

Name \_\_\_\_\_ Date \_\_\_\_\_



## CHROMATOGRAPHY QUIZ –Answer Key

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1. What is chromatography?

**Laboratory/Separation technique used to separate and analyze the components of a mixture based on their differential affinities to a mobile phase and a stationary phase.**

2. The two phases of paper chromatography are the stationary phase and the mobile phase.

|   |   |
|---|---|
| What is a stationary phase?<br><br><b>The immobile material through which the sample passes</b> | What is a mobile phase?<br><br><b>The fluid that carries the sample through the stationary phase.</b> |
|---|---|

3. The two types of paper chromatography are ascending and descending paper chromatography.

|   |   |
|---|---|
| What is ascending paper chromatography?<br><br><b>Involves placing the sample at the bottom of the paper and allowing the solvent to move upward.</b> | What is descending paper chromatography?<br><br><b>Involves placing the sample at the top of the paper and allowing the solvent to move downward.</b> |
|---|---|

|  |  |
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|--|--|

4. Indicate whether the following statements about paper chromatography are True or False

| Statement   | True (T) or False (F) |
|---|-----------------------|
| Chromatography is only used for the separation of colored substances.   | <b>False</b>          |
| In paper chromatography, the differences in interactions with the stationary and mobile phases cause the separation of the different components of the mixture. | <b>True</b>           |
| If a substance gives one spot when run in different solvents, it indicates the presence of impurities.  | <b>False</b>          |
| Paper chromatography can detect the presence of impurities in substances.   | <b>True</b>           |

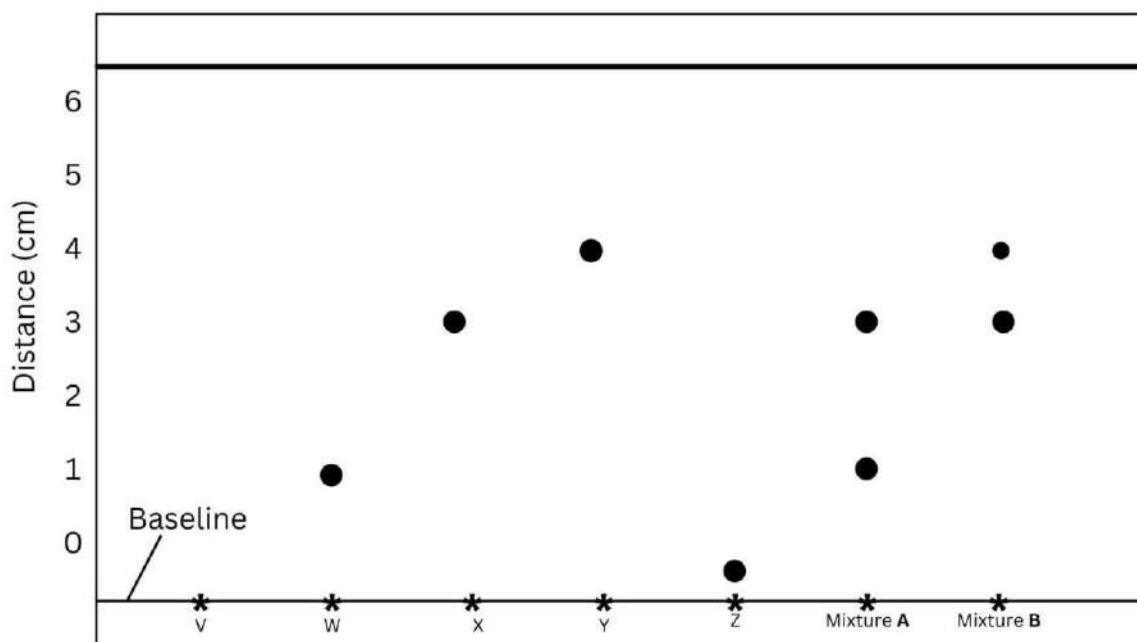
Reference: <https://chemtribe.com/chromatography/>

5. Use the word bank below to fill in the blank spaces.

**Chromatogram, Analyte, Adsorption, Solvent, Solvent Front, Baseline, Solubility**

- a. **Adsorption** is the process by which the sample components adhere to the surface of the stationary phase.
  - b. **(Solubility)** The ability of a substance to dissolve in a solvent.
  - c. The **Solvent** is the liquid used as the mobile phase in chromatography.
  - d. The substance or mixture of substances being analyzed in chromatography is called **Analyte**.
  - e. The **Baseline** is the starting line on the chromatogram where the sample is applied.
  - f. The leading edge of the mobile phase as it moves through the stationary phase is called **Solvent Front**
  - g. **Chromatogram** is the output of a chromatography run or the visual representation of the separation process that has occurred during chromatography.
6. If paper chromatography is used to analyze colorless substances, what two methods can be used in the identification of the substances?
- **Chromatogram may be sprayed with reagents that interact with the separated substances to produce colored spots.**
  - **The chromatogram may be exposed to ultraviolet light, which causes various substances to fluoresce making them visible.**

7. The following chromatogram was obtained in an experiment to analyse two mixtures, A and B. Use it to answer the questions below:



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- a. How many components were in each mixture?

**2 each**

- b. Which pure substance was:

I. Least soluble: **Z**

II. Most soluble: **Y**

- c. Which pure substances were in the mixture:

I. A: **W and X**

II. B: **X and Y**

- d. Which component was present in both mixtures? **X**

- e. Which pure substance is not found in either mixture? **Z**

- f. Why is the baseline usually drawn in pencil and not in ink?

**g. Components in pencil don't separate during chromatography**

**h. Components in ink will dissolve in the mobile phase and separate out and interfere with the results of experiment**

i. What is the name given to the uppermost bold line: **Solvent front.**

j. Other than chromatography paper, what else is required during the separation of the two mixtures?

**Suitable solvent**

k. State two factors that determine how far a substance moves up the adsorbent material.

- **Solubility of the component in the solvent**
- **Extent of adsorption or stickiness on the chromatography paper**

8. State at least 3 applications of paper chromatography in real life.

- **To detect the presence of impurities in substances.**
- **To detect the presence of additives in commercially processed foods.**
- **To separate and identify pigments in plants, such as chlorophyll, carotenoids, and anthocyanins.**
- **To test the presence of illegal substances (like steroids) in the urine and blood samples of contestants.**
- **To separate and quantify amino acids present in biological samples.**
- **Detection and separation of drugs and their metabolites.**

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