

Data Does It: Planning a Trip

3-5 Data and Probability

i-Plan

8 Lessons: 45 minutes each

Overview: In this i-Plan, teams of students plan trips. To put together their best travel plan, students study a map, consider different routes, visit websites to get airline schedules and costs, and analyze their data. Each team presents its travel schedule and budget to the class. Then teams analyze the different plans and discuss the best features of each one. Students collect data, organize data, and compute differences of multi-digit numbers. This lesson also integrates Social Studies and Art.

Mathematical Content: The sequence of lessons in this i-Plan builds skills required for collecting, displaying, and using data to solve problem situations. Students collect and use numerical data from the Internet to estimate and calculate travel costs, to evaluate travel plans that meet specified conditions and to analyze possible flight plans to determine the best value.

Using the Plan: This Internet i-Plan is a set of sequenced mathematical activities designed for use as an instructional unit. The purpose is to connect mathematical ideas and to develop understanding and application. To accomplish the instructional intent, it is recommended that this set of lessons be used in the suggested sequence. The time spent on each lesson will vary according to the needs of the students.

NCTM Standards:

Data Analysis and Probability Standard for Grades 3-5
(<http://standards.nctm.org/document/chapter5/data.html>)

Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.

- Design investigations to address a questions and consider how data-collection methods affect the nature of the data set.
- Collect data using observations, surveys and experiments.
- Represent data using tables and graphs such as line plots, bar graphs, and line graphs.

Select and use appropriate statistical methods to analyze data.

- Compare different representations of the same data and evaluate how well each representation show important aspects of the data.

Develop and evaluate inferences and predictions that

are based on data.

- Propose and justify conclusions and predictions that are based on data and design studies to further investigate the conclusions or predictions.

Number and Operations Standard for Grades 3-5

(<http://standards.nctm.org/document/chapter5/numb.htm>)

Compute fluently and make reasonable estimates

- Develop fluency in adding, subtracting, multiplying and dividing.
- Develop and use strategies to estimate the results of whole-number computations and to judge the reasonableness of results.
- Select appropriate method and tools for computing with whole numbers from among mental computation, estimation, calculators and paper and pencil according to the context and nature of the computation and use the selected method or tool.

Measurement Standard for Grades 3-5

(<http://standards.nctm.org/document/chapter5/meas.htm>)

Understand the need for measuring with standard units and become familiar with standard units in the customary and metric system

- Understand the need for measuring with standard units and become familiar with standard units in the customary and metric systems

Apply appropriate techniques, tools, and formulas to determine measurements

- select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature and the size of angles.

Problem Solving Standard for Grades 3-5

(<http://standards.nctm.org/document/chapter5/prob.htm>)

Apply and adapt a variety of problem solving strategies to solve problems.

Websites:

Travelocity

<http://www.travelocity.com>

Expedia

www.expedia.com

Students can sign on as guests to these websites, then follow on-screen directions to find the times and prices of available flights between any two cities.

Firstgov

http://firstgov.gov/state_gov/state.html

On this website students can visit a state government homepage by clicking on the name of the chosen state. This site offers multiple resources useful for Social Studies topics.

Mapquest

<http://mapquest.com>

At this website students can type a specific address to display a map. They can also observe the relationship between locations and their school.

50 States and Capitols

<http://www.50states.com>

This site allows students to access information about each of the 50 states of the United States and items of significance to each.

Disney Online

<http://www.disney.com>

Students can find information needed for this lesson including specific attractions in each of the theme parks.

National Council of Teachers of Mathematics

<http://standards.nctm.org/document/chapter5/data.html>

This URL identifies the Data Standard in the Principles and Standards document with specific examples for this grade band.

Materials:

Computer
Internet connection
Chart paper
Poster Board
Markers
Crayons
Teacher Assessment Tools
Student Recording Sheets

i-Plan Contents

Overview: The unit consists of eight lessons that build early understandings about collecting, organizing, and displaying data.

- Lesson 1:** **“Planning a Class Field Trip”**
This lesson focuses students’ attention on the variables used in planning trips.
- Lesson 2:** **“Presenting the Plan for a Class Trip”**
This session allows students to share the trips they have planned.
- Lesson 3:** **“Planning a Class Trip to a Local Attraction”**
In lesson 3 students apply knowledge about trip planning in a new context.
- Lesson 4:** **“Planning a Class Trip to the State Capitol”**
This lesson engages students in integrating mathematics with social studies.
- Lesson 5:** **“Planning a Trip to Disneyland or Disney World”**
This requires students to use the Internet to collect data for planning a trip involving air travel.
- Lesson 6:** **“Planning a Trip to Disneyland or Disney World, II”**
In this lesson students continue the investigation begun in Lesson 5.
- Lesson 7:** **“Choosing the Best Option”**
Students compare the trips they have planned.
- Lesson 8:** **“Looking Back and Moving Forward”**
This lesson is the Performance Assessment guide for this i-Plan.

Lesson 1: “Planning a Class Field Trip”

This lesson focuses students’ attention on the variables used in planning trips. It captures students’ interest, provides a review of the primary unit objectives, and assesses students’ prior knowledge. This experience enables students to consider the variables that must be accounted for in planning a class field trip. There are seven other lessons in this unit plan. The time spent on each lesson will vary according to the needs and abilities of your students but they have been designed to take about 45 minutes.

Learning Objectives:

- Students will select appropriate methods and tools for computing with whole numbers from among mental computation, estimation, calculators, and paper and pencil
- Students will model problem situations using a table

- Students will compute elapsed time and distance

Lesson Description:

While students remain in their seats, ask them to identify variables that must be considered when planning a class field trip. Some variables to remember are: time of trip, distance, duration, cost of transportation, cost of food, need for special permissions, and need for additional chaperones. Record and post this information on a chart for future reference. The students may add to this list in subsequent lessons.

Discuss with students how these variables affect decisions about the trip. Ask them to explain and defend their choices. Invite students to prioritize the variables from most to least important in planning a class trip and record the prioritized list. The priority value of any item will be determined by local circumstances. These recordings enable the teacher to see which variables students frequently attend to and provide information for instructional decisions and evidences to document student progress toward learning goals.

Students will consult a map and select information from some of the many Internet links that can be used to direct students to online maps. A state and its local tourism offices often maintain these sites. Sample addresses include: <http://www.arkansas.com>, <http://gocalil.ca.gov>, <http://visitdelaware.net>, and <http://commerce.state.nc.us/toursim>. You may wish to bookmark the pages relevant to your state and community before you begin this unit.

Assign the students into groups. Have them select a location for the field trip that is of interest and within driving distance of the school. Provide local maps so that students can determine the distance to the site and a copy of the school's field trip policy including costs. Using this information, students plan a local trip consistent with school policy. They need to include the cost, departure time, duration, return time, and other considerations. The work sheet provided will help them to organize their data.

As a piece of authentic writing, have students draft a permission slip and a request for chaperones.

Extension:

Ask the students to consider the variables required for planning a field to the same location for a group of Kindergarten students. Compare the list with the considerations listed by the class. Have students reflect on reasons why considerations differ between the two age groups. These reflections should be recorded and placed in each student's portfolio.

Guiding questions:

1. What type of transportation can we use?
[Sample responses include parent drivers, school bus, and public transportation,

and rent a private bus]

2. How can we keep travel costs down?
3. What time will we need to leave school to be there when the attraction opens?
4. What will be our schedule at the attraction?
5. What time do we need to leave the attraction to get back to school by departure time?
6. Everyone is bringing his or her own lunch. How much time should we plan in our schedule for lunch? When should we eat?

[Sample response: We can set aside 30 minutes for lunch.]

Assessment:

At this stage of the unit it is important to know:

- variables students attend to
- whether students can use all the variables to plan a trip
- if students can determine time duration and distance
- if students can compute using the data collected

The guiding questions help students focus on the mathematics and aid you in understanding the students' level of knowledge and skill with the mathematical concepts of this lesson. One of the assessment tools provided is a recording sheet entitled "Status of the Class". It is helpful to record students' current level of understanding as a way to plan instruction and to monitor and measure their growth toward meeting the learning objectives. Documenting information about student understanding throughout the lesson can help you focus on individual student needs and strengths, and thus can increase student learning opportunities.

The assessment information you collect can help you to monitor student learning, to adjust instruction, and to plan future lessons for the class. Data on individual students can be used to plan strategies for regrouping students, for remediation, and for extension activities. This information is extremely useful when discussing progress toward learning targets with students, parents, administrators, and colleagues.

Teacher Reflection Questions:

1. Which management strategies were most effective?
2. Which management strategies were least effective?
3. Which students met all the objectives of this lesson? What extension activities would be appropriate for those students?
4. Which students did not meet the objectives of this lesson? What instructional experiences do they need next? What mathematical ideas need clarification?
5. What adjustments would you make the next time you teach this lesson?

Lesson 2: "Presenting the Plan for a Class Trip"

During this segment, student groups present the plans they developed in the previous lesson. This provides the teacher an opportunity to review students' attainment of the

primary unit objectives and to assess students' current knowledge and skill level. This experience focuses students' attention on the mathematics needed in planning a short trip. It builds towards the application of these understandings and skills in the remaining segments of this unit plan. The lesson is planned to last about 45 minutes but the actual time will vary according to the needs and abilities of your students.

Learning Objectives:

- Students will display the data they collect
- Students will formulate questions based upon the data collected by other groups
- Students will defend the choice they made

Lesson Description:

Ask students to gather in the groups they worked in during the previous lesson and to prepare to present their travel plans to the class. Remind students to include their reasons for making the decisions that they did.

As each group reports, display its data in chart form using the attached worksheet. When all groups have reported, discuss with students the ways they collected their data and the decisions they made based on that data. Ask them to explain and defend their choices. Invite students to record the process in journal format. These recordings enable the teacher to see which variables students attended to most often and provide evidence to document student progress toward learning goals.

After each group's presentation, or after all groups have reported, invite the students to reconvene in their individual groups to formulate questions about each of the other groups' plans. Then compare the trip plans and ask group members how they arrived at their final plan. You may suggest that they specifically focus on how they decided what the distance was to their destination and how they figured the time needed for the trip.

Extension:

Ask students to draw a picture or write descriptions of the places they planned to visit. [This activity could address required curriculum goals and objectives such as descriptive writing and social studies topics.]

Guiding Questions:

1. How did you decide where to go? Did everyone in your group agree? If not, how did you come to an agreement?
2. How did you determine how long the trip would take? What did you need to take into account as you planned the departure time? The return time?
3. What helped you plan a schedule during the visit? Why did you choose those items?
4. Could you have had a different schedule?
5. How did you find the distance to the attraction? Could you do it another way?

Assessment:

At this stage of the unit it is important to know:

- which variables students attend to
- whether students can find distances
- if students can find elapsed time

The guiding questions help students focus on the mathematics applied in this unit and aid you in understanding the students' level of knowledge and skill with them. One of the assessment tools provided is a recording sheet entitled, "Status of the Class". You may find it helpful to record students' current level of understanding as a way to plan instruction and to monitor and measure their growth toward meeting the learning objectives. Documenting information about student understandings throughout the unit helps you focus on individual student's needs and strengths, and plan instructional activities to increase student-learning opportunities.

Data on individual students can be used to plan strategies for regrouping students, for remediation, and for extension activities. This information is extremely useful when discussing progress toward learning targets with students, parents, administrators, and colleagues.

Teacher Reflection Questions:

1. Which groups worked together most effectively? Would a different grouping strategy work?
2. Did students in each group contribute equally to the project? Did some students exhibit special strengths? Did some students exhibit reluctance to participate? Why?
3. Which students met all the objectives of this lesson? What extension activities are appropriate for these students?
4. Which students did not meet the objectives of this lesson? What instructional experiences do they need next? What mathematical ideas need clarification? What misconceptions did they demonstrate?
5. What adjustments would you make the next time you teach this lesson?

Lesson 3: "Planning a Class Trip to a Local Attraction"

This lesson builds on Lessons One and Two and encourages the students to work in groups and apply their knowledge about a trip in a new context. In this lesson, students plan a trip to a local attraction such as a museum, a site of historical or scientific significance, or business. They research times the attraction is open, its distance from the school and prepare a schedule which is displayed to inform as they solve an open-ended problem involving distance and time. This experience focuses students' attention on the mathematics needed in planning a trip and allows them to apply these understandings and skills in a group-selected context. The lesson has been planned to last about 45 minutes but the actual time will vary according to the needs and abilities of your students.

Students determine the distance to a local attraction others of their trip plans. A website which students can use to explore the attractions in their state is provided by the Library of Congress, www.Americaslibrary.gov. Material can be accessed for each state if the "Explore the States" button is selected.

Learning Objectives:

- Students develop a schedule for a one-day trip to a selected location
- Students prepare a display based on their calculations

Lesson Description:

To begin this class, ask students to brainstorm some of the places they might like to visit as a class. Record these locations where all students can see them. Then assign the students to small groups. These could be the groups students worked in previously or new groups. Have available some references students might use to plan a local trip such as phone books, advertising brochures or local newspapers. In addition, helpful material can often be found on the web by entering the name of your community into the search function. Explain that each group should choose a location and then prepare a schedule for a day's visit. Record this information on a poster to share with the class. A sample poster is provided at the end of this unit.

You may wish to review the concept of time duration if it is not well understood by the children. Since finding elapsed time requires working in a system other than base ten, you may wish review this before the children begin. Those who need a more concrete way to find elapsed time than calculation affords may wish to model the opening and ending times on a clock with movable hands.

Information on how to construct effective posters is available on the Marco Polo site ArtsEdge in the lesson, <http://artsedge.kennedy-center.org> "Poster of Your State". As each group finishes its task, display their posters. When all groups have finished, discuss with students the ways they collected information, how they determined distances and elapsed times. Then ask them to explain why they chose that site to visit and how they arrived at their schedules.

After all groups have reported, invite the students to compare the schedules to determine similarities and differences. You may want to call attention to the procedures followed when figuring elapsed time.

Extension:

Ask students to write to the places they chose to visit and request more information about them. Have students locate Chambers of Commerce websites to find information about other places of interest. Criteria for determining interest might be curriculum expectations and/or curricula topics required for your students. Students may develop a brochure or newspaper ad for the site they chose.

Guiding Questions:

1. How did you decide where to go? Did everyone in your group agree? If not, how did you come to an agreement?
2. How did you determine how long the trip would take? What did you need to take into account as you planned the departure time? The return time?
3. What helped you plan a schedule during the visit? Why did you choose the items you included?
4. How did you find the distance to the attraction? Could you do it another way?
5. If the attraction were twice as far away, how would that affect the schedule you developed?

Assessment:

At this stage of the unit it is important to know:

- which variable students attend to
- whether students can find distances from a map
- if students can find elapsed time
- if students can use elapsed time to plan a schedule

The guiding questions help students focus on the mathematics applied in this unit and aid you in understanding the students' level of knowledge and skill with them. You may want to add another entry to the recording sheet "Status of the Class" to document students' current level of understanding and to monitor their growth toward meeting the learning objectives. You may also wish to copy the schedules as a way to document the growth of student skills and understandings as they complete this part of the unit. You can store these student work samples in student's folders or portfolio.

Data on individual students can be used to plan strategies for regrouping students, for remediation, and for extension activities. Besides being useful to the teacher, they are a valuable addition to a portfolio that can be shared with parents, administrators, and colleagues.

Teacher Reflection Questions:

1. Which groups worked together effectively? Why?
2. Did the students in each group contribute equally to the project? Did some students exhibit special strengths?
3. Which students met all the objectives of this lesson? What extension activities are appropriate for those students?
4. Which students are still having difficulty with the objectives of this lesson? What additional instructional experiences do they need?
5. What adjustments would you make the next time you teach this lesson?

Lesson 4: "Planning a Trip to the State Capitol"

During this lesson, student groups will plan a trip to the state capitol. Depending upon your location, this may be an overnight trip or a day trip. Using the skills they

developed in the previous lessons, students determine not only elapsed time and distance, but extend their problem solving to figuring meals and lodging costs. As they tackle this more complex task, teachers have opportunity to observe students' growing competence. These include which variables students attend to, if students can find distances from a map, if students can find elapsed time or if students can use elapsed time to plan a schedule

If initial data is presented to the students, the lesson may take about 45 minutes. If the students collect the data themselves using the Internet or print resources, the actual time will vary according to the ability of your students to find the relevant information.

Web resources students might find useful are

<http://travelocity.com>

<http://mapquest.com>

<http://www.50states.com>

Learning Objectives:

- Students will determine the distance to the state capitol.
- Students will develop a schedule for a one-day visit to the capitol, including travel time and, if appropriate, lodging.
- Students will compare options for reducing the cost of the trip.
- Students will prepare a display based on their calculations.

Lesson Description:

To begin this class, ask students to locate the state capitol on a map. The website <http://50states.com> is an excellent site for state maps. Students might investigate this and other websites that describe the state capitol and review resources provided by the teacher or those from texts. Ask the students to imagine that they will visit the capitol as a class and that they will need to figure not only the distance and visitation schedule but also the cost of the trip. Ask them to estimate how long the trip will take and how much it will cost. Record these estimates for comparison later in the unit .

Assign students to small groups. These could be the groups they have worked in previously, or new group assignments. Have available some reference resources students might use to plan the trip such as maps, brochures, menus, hotel rates or newspapers. Explain that each group should plan a trip to the capitol then prepare a schedule for a day's visit. Record this information on a poster to share with the class. A sample-recording sheet, "Cost of Trip to the State Capitol", is attached.

Review the concept of time duration to prepare the students for group work and to check for individual student's understanding. You may wish to supply a variety of computation materials and the children select the ones most helpful to them. Some children will need to be reminded that when they regroup in a time duration calculation, they will be regrouping 1 hour to 60 minutes, not 1 ten to ten ones.

You may wish to do a few sample calculations as a class before the groups begin their own work.

As students work, circulate among them asking guiding questions and providing assistance as needed. This is a prime time to assess student progress by observing and asking questions. It may be appropriate to conduct “mini lessons” on topics such as problem-solving strategies, Internet usage, and group dynamics. Documenting the mini lessons will help you remember which students needed additional experiences in these areas.

As each group finishes its task, display their poster. When all groups have finished, discuss with students the ways they collected the data they needed and how they determined distances, costs, and elapsed times. Ask them to compare their schedules and costs with the estimates they made at the start of the lesson. Then ask students to explain ways they used to reduce the cost of the trip and how they arrived at their schedules.

Extensions:

You may wish to ask students to write to the members of their state legislatures for information about the state capitol. Mailing and email addresses can be found on the Web by locating the state government site for your state. One way to do this is to search for the state capitol by name on your web search function. In addition, you may wish to ask student to explore the websites of other states to see what information on the capitol is available. The Library of Congress site mentioned earlier is a most informative source.

Students may also wish to develop a brochure or travel poster about their state showing the state flower, bird, and a picture of the state quarter, if available. They could expand this brochure with information about the state’s history and its famous people.

Guiding Questions:

1. How did you decide how far the capitol was from the school? Did everyone in your group agree? If not, how did you come to an agreement?
2. How did you determine how long the trip would take? What methods did you use? What did you need to take into account as you planned the departure time? The return time?
3. How did you determine how much the trip would cost? What did you need to take into account as you planned the cost?
4. What helped you plan a schedule during the visit? Why did you make these choices?
5. How did you find the distance to the attraction? Could you do it another way?
6. If the capitol were twice as far away, how would that affect the cost of the trip? If the capitol were half as far away, how would that affect the cost?
7. How did you arrive at your estimates? Would you do it the same way again?

Assessment:

At this stage of the unit it is important to know:

- which variables students attend to
- whether students can find distances from a map
- if students can find elapsed time
- if students can use elapsed time to plan a schedule
- if students can compare costs to find a less expensive option

The guiding questions help you understand the students' current level of knowledge and skill. You may wish to record students' current level of understanding on the "Status of the Class" sheet as you continue to monitor student growth toward meeting the learning objectives. You may also wish to keep a copy of the students' schedules for their portfolios or for a class display.

Teacher Reflection Questions:

1. Which groups worked together most effectively? Have they developed the ability to work together as the unit progressed?
2. Did students in each group contribute equally to the project? Did some students exhibit special strengths?
3. Which student met all the objectives of this lesson? What extension activities are appropriate for those students?
4. Which students are still having difficulty with the objectives of this lesson? What additional instructional experiences do they need?
5. What would you do differently the next time you teach this lesson?

Lesson 5: "Planning a Trip to Disneyland or Disney World"

Using the website, student groups collect data to plan a trip to Disneyland or Disney World <http://disney.com>. [You may wish to substitute some other destination of high interest for your students.] In lesson 5 students plan the trip using data collected in this lesson. Depending upon your location, this may be an overnight trip or a day trip. Using skills they developed in the previous lessons, students determine not only elapsed time and distance, but extend their problem solving to figuring meals, lodging, and air travel. As they tackle this more complex task. Teachers have opportunity to observe students' growing competence with methods and tools for computation, estimation, problem posing and solving, interpretation of graphical representations, measuring with standard units, and responding to investigations that require the comparison of data sets. This lesson is designed to take approximately 45 minutes but time will vary according to the needs and abilities of your students.

Learning Objectives:

- Students will select appropriate methods and tools for computing with whole numbers from among mental computation, estimation, calculators, and paper and pencil
- Students will figure elapsed time
- Students will record information on a chart

Lesson Description:

To begin this class, ask students to locate both Disneyland and Disney World on a map, then have students visit the Disney website (www.Disney.com) that describes both attractions. Ask the students to imagine visiting one of the attractions as a class and tell them that they need to figure not only the distance and visitation schedule but also the cost of the trip.

Assign students to small groups. These could be the groups they have worked in previously or new group assignments. Have available reference resources students might use to plan the trip such as maps, brochures, menus [Students might consider restaurant chains represented in the area in which they live. Information about these are available on the Web by typing in the name of the restaurant chain and .com], hotel rates [Students might consider hotel chains represented in the area in which they live. Information about these are available on the Web by typing in the name of the hotel chain and .com], videos, or newspapers.

Explain that each group should plan a trip to one of the Disney attractions then prepare a schedule for the trip. In this phase, students will collect the data for accommodations, air travel, meals, tickets to the attractions, and incidental expenses. Information on the cost of air travel is available from www.travelocity.com or www.expedia.com as well as from the websites of the various airlines that serve your closest airport.

Record trip information on a chart to share with the class. Be certain that students provide information about lodging, meals, air travel, ground travel, and incidentals. You may wish to provide a brief review how to find elapsed time if it is not well understood by the students.

As each group finishes its task, display their poster. When all groups have finished, discuss with students the ways they collected the data they needed. After all groups have reported, invite the students to compare their data to determine similarities, and differences. You may want to call attention to the variety among the costs and the rationale for these differences.

Extension:

Have students to verify with school field trip policies under which conditions such a trip is feasible.

Guiding Questions:

1. How did you decide how far the two Disney attractions were from the school? Did everyone in your group agree? If not, how did you come to an agreement?
2. How did you determine how long the trip would take? What did you need to take into account as you planned the departure time? The return time?

3. Is it possible for the class to visit this location based upon school field trip policy? What additional considerations must be made for taking this trip that are not required for a trip to a local attraction?
4. How does the cost of the transportation provided by the school compare with public transportation that is needed for travel to the Disney attraction?
5. How did you determine the best selection of hotel, restaurants, airline, and ticket option?
6. What arguments would you use to defend this trip to the school board as an educational experience?
7. What flight information do you need? What is the difference between one-way and round-trip tickets?
8. When several airlines have flights to your destination, is the fare usually cheaper? Why do you think that is or is not so?
9. Does the day of the week and/or the time of day you choose to travel affect the cost of the fare?
10. From data you collected, what have you learned about the distance between cities and airfares? [Teacher note: Unlike car travel, often-longer flights are cheaper than shorter ones.]

Assessment:

At this stage of the unit it is important to know:

- which variables students attend to
- whether students can find distances from a map
- if students can use Internet resources to research options
- if students can compare costs to select best options
- if students can connect a trip of choice to curricular goals
- if students can prepare a convincing argument to defend their participation in this trip

The guiding questions help you understand the students' current level of knowledge and skill. You may wish to record students' current level of understanding on the "Status of the Class" sheet as you continue to monitor student growth toward meeting the learning objectives. You may also wish to keep a copy of the students' data for their portfolios or for a class display. In addition, you may choose to ask students to reflect in writing on the activities in this lesson. Checking to see if students can state how the mathematical skills they have learned in previous lessons enabled them to complete this one will help them develop a value for the mathematics they are learning.

Teacher Reflection Questions:

1. Which groups worked together most effectively? Have they developed the ability to work together as the unit progressed?
2. Did students in each group contribute equally to the project? Did some students exhibit special strengths?
3. Which student met all the objectives of this lesson? What extension activities are appropriate for those students?
4. Which students are still having difficulty with the objectives of this lesson?

- What additional instructional experiences do they need?
5. What would you do differently the next time you teach this lesson?

Lesson 6: “Planning a Trip to Disneyland or Disney World, Part Two”

During this lesson, student groups use data collected in the previous lesson to plan a trip to Disneyland or Disney World. Using skills they developed in the previous lessons, students determine not only elapsed time and distance, but extend their problem solving to figuring meals, lodging, air travel, and incidentals. As they tackle this more complex task. Teachers have opportunity to observe students’ growing competence with methods and tools for computation, estimation, problem posing and solving, interpretation of graphical representations, measuring with standard units, and responding to investigations that require the comparison of data sets. This lesson is designed to take approximately 45 minutes but time will vary according to the needs and abilities of your students.

Learning Objectives:

- Students will select appropriate methods and tools for computing with whole numbers from among mental computation, estimation, calculators, and paper and pencil
- Students will become familiar with standard units in the customary and metric system

Lesson Description:

To begin this class, put the students into the groups they were in for lesson five and ask them to refer to the data collected in the previous lesson. Remind students that the task for today is to plan a trip providing information regarding costs of food, lodging, travel, and incidentals. Have available resources from the previous lesson so students might refer to them as they plan their trip such as computers, maps, brochures, menus, hotel rates, videos, or newspapers.

Explain that each group should plan a trip to one of the Disney attractions then prepare a schedule for the trip. In this phase, students use the previously collected data for accommodations, air travel, meals, tickets to the attractions, and incidental expenses.

Have each group enter their data on a class chart to share with the class showing the group decisions about lodging, meals, air travel, ground travel, and incidentals and the total cost. You may wish to provide calculators so that the students can more easily do the computations.

When all groups have finished, discuss with students the ways they collected the data they needed and how they arrived at their decisions. After all groups have reported, invite the students to compare their data to determine similarities and differences apparent on the chart. You may want to call attention to the most and least expensive items and discuss the rationale for these differences.

Extension:

Additional challenges might include reporting on the investigation of the events that are the most popular and the added time required to wait for these features. Students should report on other events that have similar features so that the class can select whether to wait for popular attractions or choose alternative ones. Criteria for determining participation in some events might be their educational value based upon curricula goals for your students.

Guiding questions:

1. How did you determine how long the trip would take? What did you need to take into account as you planned the departure time? The return time?
2. How did you determine how much the trip would cost? How will you decide what each person will pay?
3. How many persons must share a hotel room in order to get the best price? How many will the hotel allow in each room?
4. Who will pay for the chaperones' expenses? Will the cost for adults be greater than for students in your class?
5. How does the cost of the transportation provided by the school compare with public transportation that is likely inevitable for travel to the Disney attractions?
6. How did you determine the best selection of hotel, restaurants, airline, and ticket option?
7. How can you defend this trip to the school board as an educational experience?

Assessment:

At this stage of the unit it is important to know:

- which variables students attend to
- if students can use Internet resources to research options
- if students can compare costs to select best options
- if students compute flexibly and fluently using a variety of strategies
- if students can connect a trip of choice to curricular goals
- if students can prepare a convincing argument to defend their participation in this trip

The guiding questions help you understand the students' current level of knowledge and skill. You may wish to record this information on the "Status of the Class" sheet as you continue to monitor student growth toward meeting the learning objectives. Ask students to reflect in writing on the problem solving strategies they used to prepare a trip plan.

Teacher Reflection Questions:

1. Which groups worked together most effectively? Have they developed the ability to work together as the unit progressed?
2. Did students in each group contribute equally to the project? Did some

- students exhibit special strengths?
3. Which student met all the objectives of this lesson? What extension activities are appropriate for those students?
 4. Which students are still having difficulty with the objectives of this lesson? What additional instructional experiences do they need?
 5. What information did students provide in their written reflections that you had not observed before? How did you frame a prompt to elicit information that would help you understand what students know about data and their ability to display and interpret data sets?
 6. What would you do differently the next time you teach this lesson?
 7. Are students able to explain their reasoning? Are their reasons logical?
 8. How do students decide upon shared responsibilities?
 9. Are students able to quantify, organize and/or record information?
 10. Were directions clear and usable by students? If not what adjustment would be appropriate for you to make?
 11. What new vocabulary did students use that might need to be reinforced in the next lesson?

Lesson 7: “Choosing the Best Option”

During this lesson, student groups use data collected in the previous lesson to select a plan for a trip to Disneyland or Disney World. Using skills they developed in the previous lessons, students determine not only elapsed time and distance, but extend their problem solving to figuring meals, lodging, air travel, and incidentals in order to select the best option. As students tackle this more complex task, teachers have opportunity to observe students’ growing competence with methods and tools for computation, estimation, problem posing and solving, interpretation of graphical representations, measuring with standard units, and responding to investigations that require the comparison of data sets. This lesson is designed to take approximately 45 minutes but time will vary according to the needs and abilities of your students.

Learning Objectives:

- Students will select appropriate methods and tools for computing with whole numbers from among mental computation, estimation, calculators, and paper and pencil
- Students will use charts to draw conclusions
- Students will become familiar with standard units

Lesson Description:

To begin this class, ask students to return to the groups they were in for the previous two lessons. Then they will refer to the data collected in the previous lesson. Remind students that the task for today is to select the best plan for their trip including costs of food, lodging, travel, tickets, and incidentals. Have available resources from the previous lesson so students might refer to them as they select the best option.

Explain that each group should select an option for a trip to one of the Disney attractions. In this phase, students use the data for all the variables using the trip plans recorded on chart during the previous lesson. A sample-recording sheet is provided at the end of this unit. Be certain that students compare information about lodging, meals, air travel, ground travel, and incidentals. You may wish to review the concepts that are not well understood by the students.

When all groups have finished, discuss with students the factors they considered in making choices. After all groups have reported, invite the students to compare their data to determine similarities and differences. You may want to call attention to the variety among the costs and ask each group to defend its rationale for the “best option”.

Extensions:

Additional challenges might include creating a list of activities, a timeline and list of persons to be responsible for each activity. They should include a plan for organizing and monitoring the distribution of responsibilities. Groups might also create an advertising brochure for the option they thought best. Actual brochures from a travel agency or advertisements from the local paper might be made available as models.

Guiding Questions:

1. How did you determine how long the trip would take? What did you need to take into account as you planned the departure time? The return time?
2. How did you determine how much the trip would cost? How will you decide what each person will pay?
3. Did other groups consider things your group did? Did other groups consider things that you did not?
4. How did you determine the best selection of hotel, restaurants, airline, and ticket option?
5. How could you defend this trip to the school board as an educational experience?

Assessment:

At this stage of the unit it is important to know:

- which variables students attend to
- if students can use Internet resources to research options
- if students are able to identify similarities and differences among various plans
- if students can compare costs to select best options
- if students compute flexibly and fluently using a variety of strategies
- if students can connect a trip of choice to curricular goals
- if students can prepare a convincing argument to defend their participation in this trip

Teacher Reflection Questions:

1. Which groups worked together most effectively? Have they developed the ability to work together as the unit progressed?
2. Did students in each group contribute equally to the project? Did some students exhibit special strengths?
3. Which students met all the objectives of this lesson? What extension activities are appropriate for those students?
4. Which students are still having difficulty with the objectives of this lesson? What additional instructional experiences do they need?
5. What information did students provide in their written reflections that you had not observed before? How do you frame a prompt to elicit information that will help you understand what students know about data and their ability to display and interpret data sets?
6. What would you do differently the next time you teach this lesson?

Lesson 8: “Looking Back and Moving Forward”

During this lesson, student use mathematical knowledge and skills developed in the previous lessons to demonstrate understanding and ability to apply that knowledge in a real-life context. As students tackle more complex tasks, teachers have opportunity to observe student’s competence with methods and tools for computation, estimation, problem posing and solving, collection of data, organization and interpretation of graphical representations, measuring with standard units, and responding to investigations that require the comparison of data sets. This lesson is designed to take approximately 45 minutes but time will vary according to the needs and abilities of your students.

Learning Objectives:

- Students will select appropriate methods and tools for computing with whole numbers from among mental computation, estimation, calculators, and paper and pencil
- Students will use charts to draw conclusions
- Students will become familiar with standard units

Lesson Description:

To begin this class, ask students to remember what they did in previous lessons. Remind them that today’s task is for individual students to plan a trip including costs of food, lodging, transportation, tickets for attractions, and incidentals. Students may choose the destination of their choice. If access to the Internet is limited for your students, this could be a project that students complete independently over a reasonable period of time.

Explain to students that although they worked in groups in former lessons, they will work independently today. Have available resources from the previous lessons so students might refer to them as needed. You may wish to review specific concepts that are not well understood by the students.

Students may reflect upon what they learned during the sequence of lessons in this unit. A sample reflection guide is provided at the end of this unit.

Extension:

An additional challenge might be to have students write a reflection on the planning process including identification of most influential factors. Students might also suggest the mathematical knowledge needed to complete the task and how this task might be useful in their personal lives.

Guiding Questions:

1. Why did you choose your destination? Who will be making the trip with you?
2. How did you determine how long the trip would take? What did you need to take into account as you planned the departure time? The return time?
3. How did you determine how much the trip would cost?
4. How did you determine the best selection of hotel, restaurants, airline, and ticket option?
5. How does group planning compare with individual planning?

Assessment:

At this stage of the unit it is important to know:

- which variables students attend to
- if students can use Internet resources to research options
- if students are able to identify similarities and differences among various plans
- if students can compare costs to select best options
- if students compute flexibly and fluently using a variety of strategies
- which data are important to review when planning a trip

The guiding questions help you understand the students' current level of knowledge and skill. You may wish to review the completed "Status of the Class" documents completed throughout this unit. These can guide Guiding Questions you pose for individual students. The primary assessment document is the written report prepared by the student. Since this is a summative assessment, limited assisted should be provided to students.

Teacher Reflection Questions:

1. Which groups worked together most effectively? Have they developed the ability to work together as the unit progressed?
2. Did students in each group contribute equally to the project? Did some students exhibit special strengths?
3. Which student met all the objectives of this lesson? What extension activities are appropriate for those students?
4. Which students are still having difficulty with the objectives of this lesson? What additional instructional experiences do they need?

5. What information did students provide in their written reflections that you had not observed before? How did you elicit information that will help you understand what students know about data and their ability to display and interpret data sets?
6. What would you do differently the next time you teach this lesson?

Looking Back:

1. What key ideas do the majority of the students apply consistently?
2. Which students met all the objectives of this unit? What extension activities are appropriate for those students?
3. Which students did not meet the objectives of this unit? What additional instructional experiences do they need?
4. What other learning experiences would help students compute elapsed time? Cost?
5. What knowledge and skills do students need to better construct a schedule?
6. Can students recognize the variables to be considered in planning a trip?
7. Can students explain and defend the procedures they use to develop a schedule or to plan a trip?
8. What were the greatest challenges for the most students?
9. Which portions of this I-Plan were the students most motivated to complete? Why?

This set of questions may help you determine the focus of your next instructional activities. Documenting the level of each student's understanding makes accurate information available for planning the appropriate subsequent instructional activities.

Moving Forward:

1. How can I help student focus on the important ideas in this and other mathematics lessons?
2. What other situations could I pose that would have meaning for the students?
3. What other learning experiences will help students develop and answer questions about duration and distance?
4. How might I connect the key ideas of this unit with lessons about similar mathematics content?
5. What learning experiences that we routinely use would help students develop and respond to questions? How can these be changed to better facilitate questions posing?
6. In which other mathematics experiences do we or could we compute in a meaningful context?
7. What new assessment tools would enable me to efficiently gather data on my students' performance and on their progress toward learning targets?

Status of the Class

Mathematical Idea: _____ Date: _____

Name of Student	Comments about Understanding
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
14.	
15.	
16.	
17.	
18.	

Date: _____

Schedule for Visit to _____

Departure	
Arrival at Site	
Activity 1	
Activity 2	
Activity 3	
Lunch	
Activity 4	
Activity 5	
Departure	
Arrival Home	
Total time for the trip:	

Names of Students in Working Group: _____

Date: _____

Trip Comparison Chart

Group	Departure Time	Return Time	Duration Of Trip	Distance	Cost of Transportation	Cost of Food	Incidentals/ Other

Special Notes:

Names of Students in Working Group: _____

Date: _____

Cost of Trip to the State Capitol

Trip Dates: _____

	Total Estimated Cost	Total Actual Cost	Total Cost per person
Transportation			
Hotel			
Food			

Special Notes:

Names of Students in Working Group: _____

Name: _____
Date: _____

Things I learned from This Unit

About mathematics...
Data...

Measurement...

Numbers...

Computation...

Problem Solving...

About working in groups...

I especially want to remember...