Lesson Plan Title: “Let’s Take a Trip!”

Local School District: Symmes Valley
Grade Level: 6th Grade
Teacher Name: Becky Bowling

Estimated Total Time: 3 hours
Daily Time Allocation: 45 minutes
Number of Days: 4 days

National Standards:


Mathematic Benchmarks and Indicators by Grade Level (http://www.ode.state.oh.us/academic_content_standards/word/Math_Benchmarks_and_Indicators_by_Grade_Level.doc)

Ohio Standards Connections:
Ohio Standards, Benchmarks, and Indicators (http://www.genevaschools.org/standards/#math)
Mathematics Academic Content Standards (http://www.ode.state.oh.us/academic_content_standards/acsmath.asp)

• Key Standard(s), Benchmarks, and Grade Band(s):
  Standard:
  Number, Number Sense, and Operations
  Benchmark (5–7):
  Use a variety of strategies, including proportional reasoning, to estimate, compute, solve, and explain solutions to problems involving integers, fractions, decimals, and percents.

Grade Level Indicators:
Standard: Number and Number Sense Operations

Grade 3, 15. Evaluate the reasonableness of computations based upon operations and the numbers involved (e.g., considering relative size, place value, and estimates).

Grade 4, 7. Recognize that division may be used to solve different types of problem situations and interpret the meaning of remainders (e.g., situations involving measurement, money).
Grade 4, 9. Estimate the results of computations involving whole numbers, fractions and
decimals, using a variety of strategies.

Grade 4, 11. Develop and explain strategies for performing computations mentally.

Grade 4, 12. Analyze and solve multi-step problems involving addition, subtraction,
multiplication, and division using an organized approach, and verify and interpret results with
respect to the original problems.

Grade 4, 13. Use a variety of methods and appropriate tools for computing with whole numbers
(e.g., mental math, paper and pencil, and calculator).

Grade 4, 14. Demonstrate fluency in adding and subtracting whole numbers and in multiplying
and dividing whole numbers and in multiplying and dividing whole numbers by 1- and 2-digit
numbers and multiples of ten.

Grade 6, 13. Estimate reasonableness solutions to problem situations involving fractions and
decimals.

Grade 6, 14. Use proportional reasoning, ratios and percents to represent problem situations and
determine the reasonableness of solutions.

**Standard 2 Measurement:**
Grade 7, 4. Solve problems involving proportional relationships and scale factors (e.g., scale
models that require unit conversions within the same measurement system).

Grade 7, 5. Analyze problem situations involving measurement concepts, select appropriate
strategies, and use an organized approach to solve narrative and increasingly complex problems.

Grade 5, 5. Make conversions within the same measurement system while performing
computations.

- **Benchmark (5–7):**
  B. Convert units of length, area, volume, mass, and time within the customary
  system of measurement.

  E. Use problem-solving techniques and technology as needed to solve problems
  involving length, weight, perimeter, area, volume, time, and temperature.

**Grade Level Indicators (5–7):**
4. Solve problems involving proportional relationships and scale factors; scale models that
require unit conversions within the same measurement system.

5. (a). Make conversions within the same measurement system while performing computations.
5. (b). Analyze problem situations involving measurement concepts, select appropriate strategies, and use an organized approach to solve narrative and increasingly complex problems.

Mathematical/Scientific Processes:
Grades(s) – 6:
• **Problem Solving:** Apply and justify the use of a variety of problem-solving strategies (e.g., make an organized list, guess and check).
• **Reasoning:** Check for reasonableness before you leave each step of your problem.
• **Connections:** Connect this project to real-life application for family planning.

• **Other Related Benchmarks:**
  **Standard: Number, Number Sense, and Operations**
  **Benchmarks (3–4):**
  J. Estimate the results of whole number computations using a variety of strategies, and judge reasonableness.
  K. Analyze and solve multi-step problems involving addition, subtraction, multiplication and division of whole numbers.
  L. Use a variety of methods and appropriate tools (mental math, paper and pencil, calculators) for computing with whole numbers.

**Lesson Summary:**

*Describe what students will know, understand, or be able to do after this lesson.*

Students are planning a trip for a family of four.

Students will be choosing their best travel plan by studying maps, considering different routes, visiting Web sites to get airline and travel schedules. Students will be able to use ratios and proportions as well as changing from fractions to decimals to percents to solve problems involving rate of speed, distance in miles, and cost with different modes of transportation (budget), and finding cost effectiveness on a trip to another destination of their choosing. The trip must be able to be made by land or air within the North American continent. They will be discussing the best features of each travel made. This lesson integrates mathematics, social studies, technology, and family planning.

**Preassessment:**

*Describe how you will know what knowledge/skills students already have related to the concepts being taught in this lesson.*

Students will have already reviewed how to read the scale of miles on a map and how to use it. They also will have figured the average price for a gallon of fuel in their community. They will be familiar with Internet sites to assist them in their search such as MapQuest.com, Travelocity.com, AAA, as well as airline accommodations. Show the students the use of the SmartBoard for presentation purposes if one is available.
Can students calculate distances effectively? A KWL define may be used if teacher feels it is necessary.

- **Scoring Criteria:**
  Students will explain by comparison, the most cost effective mode of transportation to reach their chosen destination. Students will be given the option of using the overhead or SmartBoard to make their presentations to the class.

**Postassessment:**
*Describe how you will determine the level of student understanding of the concepts in the lesson.*

- **Cost comparison:**
  I will question students and ask them to explain all of their findings with a presentation to the class. They will be given a chart/table to be used to answer three questions (one multiple-choice, one short answer, and one extended response). They may use the overhead projector or SmartBoard to present their findings. Students should give a convincing argument to defend their choice of trips.

- **Scoring Criteria will include:**
  1. Explanation of findings to class by way of overhead or SmartBoard using attached table (see Appendix).
  2. Each research team will be graded on their findings by all other research teams together using calculations for algorithms.
  3. Showing understanding of project by answering of attaching multiple-choice, short answer, and extended response answers (see Appendix). Rubric scoring is attached.

**Interdisciplinary Connections:**
Social Studies, Technology, Geography, and Family and Life Planning

**Material and Resources Needed:**
*Products that need to be copied, collected, or created. Use box to indicate status.*

- Transparency film for copier
- Rubric for assessment (multiple-choice, short answer, extended response)
- United States/Canada/Mexico maps
- Computers with Internet access
- Overhead projector
- SmartBoard (needs to be online)
- Table with different modes of transportation
**Procedures:**

*Describe step-by-step instructions for the illustrative activities and specific methods for developing the lesson.*

First, introduce students to the lesson and have a group discussion on skills covered so far this year that will be integrated into project such as proportional reasoning, scale, unit analysis, and interest search.

Second, students will find a destination and calculate total miles. Then research different routes and means of transportation to get there such as car, train, air, etc. Students will work together in groups of to research and gather their data.

Finally, they will calculate the cost of two means of transportation, advantages and disadvantages of each, and make a comparison by calculating the best route and cost. Students will have access to the Internet for research and measuring devices as needed. Students should have to present to the rest of the group convincing arguments with their results to support their choices.

**Differentiated Instruction Strategies:** ([http://www.teach-nology.com/tutorials/teaching/differentiate/bottom_line/](http://www.teach-nology.com/tutorials/teaching/differentiate/bottom_line/))

*Describe changes that may be needed in depth, breadth, and pace of the lesson to accommodate unique learner needs.*

- **Intervention:** Students may need my assistance in checking airline prices and finding the best sites for mapping their trip. If students do not have Internet access at home, time in the lab will be provided as can be scheduled.

- **Enrichment:** Students will answer “why” questions such as “Why use air travel as opposed to ground transportation?” or “Why do you think your destination should be chosen?”

Students will also give several attributes, sites, and amenities of their choice of destination to convince the class that “This is the place to go!”

**Extension:**

*Describe how newly gained knowledge, understanding, or skill can be extended through context or application.*

- Students will apply this in the real world to determine cost and to plan their family vacations as well as favorite vacations.
- Ask students to write a descriptive paragraph on why they chose the destination they chose in their math journals.
- Students could possibly do a WebQuest to place on the school Web site.
- Students could share some of their travel experiences with the class.

**Homework Options and Home Connections:**
Research the Internet to help assist family in vacation plans by helping figure the cost and reason for vacation choices.

**Key Vocabulary:**
- MapQuest ([http://www.mapquest.com/](http://www.mapquest.com/))
- Proportional reasoning ([http://www.nde.state.ne.us/NMSI/mathvantage/proportional/](http://www.nde.state.ne.us/NMSI/mathvantage/proportional/))
- Scale
- Unit analysis
- Unit conversions
- WebQuest

**Technology Tips:**
If the Internet is down at school, use the lab when available or computers in the library. SmartBoard instruction is needed either by peers or myself. Suggest the program WebWhacker, which can download an Internet site to be used by the students.

**General Tips:**
Delegate specific jobs for each group member. Allow calculators for algorithms. Make sure one person in the group is familiar with or has been briefly schooled on Internet site search engines and research.

**Research Connections:**
[http://www.priceline.com](http://www.priceline.com) will help as a back-up research.


NCREL – (North Central Regional Educational Laboratory) ([http://www.ncrel.org/](http://www.ncrel.org/))

**Teacher Reflections and Notes:**
Not enough time was allotted. I would arrange the schedule to allow for more time for this project. Students need to be reminded to check for reasonableness in their calculations. Wonderful project! Students learned some neat stuff about vacation destinations.
Other Web Resources:

Travel.com: http://www.travel.com/
Travelweb: http://www.travelweb.com/tvlw_web/jsp/index.jsp
Amtrak: http://www.amtrak.com/
Metra: http://www.metrarail.com/
Greyhound: http://www.greyhound.com/
Comparison Table of Modes of Transportation

**Destination**

<table>
<thead>
<tr>
<th>Travel Variables</th>
<th>Automobile</th>
<th>Train</th>
<th>Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance (miles)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time (hours)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost per Mile (Dollars)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments or explanations:

Cost must be calculated from the same departure point.
Questions on Unit

“Let’s Take a Trip”

1. If your family drove 650 miles in 9 ½ hours, what is the best estimate for the rate of speed?
   A. 50 mph
   B. 55 mph
   C. 60 mph
   D. 65 mph

2. Using the map, what is the distance in miles between Columbus, Ohio, and St. Paul, Minnesota? How many gallons of gas will it take to drive it?

3. Using the information on your table, answer the following questions: (8 pts.)
   A. What’s an advantage of flying to your destination?
   B. Calculate the average speed by air.
   C. What is the cost per mile of each mode of transportation: automobile, train, and air?
   D. Give two reasons why you chose the mode of transportation you did.

   A. ____________________________________________________________

   ____________________________________________________________

   B. ____________________________________________________________

   C. ____________________________________________________________

   D. ____________________________________________________________
“Let’s Take a Trip”

Rubric

9–11 points: Has an understanding of the goal of the project.
   Has clear and precise explanation and reasoning.

8–10 points: Has a reasonable understanding of the task expected but has some incomplete concepts and/or understanding of questions. Intervention is necessary to relate expectations of task.

5–7 points: Attempts to answer and/or explain the ideas and reasoning of the lesson but ideas are illogical or show a lack of understanding of task requested.

Under 5 points: Missing important information and shows little relationship between the explanations and requested task.

Total Score: ____________