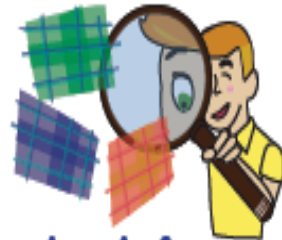
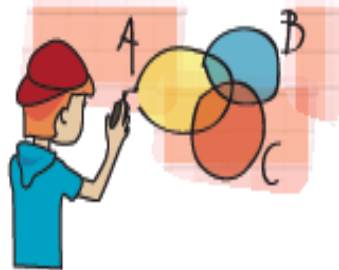


Problem Solving Strategies



Trial and Improvement

Draw a Diagram



Look for a Pattern

Act It Out



Draw a Table

Simplify the Problem



Use an Equation

Work Backwards



Eliminate Possibilities

Problem: Open & Closed Lockers

In a school hallway there is a row of 100 closed lockers numbered 1 to 100.

A student goes down the hallway opening every locker. Then a second student goes down the hallway closing every second locker.

A third student goes down the hallway, and at every third locker, she opens it if it was closed and closes it if it was opened. This continues on for a total of 100 students opening and closing lockers.

How many lockers are opened when the students are finished?

If there were 1000 students and lockers, which lockers remain open after the 1000th student has passed?



Extension Questions



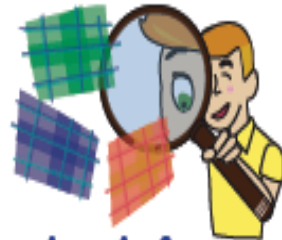
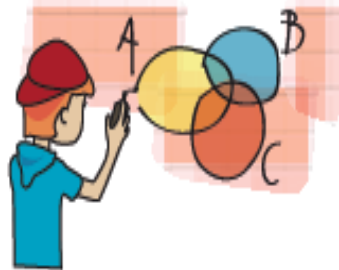
- Which students touched both lockers 36 and 48?
- Which lockers were touched by only two students?
How do you know?
- Which lockers were touched by only three students?
How do you know?
- Which lockers were switched the most times?

Problem Solving Strategies



Trial and Improvement

Draw a Diagram



Look for a Pattern

Act It Out



Draw a Table

Simplify the Problem



Use an Equation

Work Backwards



Eliminate Possibilities

	Locker	1	2	3	4	5	6	7	8	9	10	11	12
Student													
1		O	O	O	O	O	O	O	O	O	O	O	O
2		O	C	O	C	O	C	O	C	O	C	O	C
3		O	C	C	C	O	O	O	C	C	C	O	O
4		O	C	C	O	O	O	O	O	C	C	O	C
5		O	C	C	O	C	O	O	O	C	O	O	C
6		O	C	C	O	C	C	O	O	C	O	O	O
7		O	C	C	O	C	C	C	O	C	O	O	O
8		O	C	C	O	C	C	C	C	C	O	O	O
9		O	C	C	O	C	C	C	C	O	O	O	O
10		O	C	C	O	C	C	C	C	O	C	O	O
11		O	C	C	O	C	C	C	C	O	C	C	O
12		O	C	C	O	C	C	C	C	O	C	C	C

Implications for the classroom



(A) Groupwork

- Problem solving sessions need to be structured by the teacher-takes time and trialling to set it up as an effective habit
- *"I tried group-work once and I didn't like it"* misses the point
- Group-work does not have to be done in all classes
- Encourage perseverance!
- Don't tell them too much!! Can be difficult for teachers!!

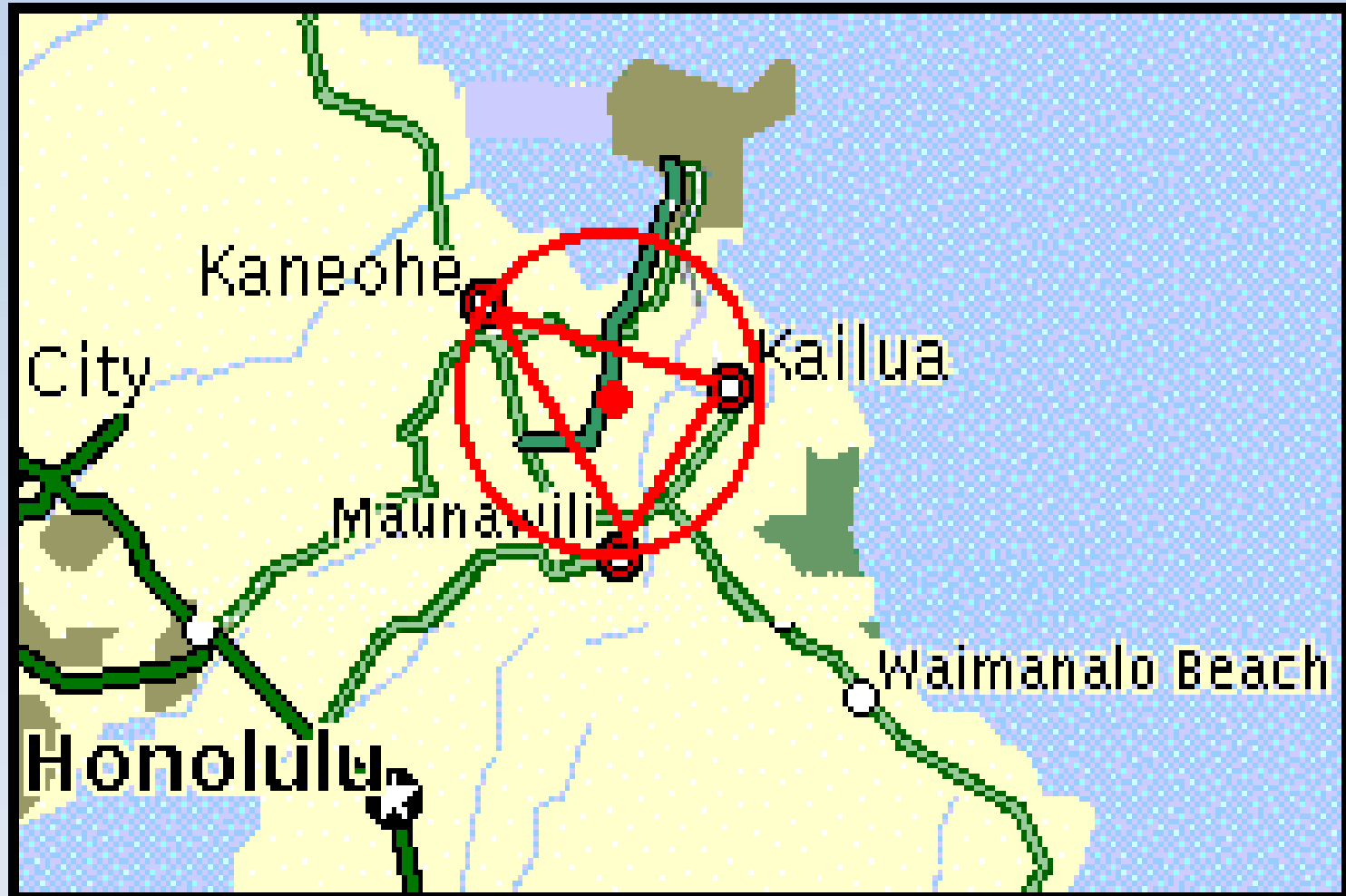
Implications for the classroom



(B) Ideas for Teaching

- Give problems at different times e.g. Lesson starter/ whole class/ "Pot Boilers"
- "No hint problem" up in the classroom/"Lucky Dip" from tissue box
- A collection of problems to choose from (Differentiated)
- Encourage participation in problem solving contests eg. PRISM, Junior Maths Competition etc

Problem Starter – Where to Build the Fire station?



Pot Boiler

How many different ways are there to place ten Smarties into 3 different bowls? Try it for different numbers of Smarties.



Implications for the classroom



(C) Exam Preparation

- Fear of getting it wrong and lack of discussion equates to maths being a “spectator sport” for our students
- Students need to be exposed to problem solving approaches in the classroom
- A different type of work has to take place in the classroom if we are to prepare students for this exam i.e. not just teacher directed single approach- T&L’s and Trial report emphasise this
- An achievable goal could be to introduce the 1st/ 5th years to each of the problem solving strategies over a period of time

A Time to Reflect



Think of your own teaching –

Which teaching and learning strategies would help our students better cope with the shift to more problem solving style questions in the exam?

George Polya (1972)

“A teacher of mathematics has a great opportunity. If he FILLS his allotted time with drilling his students in routine operations he kills their interest, hampers their intellectual development, and misuses his opportunity. But if he challenges the curiosity of his students by setting them problems proportionate to their knowledge, and helps them to solve their problems with stimulating questions, he may give them a taste for, and some means of, independent thinking.”





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