

Take a Trip: Computation and Estimation with Whole Numbers

- Strand:** Computation and Estimation
- Topic:** Solving practical problems using the four basic operations with whole numbers.
- Primary SOL:** 5.4 The student will create and solve single-step and multistep practical problems involving addition, subtraction, multiplication, and division of whole numbers.

Materials

- Planning the Trip Cards (attached) (Each category copied on a different paper color)
- Planning the Trip Recording Sheet (one per group)
- Pencil and paper for each student
- Access to computer or print material for information searches
- Calculator (optional)
- Document camera or poster paper

Vocabulary

budget, difference, estimate, product, quotient, sum

Student/Teacher Actions: What should students be doing? What should teachers be doing?

1. Ask, “If you could go on a dream vacation, where would it be?” Allow students to share with the class, and list responses on the board. Then, ask students what they know about budgets. “Why are budgets helpful? What things are included in a budget?” “What would you need to include in your vacation budget?” Allow students to share, and again, list responses on the board. Students might include wardrobe/clothes, airfare, hotel, rental car, meals, and other travel expenses.
2. Share the following situation: “Summer Inn costs \$65 per night and has a limit of two people per room. There are three of you traveling, and you need to stay at a hotel for three nights. How would you estimate the total cost to stay at this hotel? How would you compute the total cost? How many steps are required to solve this problem? What operations are involved?” Without actually solving the problem, have students discuss with elbow partners how they might solve this problem. Allow students to share their thoughts with the class. Important things to consider:
 - 3 people are traveling, so they will need to reserve 2 hotel rooms.
 - They will need rooms for 3 nights.
 - This is a multistep problem. (How do you know?)
 - To estimate, we could adjust \$65 to \$70 to have a friendlier number to compute.
 - Operations for this problem could include addition and/or multiplication.
3. Explain that students will work in small groups to plan a budget for an imaginary trip. Their budget is \$2,000.

- a. Divide students into groups of three, and hand each group one copy of the “Planning a Trip Recording Sheet.” Each student will need their own paper and pencil.
 - b. Groups should decide where they will go on their imaginary trip. Students will pick a Planning the Trip Card from each of the following categories: Number of People Traveling, Number of Days, Airline and Cost, Rental Car and Cost, Hotel and Cost. Instruct students to fill in these categories at the top of the Trip Recording Sheet.
4. Have students split up the jobs to find the cost: one person will find the cost of airfare, one person will find the cost of the rental car, and another will find the cost of the hotel. Each person should fill out their portion of the Trip Recording Sheet.
 5. As students are working, the teacher should circulate and visit each group, and ask questions like, *“What category are you budgeting?” “What is your plan to solve your problem?” “What operation are you using, and why?” “How did your estimate compare to the actual amount?” “Does your answer make sense? Why, or why not?”*
 6. Encourage students to check one another’s computation to ensure their totals are accurate. All three group members should calculate the total amount needed for the trip.
 7. After the group has found the total amount they need for the trip, they should pick a card from the Change pile. They need to find the new cost of the trip and document the new amounts on the second part of the Trip Recording Sheet.
 8. If time allows, have groups create larger posters to diagram their trip budget.
 9. Have the groups take turns presenting their posters to share the budget details of their trips with the class. Have individuals explain the computations they performed to figure out the cost of their categories. Ask, *“Was \$2,000 enough?” “How much extra money does your group have, or how much more money does your group need?” “How did you factor the change into your budget?” “How did the change card affect your budget?”*

Assessment

- **Questions**
 - How did you figure the cost of the airfare/hotel/rental car for your trip? How did you plan your solution? What operations did you use, and why did you choose them?
 - How did your estimate compare to the actual cost?
 - How did the cost of each category change when you added in the change card?
- **Journal/writing prompts**
 - Describe the trip your group planned. What was your destination, and how much did airfare, hotel, and rental car cost? How close was your group to the \$2,000 budget?
 - Your friend is confused about how to figure out how much the hotel would cost for his trip. Explain using pictures, numbers, symbols, and words how your friend might figure out the cost.

- Discuss how you would save money to afford this trip.
- **Other Assessments**
 - Have individual students pick trip cards and compute the trip budgets independently.
 - Using the trip cards, have students compute the cost of the trip for one person.

Extensions and Connections (for all students)

- Allow groups to create a trip to their favorite place by conducting research via the internet, using actual airfare, hotel, and rental car prices. (Possible variations: historical locations, ecosystems, regions of Virginia)
- Add another category to the trip, such as clothes, meals, or excursions, and have students recalculate the total cost of their dream vacation.

Strategies for Differentiation

- Create a trip as a class, allowing partners to work together to compute each category.
- Allow students to create nonlinguistic representations of their trips. Example: Provide or create a brochure for the trip.
- Provide a list of steps for the team to follow.
- Facilitate discussion to allow students to identify practical applications of addition, subtraction, multiplication and division in their daily life.
- Start the lesson with just travel and lodging. Tell students their parents will pay for the rest.

Note: The following pages are intended for classroom use for students as a visual aid to learning.

Planning the Trip Recording Sheet

Names of Students _____

Name of Vacation Site _____ Budget: \$2,000

Number of people traveling _____ Number of days traveling _____

Airline and cost (info on card) _____

Rental car and cost (info on card) _____

Hotel and cost (info on card) _____

1. On a separate sheet, show your computation for your estimate and the actual costs of each category. Record your results in the chart below.

CATEGORY	YOUR ESTIMATE	ACTUAL COST
Airline		
Rental car		
Hotel		
TOTAL COST OF TRIP		

Did the group have enough money to take the trip? _____

If so, how much extra money did the group have? _____

If not, how much more money did the group need? _____

2. Draw a Change card. Record the information on that card here:

Now recalculate your costs based on the Change card, including estimating and actual answers. Record your new information in the chart below.

3. The group has decided to share the cost of the trip equally. How much will each person pay?

NEW TRIP COSTS:

CATEGORY	YOUR ESTIMATE	ACTUAL COST
Airline		
Rental car		
Hotel		
TOTAL COST OF TRIP		

Did the group have enough money to take the trip? _____

If so, how much extra money did the group have? _____

If not, how much more money did the group need? _____

Planning the Trip Cards

Number of People Traveling Cards

2 people	2 people
3 people	3 people
3 people	4 people
4 people	4 people

Number of Days Cards

2 days	2 days
3 days	3 days
4 days	4 days
5 days	5 days

Airline and Cost Cards

Chi Airways \$162 per person	Beta Airlines \$268 per person
Alpha Airlines \$189 per person	Epsilon Airways \$322 per person
Omega Airlines \$253 per person	Gamma Airways \$121 per person
Kappa Airways \$275 per person	Zeta Airlines \$337 per person

Rental Car and Cost Cards

Watt Car Rental \$25 plus \$35 per day	Lens Car Rental \$30 plus \$15 per day
Micro Car Rental \$15 plus \$20 per day	Bushel Car Rental \$50 plus \$12 per day
Radian Car Rental \$35 plus \$17 per day	Dash Car Rental \$28 plus \$18 per day
Violle Car Rental \$10 plus \$36 per day	Karat Car Rental \$23 plus \$25 per day

Hotel and Cost Cards

La Quantum Inn \$78 per day Maximum: 2 people	Comfortable Inn \$89 per day Maximum: 2 people
Sleepy Inn \$112 per day Maximum: 2 people	Campton Inn \$145 per day Maximum: 2 people
Best Eastern \$99 per day Maximum: 2 people	Emblem Suites \$157 per day Maximum: 2 people
The Milton \$64 per day Maximum: 2 people	Valentine Inn \$138 per day Maximum: 2 people

Change Cards

<p>A friend wants to join the group.</p>	<p>Your car rental company is having a sale. They are offering one day free.</p>
<p>Your hotel has a special offer. The cost is half off.</p>	<p>Your airline has added a new fuel fee. Add \$35 per person.</p>
<p>One of the people in the group cannot go.</p>	<p>You have too many people for one hotel room. You have to get a second or third.</p>
<p>The car rental company doesn't have a big enough car for everyone. You have to rent another car.</p>	<p>The airline is offering a discount of \$25 per person.</p>