

## The scenario

<b>Subject</b>	Paper chromatography of food dyes
<b>Length</b>	7,43 min.
<b>Main objectives</b>	Learning the method of separation of chemical substances
<b>Detailed objectives</b>	Observation of changes occurring during separation methods Getting to know paper chromatography
<b>Structure and description of experiments:</b>	
<b>Introduction</b>	The chromatography method is used to separate, identify and quantify chemical substances. It consists in separating the components of the mixture between the mobile phase (eluent) and the stationary phase by their different division. The mobile phase can be a gas (gas chromatography) or a liquid (liquid chromatography). Thin layer chromatography (TLC) and paper chromatography are liquid or planar chromatography because the separation process is carried out on a plane and the mobile phase is a liquid or liquid system. Thin-layer chromatography is carried out on aluminum plates coated with a suitable adsorbent which is the stationary phase, usually silica gel or alumina, while in paper chromatography the stationary phase is paper. In thin-layer and paper chromatography, the mobile phase (developing system, eluent, washing agent) can be one solvent or a system of liquids miscible with each other in a specific volume ratio.
<b>Main subject</b>	Description: Learning the method of substance separation - chromatography
<b>Experiment</b>	<p><b>Equipment:</b> filter paper, dryer</p> <p><b>Glass:</b> watch glasses, Pasteur pipette, small beaker, tweezers, scissors, pencil, water wash bottle</p> <p><b>Reagents:</b> colorful candies, e.g. skittles</p> <p><b>Attention! Treat the candies in the stand as a chemical reagent - they are not suitable for consumption!</b></p> <p><b>Description:</b> Cut out discs from the filter paper that are the size of the watch glasses. Prepare as many discs as there are types of candy colors on the stand. Place the discs on the watch glasses. Then, using tweezers, place one candy in the center of each disc, having previously dipped it in a beaker of water for a few seconds. After placing all the candies on the paper, use a water spray to gently wet each candy. When the water has traveled about 3/4 of the way from the center of the disc, remove the candies and dry the discs with a hair dryer.</p> <p><b>Questions:</b></p> <ol style="list-style-type: none"> <li>1. Describe the differences observed on individual discs after drying them. What do you think these differences are due to?</li> <li>2. What role did water play in this experiment?</li> </ol> <p><b>Conclusions:</b></p> <p>After drying the tissue paper on several discs, after unrolling there are several bands of colors - this means nothing else than that the dye used in the candy is a mixture of substances. Depending on the number of colors that appeared on the paper, we can determine how many different substances there are in the dye of a given candy. Distilled water acted as the mobile phase.</p>

Chromatography provides the chemist with two very important pieces of information: qualitative - the number of spots determines the amount of substance in the sample;

quantitative - the size of the spot, as well as its surface, allows you to calculate the mass of the substance in the test sample.

The use of TLC and paper chromatography allows the detection of metal ions and dyes. Liquid and gas chromatography is widely used in biochemical research as a tool for separating and detecting chemical compounds as well as quality control and monitoring of environmental pollution.

**Level:** Secondary School