Tens! Hundreds!! Thousands!!! of Tons

Students will practice mathematics skills using information about ships visiting the Port of Albany on the Hudson River.

Objectives: Students will solve problems that require them to:

- read and interpret data from a table;
- use estimation in finding solutions involving large numbers;
- compute average loads of ships docking in Albany;
- recognize that ships play a role in transportation and commerce in the Hudson Valley.

Grade level: Elementary (Grade 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 tables.
- Use rounding and estimation to find reasonable answers.
- Calculate the mean for a given set of data.
- Apply mathematics in real world settings.
- Reason mathematically.

Duration:

Preparation time: 5 minutes
Activity time: 30 minutes

Materials: Each student should have:

- ☐ Worksheet: Tens! Hundreds!! Thousands!!! Of Tons
- ☐ Pencil
- ☐ Calculator

Background:
The Hudson River is a major shipping route for oil, grain, cement, and other commodities. A small unit of any of these products has little worth; transporting huge loads by water minimizes shipping costs.

The Port of Albany is the destination of many vessels seen on the Hudson. The largest grain export elevator east of the Mississippi loads ships with grain brought to Albany by rail. Molasses brought to the port is mixed with grain to produce feed for livestock. Road salt also arrives by ship, as does wood pulp. Scrap metal is shipped out of Albany. Heavy equipment – windmill blades, generators, and turbines – enters and leaves the port on heavy lift vessels.

While oil is not included in data on cargoes handled at the Port of Albany (the tank farms located in the area are privately owned), gasoline, heating oil, jet fuel, and other petroleum products are – by volume and value – the most important cargos on the Hudson River. Tankers and tanker barges bring oil to Albany, and carry ethanol, brought in by rail, to refineries elsewhere in the Northeast, where it is blended into gasoline. Also not included in the data are the frequent shiploads of gypsum brought to a wallboard (sheetrock) factory in Rensselaer, across from Albany.

Activity:
1. Discuss the kinds of ships and cargoes seen on the Hudson.
2. As needed, review skills (estimating; calculating means) required to answer the questions.
3. Point out that some questions require gleaning data from more than one table.
4. 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.
- Use other data from the table to make up similar problems for quiz.

Vocabulary:
bulk carrier: a ship that carries large amounts of raw or minimally processed materials
cargo: the goods or materials carried on a ship
generator: a machine that produces electricity from mechanical energy
machinery: sets of parts connected in ways that transmit force to do work
turbines: an engine in which water, air, or other liquids or gases rotate a shaft

Resources:
Information about the Port of Albany is available at the Albany Port District Commission's website http://www.portofalbany.com .
Line drawings and descriptions of types of ships seen on the Hudson and New York Harbor can be viewed at http://www.worldtraderef.com/WTR_site/cargo_vessels.asp

Tens! Hundreds!! Thousands!!! Of Tons: ANSWER KEY

1. For each of the cargoes listed below, write whether it is unloaded at Albany, loaded at Albany, or both.

grain_____***loaded***_____ heavy lift____***loaded & unloaded***__

molasses_____***unloaded***_____ salt_____***unloaded***_____

scrap iron_____***loaded***_____ steel/pipe_____***unloaded***_____

wood pulp_____***unloaded***_____

2. To fill in the blanks below, estimate using information in Tables 1 and 2.

_steel/pipe__ More tons of this cargo were unloaded in Albany than of any other cargo unloaded there from January to June.

___grain____ More tons of this cargo were loaded at Albany than of any other cargo loaded from January to June.

__January___ More tons of cargo were loaded at Albany in this month than in any other month in this time period.

3. Use data from the three tables to answer the following questions. Write each question out in numerical form, then answer it using a calculator.

(a) How big was the average load of grain loaded at Albany in January?

63,519 *(from Table 2)* ***÷ 3*** *(from Table 3)* ***= 21,173 tons***

(b) How big was the average load of scrap iron loaded at Albany between January and June, 2008?

(22,014 + 27,180 + 20,561 + 15,101 + 17,509) ÷ 5 = 20,473 tons

(c) From January to June 2008, what was the average load per month of wood pulp unloaded at the Port of Albany?

(2,930 + 3,400 + 2,187 + 7,283 + 3,280) ÷ 6 = 3,180 tons

(d) Assuming that salt is worth $70 per ton, what was the value of the salt unloaded at Albany in February?

34,532 x 70 = $2,417,240