



# Add & Subtract with Hudson River Shipping

*Students will practice addition and subtraction skills by tracking the movements of ships, tugboats, and barges on the Hudson River estuary.*

**Objectives:** Students will solve word problems that require them to:

- read and interpret data from a table;
- add and subtract to calculate distances traveled by vessels on the Hudson;
- add and subtract using hours and minutes to determine elapsed time required by vessels to move between river milepoints.

**Grade level:** Elementary (Grades 3-5)

**Subject Area:** Math, Social Studies (Geography)

**New York State Learning Standards:**

Mathematics, Science, & Technology Standards 1, 2, 3  
Social Studies Standard 3

**Skills:**

- Interpret data from a table.
- Use whole numbers to identify locations and measure distances.
- Add and subtract whole numbers.
- Apply mathematics in real world settings.
- Reason mathematically.

**Duration:**

Preparation time: 5 minutes

Activity time: 30 minutes

**Materials:** Each student should have:

- Worksheet: Add & Subtract with Hudson River Shipping
- Hudson River Miles map
- Pencil

## Background:

The Hudson River is a major shipping route for oil, grain, cement, and road salt. A small unit of any of these products has little worth; transporting huge loads by water minimizes shipping costs. By volume and value, petroleum products are the most important cargos on the river; tanker barges are the most common commercial vessels. Ships carry gypsum to wallboard factories in Rensselaer, Verplanck, and Haverstraw. Road salt also arrives by ship. Powdered cement goes downriver in barges. Stone quarried in Ulster, Dutchess, and Rockland Counties is pushed downriver in scows (barges without a deck over their cargo area).

The Port of Albany is the destination of many vessels seen on the Hudson. Scrap metal is shipped in and out of Albany, as is wood pulp. Heavy equipment leaves the port on heavy lift vessels. Containers are barged between Albany and New York Harbor. Food products are also carried on ships. Grain goes in and out of Albany while cocoa beans and molasses come in from points south. Raw sugar is barged from Florida to a refinery in Yonkers.

Distances on the Hudson are often measured in Hudson River Miles. Hudson River Miles start at the southern tip of Manhattan. This spot, called The Battery, is River Mile 0. The estuary part of the Hudson ends at the Federal Dam in Troy at River Mile 153.

## Activity:

1. Introduce the Hudson River Miles system; show students the Hudson River Miles map.
2. Discuss the kinds of ships and cargoes seen on the Hudson.
3. Go over the worksheet with the class, or assign as in-class work or homework.

## Assessment:

- Have students share answers to questions from worksheet, or collect and grade sheets.
- Make up similar elapsed time/distance problems for quiz.

## Vocabulary:

**barge:** a wide, flat-bottomed boat that is pushed or towed by other boats to transport goods

**factory:** a building or set of buildings with machinery for making products

**gypsum:** a colorless mineral that consists of calcium sulfate occurring in crystals or masses

**Hudson River miles:** distance measured north from the Battery at Manhattan's southern tip

**tugboat:** a strongly built, powerful boat used to tow or push other vessels

**vessel:** a boat, ship, or other craft used for travel on water

**wallboard:** a building material made in large stiff sheets to form interior walls and ceilings; often called sheetrock

## Resources:

Photos and dimensions of the barges described in this activity, as well as many tugboats commonly seen on the Hudson, can be viewed at the websites of the Bouchard Transportation Company <http://www.bouchardtransport.com/HomePage.htm> and the Reinauer Transportation Company <http://www.reinauer.com/RTCWeb/DesktopDefault.aspx?tabindex=4&tabid=3>.

# Add & Subtract with Hudson River Shipping: ANSWER KEY

## Add & Subtract with Hudson River Shipping

On October 6, 2004, students recorded information about vessels they saw on the river. Use this table of their observations to answer the questions below.

		Vessels: Time Seen/Direction of Travel			
		<i>Gypsum Baron</i>	<i>Bouchard B#35</i>	<i>Alice Oldendorff</i>	<i>RTC 120</i>
Hudson River Miles/Town	HRM 124/Stuyvesant		11:30 AM/south	1:02 PM/south	
	HRM 115/Athens			1:35 PM/south	9:00 AM/south
	HRM 97/Ulster				10:30 AM/south
	HRM 87/Esopus				11:17 AM/south
	HRM 61/Beacon		4:45 PM/south		
	HRM 18/Yonkers	9:45 AM/south			
	HRM 7/Manhattan	10:45 AM/anchored			



The Alice Oldendorff passes Stuyvesant (photo by Doug Reed)

- The ship *Alice Oldendorff*, 633 feet long, carries road salt and **gypsum**.
  - How long did the *Alice Oldendorff* take to go from Stuyvesant to Athens?  
 $\underline{\text{33 minutes}}$       $1:35$       $1 \text{ hour } 35 \text{ minutes}$   
 $\underline{- 1:02}$       $\underline{- 1 \text{ hour } 2 \text{ minutes}}$   
 $0 \text{ hours } 33 \text{ minutes}$
  - How many miles did the *Alice Oldendorff* travel between those two points?  
 $\underline{\text{9 miles}}$       $124 - 115 = 9$

2. The *Gypsum Baron*, 495 feet long, carries gypsum to **wallboard factories** on the Hudson at Haverstraw, Buchanan, and Rensselaer.

(a) How many miles did *Gypsum Baron* travel from Yonkers south to Manhattan?

$$\begin{array}{r} \underline{\mathbf{11 \text{ miles}}} \\ 18 \\ - 7 \\ \hline 11 \text{ miles} \end{array}$$

(b) How long did it take *Gypsum Baron* to make the trip?

$$\begin{array}{r} \underline{\mathbf{1 \text{ hour}}} \\ 10:45 \\ - 9:45 \\ \hline 1 \text{ hour} \end{array} \quad \begin{array}{r} 10 \text{ hours } 45 \text{ minutes} \\ - 9 \text{ hours } 45 \text{ minutes} \\ \hline 0 \text{ minutes} \end{array}$$

(c) Using your answers from (a) and (b), how fast was the *Gypsum Baron* going in miles per hour? **11 miles per hour**



*A tugboat pushes the RTC 120 past Poughkeepsie. The barge is empty, so it floats high in the water.*

3. The tanker **barge** *RTC 120*, 405 feet long, carries oil. Tugboats push or pull the barge through the water.

(a) How long (in hours and minutes) did it take *RTC 120* to go from Athens to Ulster?

$$\begin{array}{r} \underline{\mathbf{1 \text{ hour}, 30 \text{ minutes}}} \\ 10:30 \\ - 9:00 \\ \hline 1 \text{ hour } 30 \text{ minutes} \end{array} \quad \begin{array}{r} 10 \text{ hours } 30 \text{ minutes} \\ - 9 \text{ hours } 0 \text{ minutes} \\ \hline 1 \text{ hour } 30 \text{ minutes} \end{array}$$

(b) How long did it take *RTC 120* to go from Ulster to Esopus? **47 minutes**

$$\begin{array}{r} 11:30 \\ - 10:30 \\ \hline 1 \text{ hour } 0 \text{ minutes} \end{array} \quad \begin{array}{r} 11 \text{ hours } 17 \text{ minutes} \\ - 10 \text{ hours } 30 \text{ minutes} \\ \hline 47 \text{ minutes} \end{array} \quad \begin{array}{r} 10 \text{ hrs} + (60 + 17) \text{ min} \\ - 10 \text{ hours } 30 \text{ minutes} \\ \hline 10 \text{ hours } 77 \text{ minutes} \\ - 10 \text{ hours } 30 \text{ minutes} \\ \hline 47 \text{ minutes} \end{array}$$

(c) How many miles did *RTC 120* travel between Athens and Esopus?

$$\underline{\mathbf{28 \text{ miles}}} \quad 115 - 87 = 28 \text{ miles}$$

Name \_\_\_\_\_ Date \_\_\_\_\_

4. The tanker barge *Bouchard B#35*, 338 feet long, also carries oil.

(a) A football field is 300 feet long from one goal line to the other. Is the *Bouchard B#35* longer than a football field? no Xyes

How much longer? 38 feet

$$\begin{array}{r} 338 \\ - 300 \\ \hline 38 \text{ feet} \end{array}$$

(b) How long did it take *Bouchard B#35* to go from Stuyvesant to Beacon?

5 hours, 15 minutes

4:45 PM          16 hours 45 minutes  
-11:30 AM      -11 hours 30 minutes  
                                 5 hours 15 minutes

(c) How many miles did *Bouchard B#35* travel between the two places?

63 miles           $124 - 61 = 63 \text{ miles}$



*A tugboat brings a tanker barge to an oil tank farm in Troy. Since the barge is loaded with oil, it floats low in the water.*