Forensic Filtration

Casper Forensic Laboratory: Notebook

Interview with student Matt:
Matt denies being in Computer Laboratory 4 on the morning of the crime.
Matt kayaks every morning off Bungy Beach.

Interview with Mrs Fizzy:

Mrs Fizzy has a sand pit in her back yard.

Evidence logged out for test:

- Sand / salt mixture from Computer Laboratory 4
- Sand / salt mixture from Bungy Beach (Matt's evidence bag)
- Sand / salt mixture from Mrs Fizzy's sand pit

Casper Forensic Laboratory Investigation:

Aim: To compare the percentage of sand in 3 mixtures of sand and salt, by separating the sand from the salt using filtration and weighing the sand.

Equipment (in addition to the evidence):

- Filter funnel
- filter paper
- retort stand
- boss head
- filter funnel ring
- 2 beakers
- scales
- distilled water
- plastic spoon
- Bunsen burner
- tripod
- gauze.

Procedure:

1. Record the mass of one beaker.
2. Add about 15 grams of sand / salt mixture from Computer Laboratory 4 evidence bag to this beaker and record the mass of the beaker and sand mixture. Calculate and record the exact mass of the mixture. Mass of sand / salt mixture = (mass of beaker + mixture) – mass of beaker
3. Add 100mL of distilled water to the beaker containing the sand mixture and stir.
4. Choose equipment, assemble and carry out a procedure to separate the salt from the sand, using the processes of filtration. Wash the sand several times with distilled water.
5. Dry the sand overnight and record the mass of the sand.
6. Calculate the percentage of sand in the mixture.

Percentage of sand = mass of sand / mass of sand mixture × 100

Repeat steps 1-6 for the other two sand mixtures.

Diagram of the process of filtration

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Results

Table 1: Comparison of the percentage of sand in each mixture

Source of sand / salt mixture	Computer Laboratory 4	Bungy Beach (Matt's evidence bag)	Mrs Fizzy's sand pit
Mass of sand / salt mixture (grams)			
Mass of dry sand after filtration (g)			
Percentage of sand in the mixture (%)			

Analysis of the results

Identify and justify a possible source of the sand mixture in Computer Laboratory 4.

Explain how this investigation has increased your understanding of events in Computer Laboratory 4 on the day of the crime.

Do you need to update your Evidence Summary?

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Suggested Answers – Forensic Filtration

Results

Table 1: Comparison of the percentage of sand in each mixture

Source of sand / salt mixture	Computer Laboratory 4	Bungy Beach (Matt's evidence bag)	Mrs Fizzy's sand pit
Mass of sand / salt mixture (grams)	15g	15g	15g
Mass of dry sand after filtration (g)	13.5g	10g	13.5g
Percentage of sand in the mixture (%)	90%	66%	90%

Analysis of the results

1. Identify and justify a possible source of the sand mixture in Computer Laboratory 4.

Students should identify that Mrs Fizzy's sand pit is a possible source of the sand/salt mixture found near the computer station containing the stolen computer. The percentage of sand in both mixtures is about 90%.

2. Explain how this investigation has increased your understanding of events in Computer Laboratory 4 on the day of the crime.

Idea: Matt did not leave the sand/salt mixture in Computer Laboratory 4.
Evidence: Students should briefly describe the procedure for the investigation, and identify that the sand/salt mixture from Bungy Beach (where Matt paddled kayaks earlier in the day) contains a different ratio of sand: salt than the mixture found in the computer laboratory.

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