

DISTILLATION ASSESSMENT RUBRIC

Name of Student:	Teacher:
Date:	Class:

Check one:

Pretest

Posttest

1) What property of matter is used to separate different substances [in distillation]?

a) density

b) melting point

c) boiling point

d) color

Chose C	1
Other	0

2) Explain the relationship between the strength of van der Waals attractions a substance has between its molecules and the boiling point of that substance.

Response includes...	
The stronger the van der Waals attraction, the higher the boiling point. With stronger van der Waals attractions, it takes a greater kinetic energy and stronger collisions to enable molecules to escape the attractions and “boil” off.	2
The stronger the van der Waals, the higher the boiling point of the substance.	1
Other	0

3) A lab technician attempted to separate substance A from B. He heated the mixture up and then condensed the evaporate. When he captured the liquid and tested the purity, he found that both substance A and B were in the captured liquid. In fact, the mixture was similar to the original mixture. Describe two possible reasons why the mixture didn't separate.

Reason 1: He heated the substance too quickly, so both substances boiled, evaporated and then were condensed.

Reason 2: The boiling point of the two substances were too close together, so they did not separate during the distillation process.

Response includes...	
Both reasons, and the reasons were accurate..	2
Only include one reason from above OR had two reasons but one was not accurate.	1
Other	0

4) Describe in detail the step-by-step process of what occurs to the molecules of the two substances during distillation.

1. First the mixture is heated. The molecules move around and have a greater number of collisions.

2. The substance with the weaker van der Waals attractions will boil off from the mixture first, breaking their van der Waals attractions and becoming a vapor or gas. The molecules that are in the gaseous phase (with no obvious van der Waals attractions) move randomly around and eventually enter a condenser.

3. When the gas molecule enters the condenser, the vapor molecules slow down and attract to each other. The molecules are aggregated in a liquid and then collected.

4. The liquid that is left behind will remain as a liquid, the molecules still attracting each other strongly enough to be kept from evaporating.

Score for Explanation

	Response includes...
Complete (3)	Concepts of heating, different boiling points necessary for separation, condensing and collecting liquid and description of distillation from above 4 steps.
Mostly complete (2)	Explanation includes most of the concepts listed above.
Partial (1)	Explanation describes the need for different boiling points but doesn't discuss the forces at work.
Incorrect (0)	Other