Estimate or Accurate

Overview

Estimation skills are extremely important in an era when students are tempted to trust any result displayed on a calculator or spread sheet. These skills are also powerful tools in budgeting or planning situations when exact calculations are not necessary.

This activity is designed to develop students' awareness of the idea of estimation, the language associated with it and the use of sensible or friendly numbers to approximate simple calculations.

Skills and Knowledge

Language of estimation, such as:
- almost
- just under/over
- approximately
- about

Preparation and Materials

Photocopy Activity Sheets 1 & 2 (1 per student).

Photocopy Practice Sheet 1 (1 per student.

Collect menus or price lists from a local take-way food outlet or restaurant (1 per small group of students).

Suggested Procedure

Introduce the idea of estimation

Begin by describing a situation in which a rough c calculation or estimate would be appropriate.

For example:

The other day I was going to a picnic with friends. On the way I wanted to buy a roast chicken, a bottle of soft-drink and some chocolate. But I discovered I had left my wallet at home. I found $15 in my pocket.

Before I went up to the counter I needed to decide if I could still afford to buy everything or whether I had to change my plan.

Ask: *How do you think I could do this quickly?*

Discuss students' input and, if no one suggests it, explain how approximate prices would help you in this situation. As you talk, emphasise the different words used to express the ideas.

Model for the students the estimated calculation of buying food for the picnic, emphasising language and friendly numbers as you do so. Try to keep it as authentic as you can by using local, current, knowledge and students' suggestions for the prices.

The process would be something like:

- *How much is a hot roast chicken?*
- *$8.95 – we will say* **approximately** *$9*
- *How much is a large block of chocolate?*
- *On special at $4.20 – OK* **a bit over** *$4*
- *A large soft-drink?*
- *$4.80 – that's* **almost** *$5*

Ask:

- *So what's the approximate cost?*

On the board

Approximate cost	*$9*
	$4
	+$5
Total	*$18*

I can't afford it! Have to change plans.

Discuss with students the possibilities e.g. buy only half a chicken, choose a smaller bottle of drink or a cheaper brand, substitute sweets for the chocolate.

Explain:

- *What we have done is worked out an* **approximate** *cost*
- *Quite often in the adult world we don't need to do* **exact** *calculations*
- *Sometimes it's good enough to get a* **rough** *idea*
- *We call this an* **estimate** *or* **approximation**

Estimation or accurate calculation

Using the exact prices (real or fictional) get students to calculate the accurate total cost of the original items using calculators.

Ask:

- *What is the* **exact** *total for those things?*
- *How close was our* **estimate***?*
- *Was it good enough to make my decision about what to buy?*
- *Do you ever think like that yourselves?*

During your discussions stress the words **exact** and **estimate** and use as many variations for accurate and estimate language as you can.

Highlighting the language of estimation

Arrange students in pairs.

Distribute *Activity Sheet 1* and use it as a guide to assist students to get used to the idea and the language of estimation as opposed to accurate calculations.

To create a more hands on activity you could put the words onto separate cards and get students to sort them into two groups.

They could also match the numbers with their best estimates in the following activity.

Follow up activity

Use the local menus or price lists to pose scenarios similar to the picnic story.

For example:
- *I have $10 in my pocket can I buy a pie, a cake and a cup of coffee?*
- *Make rough estimates to decide what you could afford to buy if you had:*
    - *$8*
    - *$10*
    - *$15*

Extension activities – planning and budgeting

For students who are able, it is a good idea also to look in more detail at situations in which estimation could be used for planning or budgeting decisions. Ask students to look at their copies of *Activity Sheet 1* again, or read the examples to them.

Explain:
- *Estimation is often used by people who want to make long terms plans about the best use of their money*
- *Activity Sheet 1 has some examples of this*
- *Which would they be?*
                    [6 and 7 both involve long term planning]

Ask: *Jo is thinking about whether it is worth buying a yearly ticket for the tram. So first she needs to know how much she now pays each year. How could she use estimation to get an idea of that?*

Model the process on the board using realistic local prices. A mythical example is given below as a possible guide.

Example: *A single ticket from home to the city costs her $2.85.*
            Each week she does the return trip 3 times

1 trip = $2.85	*approximately*	*$3*
Return trip	*approx*	*2 x $3 = $6*
3 times each week	*approx*	*3 x $6 = $18*
	approx	*$20*

52 weeks in a year	*approx*	*50*
Approx $20 a week for 50 weeks		*= 20 x 50*
	20 x 5 = 100 then add 0 = 1,000	

It costs her approximately $1,000 every year on the tram.

A similar example worth doing if there are smokers in the group would be:

How much money could a smoker save in a year if they gave up smoking?

Follow up activities

Budgeting, allocating money per week to put aside for bills such as electricity or gas is also a useful practical application of this technique. Base the examples on real, local bills. Add the totals for the year and divide by 50 to give an approximated weekly amount.

Encourage students to do this with their own expenses, such as phone, gas, Internet, electricity or transport.

Estimate or Accurate - Language

Do this activity in pairs.

1. Look at each of the words and expressions in the box. Decide whether it is a word you would use for an estimate or an accurate number. Beside the word write **'E'** for estimate or **'A'** for accurate.

<div>

About	*Just under*	
Exactly	*A bit over*	*Roughly*
Spot on		*Nearly*
Almost	*Precisely*	
		Approximately
A little less than	*Accurately*	

</div>

2. Think of some other words you could add to the list.

3. In pairs discuss these examples and decide what kind of calculation is needed: accurate or estimate. Write 'E' for estimate or 'A' for accurate.

   1. Working out if you have enough money in your wallet to go to the movies tonight.

   2. Giving change to someone who buys a movie ticket.

   3. Deciding how many pizzas to buy for a party.

   4. Working out how long it will take to drive from Melbourne to Brisbane.

   5. Working out the number of hours to write on your work time sheet.

   6. Deciding how much money you should budget (save) each week to pay for electricity.

   7. Calculating what public transport costs you for a year.

   8. Deciding on your share of the electricity bill if you share it with 2 other people.

   9. Working out a quote for a house renovation.

   10. Working out the invoice for a finished renovation.

11. Working out how much smoking costs every month.

Estimate or Accurate

1. For the amounts in the box, decide if they are likely to be estimates or accurate.

   Write '**E**' for estimate or '**A**' for accurate.

$3.95	$52.85	$3	$10,985
	29 cents	3,000 km	
267 km	30 cents		$50
22 c	$4	200 km	20 c
200 km	3,110 km		$10,000
$11,000	4,000 km	300 km	

2. Match each of the estimate figures in the box with the number, which could be used to estimate it. For example: $5.95 → $6. Join the matching pairs with a line.

3. Complete these sentences using phrases from the box below. Each phrase can be used once only.

   $ 3.95 is .... $ 4

   291 km is .... 300 km

   51 hours is .... 50 hours

   $2,090 is $2,000

   5.9 kg .... is 6 kg

   $24.00 is $24

   73 kg is .... 70 kg

   912 km is .... 900 km

   $0.15 is .... 15 cents

a little less than	almost	a bit over	the same as
just over	equal to	a bit more than	approximately	about

Can I afford it?

$9.90

$10.30
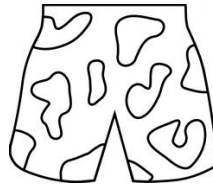
$2.85 a pair

$6.95

You have two $10 notes in your pocket. Use rough calculations to decide if you can afford to buy:

1.   2 shirts?

2.   3 t-shirts?

3.   5 pairs of sports socks?

4.   2 pairs of shorts?

If you had $25 could you afford to buy?

5.   1 shirt and 2 t-shirts?

6.   1 pair of shorts and 2 shirts?

7.   A t-shirt, a pair of shorts and a shirt?

8.   3 pairs of socks, a shirt and a t-shirt?

Approximately how much would it cost to buy:

9.   3 shirts and 1 pair of shorts

10.   A t-shirt, 2 pairs of socks and a shirt

11.   4 pairs of socks and 1 shirt

12.   1 shirt, 2 pairs of shorts, a t-shirt and a shirt