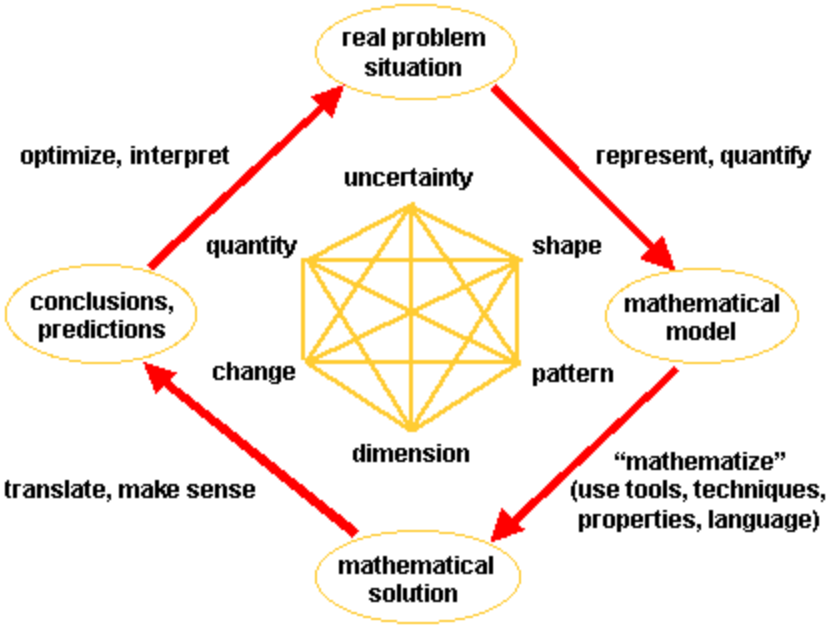
Intermodal Challenge

LEARNING AREA: Mathematical Concepts and Applications
EDUCATIONAL LEVEL: Middle School
CONTENT STANDARD: Chance and Data Handling

A student shall:

1. Evaluate and solve problems, including calculating basic measures of center and variability, to demonstrate understanding of basic concepts of probability and calculate simple probabilities;
2. Formulate a question and design an appropriate data investigation;
3. Organize raw data and represent it in more than one way;
4. Analyze data by selecting and applying appropriate data measurement concepts;
5. Critique various representations of data;
6. Devise and conduct a simulated probability situation; and
7. Predict future results based on experimental results.

Large Processes and Concepts:



NEXT STEP: Assessment Task

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Intermodal Challenge

Assessment Task-----

Description:

Intermodal Challenge is designed to challenge the student to think beyond a single mode of transportation, and to incorporate a chain of ideas to a successful trip, using the best means possible. It is up to the student to decide which mode of transportation is the best, and which one will get the job done. The challenge in all of this is to see which student can plan the cheapest, fastest, and shortest route possible.

Products/Evidence of Learning:

1. Development of route
2. Use of different sources
3. Completion of assignment

Overview:

Each student is to make a path from Los Angeles, California to the mouth of the St Lawrence river. Using as many means of transportation as possible and finding the quickest route.

Students will be in charge of:

1. Making a route from L.A. to the river mouth
2. Researching distances
3. Researching modes of transportation facilities available
4. Calculating and recalculating their information to minimize cost, mileage and time

Given only the basics of information, each student should be able to determine how many of each vehicle one would need to complete this assignment. In theory, the student would be competing with each other to see who can find the fastest, shortest, and cheapest route there. No two answers have to be the same; it is an individual or group effort to achieve this result. Time allowed should be somewhere between a week to around two weeks, depending on the internet connection availability in the classroom. Needed information for assignment:

1. Number of miles one ton can be carried per gallon of fuel
  A. Truck 59 miles
  B. Rail 202 miles
  C. Barge 514 miles
2. Total capacity in tons per vehicle
  A. Truck 25 tons
  B. Rail 100 tons
  C. Barge 1500 tons
3. Total amount of load to be moved from L.A. to the mouth of the river (6000 tons)
4. Assume that all modes of transportation use the same fuel (use current diesel fuel prices)
5. Each student is in charge of paying the drivers or captains (ten dollars per hour plus fuel costs)
6. Maximum number of hours a truck can run is ten hours a day
7. Maximum number of hours a captain is allowed to move is ten hours, but more then one captain is allowed on the train or ship
8. Each student much use all three modes of transportation at least once (for them to decide when and where the exchanges of product takes place).
9. Research on certain exchanges and use of real train lines, road and waterways.

NEXT STEP: Checklist

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Checklist-----

STUDENT	TEACHER	
_____	_____	Number of tons per mile carried by train
_____	_____	Number of tons per mile carried by barge
_____	_____	Number of tons per mile carried by truck
_____	_____	Fuel price used
_____	_____	Hours documented
_____	_____	Use of all three modes of transportation
_____	_____	Research on actual exchange points

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