Snapshot Day Lesson Plan – Addition and Subtraction with Ships

**Summary:** Students will use mathematical reasoning to determine elapsed times and distances covered by commercial shipping traveling the Hudson River on Snapshot Day 2004. The lesson can easily be adapted to use data from this year’s Snapshot Day event.

**Objective:** Students will:
- Correctly read data from a table
- Use addition and subtraction skills to determine distances traveled by vessels.
- Add and subtract using hours and minutes to determine elapsed time required by vessels to travel between river milepoints.

**Subject Area:** math, geography

**Grade Level:** elementary

**Standards:** Mathematics, Science, & Technology Standards 1, 2, 3

**Skills:** interpret data; use whole numbers to identify locations and measure distances; add and subtract whole numbers; apply mathematics in real world settings; reason mathematically

**Vocabulary:**
Barge, gypsum, Hudson River Mile, ship, tugboat, vessel

**Duration:**
Preparation time: 5 minutes; activity time: TBD - estimated 30 minutes

**Materials:**
student worksheet - Addition and subtraction with Hudson River shipping (1 per student)
Pencil

**Background:**
The Hudson River is an important shipping route for bulky cargoes like oil, grain, powdered cement, and road salt. A small unit of any of these cargoes has little value; shipping them in high quantities
volume by water is the best way to minimize the cost of transportation relative to the value of the cargo. Ships and tugboats pushing or pulling barges are common sights on the Hudson. Many of these vessels are going to or coming from the Port of Albany. By volume and value, petroleum products are the most important commodities shipped on the Hudson.

The Hudson is measured in river miles, with 0 being at the Battery at the southern tip of Manhattan Island. The George Washington Bridge is located at Hudson River Mile [HRM] 12, the Mid-Hudson Bridge and Poughkeepsie at HRM 75, and Albany at HRM 145.

**Activity:**
Introduce the concept of Hudson River Miles to students. Discuss the kinds of ships and cargoes that they might see on the Hudson. The worksheet can be done as a group in class, assigned as in-class work, or sent home as homework.

**Assessment:**
- Share answers to questions from worksheets;
- make up similar elapsed time/distance problems for quiz.

**References:**

**Answers:**

1. **Alice Oldendorff**
   - 1:02 pm to 1:35 pm
   - HRM 124 to HRM 115
   - 33 minutes
   - 9 miles
   - reached Manhattan

2. **RTC 120**
   - 9:00 am to 10:30 am
   - 1:30 am to 11:17 am
   - HRM 115 to HRM 87
   - 1 hour 30 minutes
   - 47 minutes
   - 28 miles

3. **Bouchard B#35**
   - 11:29 am to 4:45 pm
   - HRM 124 to HRM 61
   - 5 hours 16 minutes
   - 63 miles
   - Yes, longer than a football field by 38 feet

4. **Gypsum Baron**
   - HRM 18 to HRM 7
   - 9:45 am to 10:45 am
   - 11 miles
   - 1 hour
   - 11 miles per hour

Submitted by the Hudson River Estuary Program
Addition and Subtraction with Hudson River Shipping
Student Worksheet

This table lists several vessels seen by students studying the Hudson River on October 6, 2004. It shows where these vessels were seen, when they were seen, and in what direction they were going. Use the information in the table to answer the questions below.

<table>
<thead>
<tr>
<th>Hudson River Mile location</th>
<th>7 Manhattan</th>
<th>18 Yonkers</th>
<th>61 Beacon</th>
<th>87 Esopus</th>
<th>97 Ulster</th>
<th>115 Athens</th>
<th>124 Stuyvesant</th>
</tr>
</thead>
<tbody>
<tr>
<td>ship Gypsum Baron</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ship Alice Oldendorff</td>
<td></td>
<td></td>
<td></td>
<td>1:35pm</td>
<td></td>
<td>1:02pm</td>
<td></td>
</tr>
<tr>
<td>tanker barge Bouchard B#35</td>
<td></td>
<td></td>
<td>4:45pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tanker barge RTC 120</td>
<td></td>
<td></td>
<td></td>
<td>11:17am</td>
<td>10:30am</td>
<td>9:00am</td>
<td></td>
</tr>
</tbody>
</table>

1. The ship *Alice Oldendorff*, 633 feet long, carries gypsum (a mineral used to make wallboard, also called sheetrock) and rock salt to the Port of Albany. This photo shows the ship by Nutten Hook on its southbound trip on the Hudson River on Snapshot Day 2004.

   (a) How long did it take the *Alice Oldendorff* to go from Stuyvesant to Athens?
(b) How many miles did the Alice Oldendorff travel between those two points?

(c) If this ship continued in the direction it was going, would it have reached Manhattan or Albany, which is at HRM 145?

2. The tanker barge RTC 120, 405 feet long, carries oil. It has engines for pumping oil on and off the barge, but not to move it through the water - a tugboat does that. It belongs to the Reinauer Transportation Company, as does the tugboat and barge below.

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

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

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

3. The tanker barge Bouchard B#35, 338 feet long, also carries oil along the Hudson.

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

(d) How many miles did Bouchard B#35 travel between the two sites?

(e) A football field is 300 feet long from one goal line to the other goal line. Is the Bouchard B#35 longer than a football field? How much longer?
4. 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 to Manhattan?

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

   (c) How fast was the *Gypsum Baron* going (in miles per hour)?