

Lesson Plan Week 2

- 1) Two trains are on a track 100km long and will collide. Each is traveling at 100km/h. A fly on the window of train 1 takes flight when train 1 starts moving, and it flies back and forth from one train to the other at 150km/h. How far will it travel before the trains collide?
- 2) Two boys and a man need to cross a river. They only have a canoe. It will hold only the man OR the two boys' weight. How can they all get across safely?

Calculator Work:

Think of a three digit number, such as 128. Now multiply repeatedly by 3, 3, 3, 7, 11, 13 and 37. Now add 128. What do you get? Why does this happen?

Split into 5 groups (hopefully 4 per group) and rotate:

Pentago	1	
Colour squares	2	(align coloured corners)
Jumping Colours	3	
Match Stick Shapes	4	
Matchstick Game (Nim)	5	

Nim:

A game for two players — the other person watches. There are 32 matches in a pile on the table. Players alternate turns. A turn consists of removing 1, 2 or 3 matches from the pile. The person who picks up the last matches from the table wins. Play the following. Players 1, 2 and 3. Match up 1 vs 2, 1 vs 3, 3 vs 2, 2 vs 1, 3 vs 1 and 2 vs 3. Is there a strategy that guarantees you win every time?

The Money Maximising Muddle

You are offered a job for your summer hols – it's for 7 weeks, 7 days a week, and you can choose one of the following payment schemes:

Scheme 1: You'll be paid €2,000 per day for the 7 weeks.

Scheme 2: You'll be paid €100 for the first day, €200 for the second day, €300 for the third day, and so on.

Scheme 3: You'll be paid 1 cent the first day, 2 cent the second day, 4 cent the third day, and so on.

Work out how much each scheme will end up paying you, and decide which scheme is the best! Try to find a quick way of getting the total pay for Schemes 2 and 3 – in each case, there's a pattern going on, although the pattern is different for each one.

The Flummoxed Flea

A flea is jumping across a table that is 1 metre wide to get from one yummy snack to another.

However, due to malnutrition, the flea's jumps get shorter and shorter, as follows:

In the first jump, the flea jumps half way, i.e. 50cm.

In the second jump, the flea jumps half the previous jump, i.e. 25cm.

In the third jump, the flea jumps half of the previous jump, i.e. 12.5cm. . . .

Work out how far along the flea is after each of the first five jumps – show this on a diagram.

The main question now is:

Will the flea get to the other side of the table?

Some questions to think of on the way:

1. Will the flea ever get past 90 cm? If so, after how many jumps?
2. Will the flea ever get past 99 cm? If so, after how many jumps?
3. Will the flea ever get to the end of the table? If so, after how many jumps?

Use fractions (...)

Two guard riddle (If we have time left)

You face two guards: A knight and a knave. The knight will always tell the truth and the knave will always lie, and you do not know which is which. You must find out, which one is the knight and which one is the knave, and are only allowed to ask one question to one of the guards. What question should you ask?

Answer: You should ask one of them, "If I asked you were you the knight, what would you say?"

If you are talking to the knight, obviously he will say "yes".

If you are speaking to the knave, had you asked him if he was the knight he would lie and say "yes"- because you are asking him what he would say, he will lie about his answer and so tell you that he is not the knight.

Take Home Problem:

You have a scales and 10 piles of 10 coins. One pile has fake coins. Coins in the fake pile weight one gram more. What is the minimum amount of weighings you can do to find out which pile is fake? Why?