

Introducing Estimation

Katherine Willson

Katherine Willson is an assistant professor at the University of Alberta, Edmonton, Alberta. She has worked for 13 years with the Edmonton Public School Board as a teacher, math consultant, assistant principal and principal. She has also taught at the University of British Columbia, Vancouver, British Columbia.

Current elementary mathematics textbooks, such as *MathQuest* and *Journeys in Math*, have recognized the importance of estimation skills. Not only have the number of estimation activities increased in this series of textbooks, but estimation has been integrated throughout as well. However, many students exposed to these textual series still feel uncomfortable or seem reluctant to estimate.

This reluctance may be due to the fact that since Grade 1 they have been conditioned to believe that mathematics produces a single exact answer, or they may have been taught estimation skills without being taught the reasons for using estimation. Not only is it important to establish that estimation is a highly useful tool, it is also important to create a climate conducive to developing an estimation "mind-set."

Before beginning to teach specific estimation strategies, students should be provided with a rationale for estimation. The following suggestions or sequences of brief activities have been used successfully to introduce estimation to students in Grades 4 to 7. They are intended to provide a rationale as well as help establish an estimation mind-set and should be included in initial work with estimation in the intermediate grades.

Define Estimation

Begin by asking each student to write a definition for "an estimate." The majority of students will

define an estimate as "a guess." A few students will record more specific answers, such as a good guess, a smart guess, an educated guess or an approximation. Have students give examples to illustrate what they mean by a "good guess" as opposed to "a guess."

Tell students they are not competing against other students for correct answers when they estimate. Tell them they are competing against themselves to become better estimators. Only through practising estimation skills will they become more accurate with their estimates.

Brainstorm for Possible Uses of Estimation

Have students record as many situations as possible to illustrate where they or their family members have used estimates. After sharing their information with the class, ask students to interview parents and family members for the next class in order to determine additional uses of estimation. The information that students acquire from the family survey usually creates a lively class discussion and an awareness of the frequency and diversity of estimation in our daily lives.

Examples of Estimation Recorded by Students

1. How much time is left? (Asked during recess.)
2. How long will it take to get home after school?
3. How long will my homework take?
4. How much tissue paper do I need for the art project?
5. How much money can I save before Christmas?
6. Will I have enough money to buy three books at the book fair?
7. Will I have enough money for Hot Dog Day?

Examples of Estimation from Family Interviews

1. Adding ingredients when cooking
2. Determining how many kilometres the car will run for each litre of gas
3. Buying material for sewing
4. Estimating the time it takes to drive somewhere
5. Tipping in a restaurant
6. Estimating the amount of money needed at a grocery store
7. Buying fertilizer for the lawn

Identify Situations Where an Exact Number is Required

Questions such as the following establish that there are times when an exact answer is essential, and an estimate would make little sense.

1. What is your address?
2. How old are you?
3. What is your phone number?
4. What time is it?
5. How many sisters and brothers do you have?
6. What year were you born?
7. How many library books are overdue?
8. How much will dinner cost?

Have students identify whether an exact answer or an estimate is required for each question, and ask them to justify their answer. Students may ask more questions about when an exact answer is required.

Identify Situations Where Estimates Are More Appropriate

In the situations that follow, estimates are not only acceptable, exact answers would be unrealistic or inappropriate.

1. What is the population of Canada?
2. What is the population of the world?
3. At what altitude are we flying?
4. How many hamburgers have McDonald's restaurants sold worldwide?

Ask students to explain why an estimate is more appropriate than an exact answer for each of the

questions. Students may ask additional questions about when an exact answer is unrealistic.

Introduce Newspaper Headlines

Have students collect newspaper headlines that illustrate estimates as well as headlines that illustrate exact answers. Students find this activity highly motivational, and it usually evokes lively class discussions. Creating class posters from the headlines that represent estimates and exact answers provides a good visual reminder.

Examples of Newspaper Headlines

1. Civic pride fined \$50
2. 57 Dead in Plane Crash
3. 25,000 Homeless After Quake
4. 68 Carted Off
5. \$65 Welfare Cut Restored
6. 30% Off All Cameras
7. Jackpot Lotto 649 \$4.4 Million
8. 59,000 Watch Grey Cup
9. Unemployment Rate at 10%
10. \$143,000 for Script at Auction

Emphasize the Language of Estimation

Students should become familiar with the language of estimation. The following are examples of common phrases that refer to estimation:

1. About 35 and a half
2. In between 7 and 8, but closer to 7
3. Just about 80
4. Approximately 500 km
5. Close to size 10
6. A little more than 16, a little less than 35
7. Around \$100

References

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