Contrasting Cases – Estimation Study  
November 2005  
Schedule  

**Monday:**  
Give Pre-test  
Introduction lesson (10 minutes)  

**Tuesday:**  
Partner work on packet; Distribute Homework  

**Wednesday:**  
Collect Homework; Partner work on packet; Distribute Homework  

**Thursday:**  
Collect Homework  
Wrap-up lesson (5-10 minutes)  
Give Post-test  

**Friday:**  
Individual interviews
Contrasting Cases – Estimation Study
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Introduction Lesson

Overall Goal: In about 10 minutes, 1) introduce students to the idea of estimation as getting an approximate answer – and compare estimation with getting the exact answer, 2) introduce a less familiar estimation strategy.

Pass-out Handout with problems and student solutions

Problem 1:

Mrs. Roseman needs to buy some candy for the Halloween trick-or-treaters in her neighborhood. Candy is on sale for $2.98 per bag. Mrs. Roseman wants to buy 9 bags of candy. Before tax, about how much will it cost for Mrs. Roseman to buy the candy?

Mollie and Suzanne are solving this problem. Here is what they did:

<table>
<thead>
<tr>
<th>Mollie’s solution</th>
<th>Suzanne’s solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mollie solves the problem by estimating. She rounds $2.98 to $3.00 and then multiplies by 9 like this:</td>
<td></td>
</tr>
<tr>
<td>$3.00 * 9 = $27.00</td>
<td></td>
</tr>
<tr>
<td>Mollie gets $27.00 as her answer.</td>
<td></td>
</tr>
<tr>
<td>Suzanne solved this problem by multiplying $2.98 * 9, like this:</td>
<td></td>
</tr>
<tr>
<td>2.98</td>
<td></td>
</tr>
<tr>
<td>* 9</td>
<td></td>
</tr>
<tr>
<td>26.82</td>
<td></td>
</tr>
<tr>
<td>Suzanne gets $26.82 as her answer.</td>
<td></td>
</tr>
</tbody>
</table>

Questions that might be useful to ask students about these solutions:

(1) What is the difference between how Mollie solved the problem and how Suzanne solved the problem?

(2) When is it OK to estimate like Mollie did? When is it not OK to estimate?

(3) Which way of solving this problem is easiest?

Try to avoid comparing two different estimates or ways to estimate
**Problem 2:** Jamie thinks he has spent over $500 on music CDs, but his brother doesn’t believe him. Jamie does a quick count and figures he has about 72 CDs and that each CD cost about $14. Has Jamie spent over $500 on CDs?

<table>
<thead>
<tr>
<th>Frank’s solution</th>
</tr>
</thead>
</table>
| \[
72 \times 14 \\
\]
| My estimate is 700. |
| I covered up the ones digits and then multiplied the tens digits like this: |
| \[
\boxed{7} \times \boxed{1} = 7 \\
\]
| Then I added two zeros because I covered up two digits and got 700. So, Jamie was right – he had spent over $500 on CDs. |

**Goal:**
1) Show you one new way to solve: Talk through how Frank solved the problem – Write 72 \* 14 on board, cover up ones digits with hands
2) Could also solve by rounding both numbers to nearest ten, which is?

**Preview next 2 days:**
1) Work with a partner each day, studying how other kids have estimated, answering questions about their ways, and estimating on your own.
2) No homework tonight!
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Wrap-up lesson

(Note: All students can receive the same wrap-up lesson.)

Overall Goal: In about 5 minutes, provide some points of closure about estimation.

Suggested Lesson: Here are the main points that we’ve tried to emphasize in the past two days of problem solving:

I. Some things to remember about estimation:

(a) Estimation is a way to get an approximate answer. Sometimes it is OK not to get the exact answer for a problem, and estimation is a good thing to know how to do.

(b) There are many ways to arrive at an estimate. There is no one right way to get an estimate; there are lots and lots of ways to estimate.

(c) Different ways of estimating will give different estimates. If two people estimate using two different ways, they may get two different estimates. The number that you get as your estimate will depend on the way you decide to estimate.

II. Things to know about comparing different ways of getting an estimate:

(a) Some ways of getting an estimate may be better than others because they are simpler to do. Simpler means that the calculations are easier to do, because they involve easy numbers.

(b) Some ways of getting an estimate may be better than others because they get closer to the exact answer.

(c) Sometimes there is a trade-off between ways that are easier (use easy numbers) and those that get an estimate that is close to the exact answer. This means that sometimes the easiest way doesn’t give you a very close estimate.

(d) Whether or not a way of estimating is a “good” one depends on a lot of factors, such as whether it is easy to do, how close it gets to the exact answer, the problem that you are trying to estimate, and perhaps most importantly, your goals in coming up with an estimate (e.g., how quickly you need the estimate, how close you want or need the estimate to be).