Intermodal Problem (Multiple Modes)

EDUCATIONAL LEVEL: Grades 5 - 6
LENGTH: 2 - 3 Class Periods
CURRICULUM: Math
OBJECTIVES: Student will be able to choose the least costly mode or combinations of modes of transportation to move products.

MATERIALS:
1. paper
2. pencil
3. vocabulary and terms related to intermodal transportation
4. Teacher Resource:***Transportation*** by Dr. Anthony Schwaller, Professor and Chairperson, Department of Industrial Studies, St. Cloud State University
5. Teacher Resource: ***Thompson Learning Tools*****,** Chapters 1-2
6. Speakers: Contact Minnesota Department of Transportation (651) 657-3688

PROCEDURE:
1. Move 100,000 tons of cement from Davenport, Iowa to St. Cloud, Minnesota. Davenport is on the Mississippi River. You have a choice of moving this bulk product by barge, truck, rail or combination (intermodal) of them.

INFORMATION ABOUT CHOICES:

A. A truck can move 25 tons at a time and the direct cost would be $20 per ton.

B. A railroad car can hold 100 tons and a 100 car train can carry 10,000 tons. The direct cost by this mode would be $10 per ton, plus $1 per ton to unload in St. Cloud.

C. A barge can carry 1500 tons and tow barges (15) can carry 22,500 tons in one trip at a cost of $5 per ton as far as Minneapolis. This is the end of the commercial navigation on the river. From here, the cement would have to be transferred to truck at a cost of $1.00 per ton. The last 70 miles by truck would cost $3.95 per ton to be delivered in St. Cloud. Assuming that this is not a "just in time" movement and there is adequate storage in St. Cloud, what is the least costly mode or combination of modes to deliver this shipment of cement.

POINTS TO DISCUSS:
1. Students should discuss what they discovered for each scenario.

Pictures on next page---

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