 miles long and is 12 miles wide at its widest point. What is Lake Champlain's surface area?

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B. Go to this page on the LCBP website: [www.lcbp.org/Atlas/HTML/nat\\_lakefax.htm](http://www.lcbp.org/Atlas/HTML/nat_lakefax.htm). What is listed for the Lake Area?

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C. Why is your answer different from what is listed online? Think about the shape of Lake Champlain.

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### BONUS ACTIVITY ABOUT AREA:

Go to this page on the LCBP website: [www.lcbp.org/Atlas/BlankMaps/Lake\\_Champlain.pdf](http://www.lcbp.org/Atlas/BlankMaps/Lake_Champlain.pdf) and print out the map. Tape the map to a window and trace it onto a piece of graph paper. Count the number of squares that are in the Lake. Use your best estimate for partial squares. How many squares does Lake Champlain cover? Is this a better way to measure area than the equation in Question 3? Why? (Use a separate sheet of paper for your answers.)

## "Kul" Terms:

### **Aquatic biologist:**

A scientist that studies the relationship between living organisms and water.

### **Macroinvertebrate:**

Animals without backbones that are large enough to be observed without a microscope.

### **Meteorologist:**

A scientist who studies the atmosphere, including weather and climate.

### **Residence Time:**

The length of time water remains in a waterbody.

### **Transboundary:**

Across borders; in this case a lake that crosses two or more countries.

*\*Kul is the word for lake in Kyrgystan. It is pronounced like the word "cool."*

## Websites:

[www.lcbp.org](http://www.lcbp.org)

[www.echovermont.org](http://www.echovermont.org)

[vt.water.usgs.gov/echo\\_gage](http://vt.water.usgs.gov/echo_gage)

[www.worldlakes.org](http://www.worldlakes.org)

[www.epa.gov/kids/water.htm](http://www.epa.gov/kids/water.htm)

**About NEWTon:** NEWTon is the trademarked mascot of ECHO at the Leahy Center for Lake Champlain on Vermont's Burlington Waterfront. NEWTon represents the Lake Champlain Basin's native red-spotted newt.

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