

Session Guide: Chests Puzzles

Session Outline

Description

This session will present a series of logic puzzles, all involving chests. Puzzles are presented to the whole group one at a time, giving individuals a chance to think, then to discuss within small groups and then discuss as a whole group.

Session Objectives

The objectives of this session are to:

- Develop problem solving skills.
- Work collaboratively to solve problems.
- Think systematically exploring a variety of options.
- Be able to assess when the solution to a problem is correct.

Expected Outcomes

By the end of the session learners will have:

- Engaged and solved a number of logic puzzles.
- Discussed solutions to decide whether they are correct, incorrect or not fully justified.

Areas involved

- Mathematics and Financial literacy
 - Math Brain Teasers
 - Riddles
- Life skills
 - Communication
 - Conflict resolution



Activity: The First Puzzle

Objectives

To engage with and discuss the solution of the first of several puzzles.

Expected Outcomes

- Learners will have tried to solve the puzzle independently, in small groups and as a whole class.
- Learners will have decided when they found a correct and fully justified answer.

Teaching Instructions

Give learners the puzzle to work independently for a short while. They should then discuss their approaches with one or two peers. After another while they should present their ideas to the rest and as a whole group decide what a correct solution and justification is. Once they are convinced they should present their answer to test whether it is correct, incorrect or incomplete.

The puzzle: You are given three chests, each one with a label, and you are told that all the labels are misplaced so that none of the chests contain exactly what it says in the label. The first chest is labelled Gold Coins. The second chest is labelled Silver Coins. The third chest is labelled Gold Coins and Silver Coins. You are given the possibility of, without watching, take one coin from one chest of your choice and use it to place the correct label in each chest. If you succeed, you can keep all the chests with their riches. If you fail you don't get anything.

Answer (do not share!): The third chest incorrectly labelled Gold Coins and Silver Coins can either have gold coins only or silver coins only as suggested by the labels in the first and second chests. So, if you take a coin from the third chest, you will know whether it is full of gold coins only or full of silver coins only.

If you found a silver coin in the third chest, you can remove the Silver Coins label from the second chest and place it on the third chest. You now know that the first chest is incorrectly labelled Gold Coins so you need to place the Gold Coins label in the only available chest, which is the second chest. You can then place the Gold Coins and Silver Coins on the first chest.

Similarly, if you found a gold coin in the third chest, you can remove the Gold Coins label from the first chest and place it on the third chest. You now know that the second chest is incorrectly labelled Silver Coins so you need to place the Silver Coins label in the only available chest,



which is the first chest. You can then place the Gold Coins and Silver Coins on the second chest.

In this way, it doesn't matter whether the coin taken from the third chest is gold or silver as you have a process to correctly label the chests in both situations.

Suggested Guidelines

- It may very well be the case that the puzzle takes up the whole hour. This is not a problem.
- Don't give hints to learners, if they are struggling they should discuss with their peers. If they don't complete it they can keep thinking at home.
- Encourage discussions and try to moderate arguments if they become heated.
- Discourage the group from checking answers with you until they are fully convinced they are right and they can justify their answer.

Activity: The Second Puzzle

Objectives

To engage with and discuss the solution of the second of several puzzles.

Expected Outcomes

- Learners will have tried to solve the puzzle independently, in small groups and as a whole class.
- Learners will have decided when they found a correct and fully justified answer.

Teaching Instructions

Repeat the same activity as before with the second puzzle:

The puzzle: You are presented with two chests and you are told that one is full of deadly scorpions ready to attack anyone who opens it and the other is full of gold. The first chest has a label saying "This chest contains the scorpions" and the second contains a label saying "One of these two labels is true and the other is false". Which chest should you open?

Answer (do not share!): If the label in the first chest is true then it is full of scorpions and the second chest contains the gold. According to the second label, one of the labels is true and the other one is false, which means that the second label would have to be false, so either both labels are false or both are true. You are assuming that the first label is true so both would have



to be true, but then the second label would have to be true and false at the same time, which is not possible. Therefore, the first label has to be false, which means that the second label is true, satisfying the second label. So, the first label has to be false and the first chest contains the gold rather than the scorpions.

Activity: The Third Puzzle

Objectives

To engage with and discuss the solution of the final puzzle.

Expected Outcomes

- Learners will have tried to solve the puzzle independently, in small groups and as a whole class.
- Learners will have decided when they found a correct and fully justified answer.

Teaching Instructions

Repeat the same activity as before with the second puzzle:

The puzzle: You are given three chests and you are told that two of them are full of deadly scorpions ready to attack anyone who opens them and one is full of gold. The first one has an inscription that says “the gold is here”. The second one has an inscription that says “the gold is not here”. The third one has an inscription that says “the gold is not in the second chest”. However, you are also told that at least one of the inscriptions is true and at least one is false. Which chest would you open?

Answer (do not share!): In this puzzle we have to analyse all the possible combinations of true or false inscriptions in the different chests. We can automatically discard the possibility of all being true and all being false, leaving 6 possible options:

1. The first and second are true and the third is false. However, this cannot happen as if the first is true then the gold has to be in the first chest and if the third is false the gold has to be in the second chest, which is not possible.
2. The first and third are true and the second is false. However, this cannot happen as if the first is true then the gold has to be in the first chest and if the second is false then the gold has to be in the second chest, which is not possible.
3. The first is true and the second and third are false. However, this cannot happen as if the first is true then the gold has to be in the first chest, if the second is false the gold has to



be in the second chest, and if the third is false then the gold has to be in the second chest, which is not possible.

4. The first and second are false and the third is true. However, this cannot happen as if the second is false the gold has to be in the second chest but if the third is true then the gold cannot be in the second chest, which is not possible,
5. The first and third are false and the second is true. However, this cannot happen as if the second is true then the gold cannot be in the second chest and if the third is false then the gold has to be in the second chest, which is not possible.
6. The last option left is that the first is false and the second and third are true, which means since the first is false, the gold cannot be in the first chest, and as the second and third being false both indicate that the gold has to be in the second chest. As such, this is the only option that is not problematic and the gold is in the second chest.