



SAFETY BAY
SENIOR HIGH SCHOOL

imagine believe achieve

YEAR: 7

SUBJECT: Science

**Investigation: I don't Deal With Problems ...
Only Solutions!!!**

ANSWER BOOKLET

Time: 3 lessons

Total marks: 28

Grade weighting: 10% Semester 2 Report

This booklet is the work of: _____ 7 set _____

I don't deal with problems ... only solutions!!! 😊

A chemistry laboratory has made a rare and valuable new substance. This new substance looks exactly like common table salt, and like table salt it is soluble in water.

A researcher has split this new substance over a pile of white beach sand (there for another experiment) and it is much too valuable to waste!

The researcher sweeps up the substance and sand mixture, and wonders...



"How can I separate the mixture?"

Fortunately for him (but unfortunately for you) you are on work experience in the laboratory and are given the problem to solve!

Your problem is to separate the mixture in order to return the valuable substance to the researcher.

In a beaker, you will find approximately 5 grams of the mixture. This is what you have to start with.

You are to work in a group of 4 people.

Each student is required to submit this booklet, neatly completed by _____.

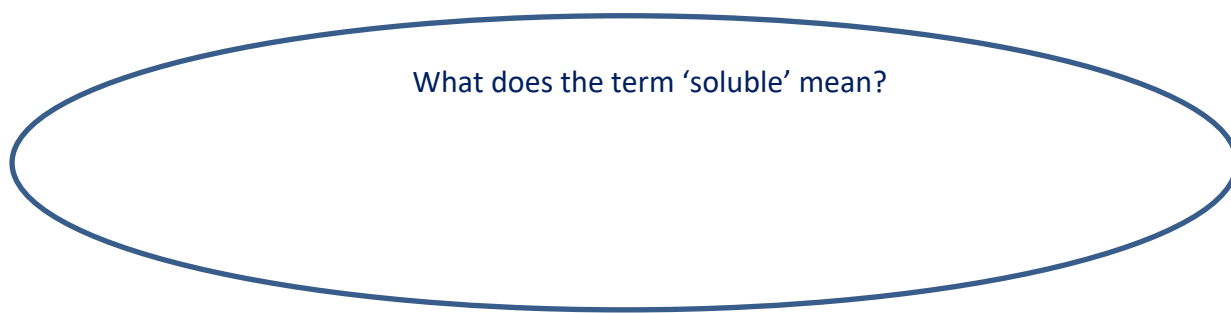
Things to do before you get started:

Who will I work with? Remember, best friends don't always make the best workmates!

If you read this entire booklet before you start you will find some clues!!!

What is the first problem that we
need to solve?

What will we need to do?



What does the term 'soluble' mean?

Is beach sand
soluble in
water?

How do we know this?

How can this information help us?

What do we predict will happen if a solvent was added to the mixture?

What safety considerations will you need to make?

Describe two different methods that can be used to separate a solid from a liquid. Include a labelled diagram in your answer. Check the textbook or your workbook if you need to!

Method # 1

Method # 2

The researcher will want to know what mass (how many grams) of the substance has been recovered. How will you work this out?

You may decide that you will need some equipment that is not usually kept in the laboratory. If this is the case... ensure that an 'Equipment Order Form' (available from your teacher) is fully completed and handed in. 24 hours notice is required for all items.

Part 1: Questioning and predicting

Write the question to be investigated.

The aim of this investigation is to ...

Write a hypothesis and explain why you think this will happen.

(If ... then ...)

Part 2: Planning and conducting

List the equipment required for the investigation.

Be specific ... what and how much?

Describe the possible safety risks in this investigation and suggest how they can be managed or controlled.


This image shows a blank sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There is a vertical margin line on the left side, creating a narrow left margin. The paper appears to be from a notebook or a standard ruled document.

Write the method for this investigation.

This image shows a blank sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There is a vertical margin line on the left side, creating a narrow left margin. The paper appears to be from a notebook or a standard ruled document.

[illegible]

Draw a labelled diagram of the equipment set-up.



Describe your observations and record your results below.

Title: _____

- | | | |
|---|-------|-------|
| a) The mass of the container and 'substance' is | ----- | ----- |
| b) The mass of the container is | ----- | ----- |
| c) The mass of the 'substance' we collected is ($c = a - b$) | ----- | ----- |
| d) The mass of the 'substance' we were given to begin with
was (collect this number from your teacher) | ----- | ----- |
| e) Difference in the 'substance' amount is ($e = c - d$) | ----- | ----- |

Part 3: Processing and analysing data

Write a description of what happened during your investigation.

Describe relationships or trends in the results. Refer to specific data.

Compare the results to your hypothesis.

Explain the relationships or trends in the results using scientific data.

Part 4: Evaluating

Identify 2 difficulties experienced when conducting the investigation.

(Quality of the data, correct use of equipment or choice of equipment.)

Make 2 suggestions to overcome the difficulties described, including ways to improve the quality of the data.

(Improvements)

Questions

1. The amount of 'salt substance' at the end of the investigation may NOT be the same as the amount you started with. Why do you think the amount of 'salt substance' may be different?

2. Could you have used the same method(s) of separation if the 'salt substance' had been mixed with sugar? Explain why or why not.

3. How did the difference in the solubility of the 'salt substance' and the sand help you in your investigation?

Marking Guide “I don’t deal with problems . . . only solutions!!!”

Part 1: Questioning and predicting

Writes a question that can be investigated and is reasonable (aim).	1
Correctly states appropriate hypothesis. States the relationship to be tested using correct procedures and an ‘if ... then ...’ statement.	1-2
Provides a reasonable explanation for choosing this hypothesis.	1

Part 2: Planning and conducting

Selects the appropriate equipment required to conduct the investigation.	1-2
Identifies safety risks associated with the investigation.	1-2
Suggests the ways to minimise the risks.	1-2
Provides a method with a logical sequence of steps.	1-2
Provides a detailed description of the techniques to ensure accuracy and considers the effect that techniques have on the accuracy of the results.	1-2
Draws a clear diagram that includes: <ul style="list-style-type: none"> - Equipment shown correctly set up - Correct labels 	1 1
Measurements table: <ul style="list-style-type: none"> - Descriptive title - Table complete with correct calculations (Limited record kept/table incomplete ½, table complete with incorrect calculations 1)	1 2

Part 3: Processing and analysing data

Statement of results: <ul style="list-style-type: none"> - Describes or compares of what happened (e.g. makes conclusions that are consistent with the data table and can relate results to physical properties of substances and processes involved) - Refers to specific data when describing or comparing (e.g. ... and we recovered 0.8 g of the salt) 	2 1
Explains the relationships or trends in the results using science ideas.	2

Part 4: Evaluating	
Identifies 2 difficulties experienced when conducting the investigation. (e.g. 'the beach sand contains salt that was previously dissolved in the sea water. This would have affected our results by...')	2
Makes 2 suggestions to overcome the difficulties described, including the ways to improve the quality of the data.	2
Total	28