

# UNIT 1 SUMMARY

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## MAKE A SUMMARY

**Table 1** Qualitative Analysis Techniques

Technique	Possible use	Physical or chemical property	Scientific theory
thermal emission spectrophotometry (TES)	identification of the composition of mineral samples	physical property	TES measures the infrared energy emitted from an object. The amount of infrared energy emitted by an object is compared to known values of the same class of objects. The example provided in the student text is minerals.
light spectroscopy	identification of different types of elements in gaseous state	physical property	Electrons in atoms of elements can be promoted to higher energy levels by an input of energy. To become excited, electrons must absorb specific amounts of energy. When electrons return to their ground state, they release the excess energy in the form of light. The energy released is recorded in a line spectrum. The wavelengths of light emitted are unique to each element.
flame test	identification of metallic ions	physical property	This technique is similar to light spectroscopy. A flame is used to excite the electrons of the compound. The electrons absorb a specific amount of energy supplied by the flame, reach an excited state, then return to a ground state. When they return to the ground state, they emit light of a characteristic colour, seen in the colour of the flame. Each metallic ion has a characteristic flame colour.
flame emission spectroscopy	detection of impurities in concrete	physical property	A sample is placed in a flame. The electrons in the sample absorb energy and enter the excited state. When they return to the ground state, they emit the absorbed energy in the form of light. The pattern of emitted light is recorded as a line spectrum.
indicator	detection of carbonation in concrete	chemical property	Phenolphthalein is an indicator that changes colour depending on whether it is found in an acidic or basic solution. Concrete is basic due to its high content of calcium hydroxide. If concrete absorbs carbon dioxide, it becomes less basic. If phenolphthalein remains colourless, it indicates that the concrete has undergone carbonation.
precipitation reactions	identification of ions found in solution	chemical property	To identify an ion in aqueous solution, we can cause it to react with another ion to form a compound that has low solubility. The formation of a precipitate allows us to identify the ion.