Lesson Plan on LTT activities in Liepaja, Latvia

Title: Substance transformations		**Subject**: Science	
Age: 11	**Date 05.03.2021** **Teacher's name: Indra Bite**	**Topic: Chemical and physical transformations of substances**	**Time 40 min** **Country: Latvia**
Objectives	• To develop an understanding about the transformations of substances. • To develop an understanding of the physical and chemical transformations of substances • To develop an understanding of PH levels (alkaline, acidic)		
Materials and equipment	• Test • Presentation. • Video with the experiment "Elephant Toothpaste" • Liquid nitrogen (-183 ⁰ C) • Inflatable balloons (4-6 pcs) • Bucket for liquid nitrogen • Gloves low ⁰ C • Metal pliers • Safety goggles • Lemon ½ • Syringe with needle • Phet Colorado application (phet.colorado.edu / → pH Scale → Macro) https://phet.colorado.edu/sims/html/ph-scale-basics/latest/ph-scale-basics_en.html • Phenolphthalein • Sodium hydroxide		
Procedure			
Directions	Step 1: The teacher introduces students to the lesson's objectives and achievable results. Step 2: The teacher explains that all the objects around us are called bodies in the natural sciences. All bodies are made up of various substances. Step 3: **Presentation** - physical transformations. The teacher explains that only the appearance, shape, or state of the substance changes, but the chemicals that make up each body remain the same. The teacher discusses with students about physical transformations in all pictures. Stem 4: The teacher demonstrates an experiment with balloons and liquid nitrogen. Step 5: **Presentation** - chemical transformations. The teacher explains what kind of chemical transformations can occur. The teacher discusses with students about physical transformations in all pictures. Step 6: Tests students' knowledge of signs that indicate danger. Step 7: **Presentation** - discussion on how can we know that some chemical transformations have taken place? Step 8: Video demonstration "Elephant toothpaste."		

	Step 9: **Presentation** - properties of substances - acidic and alkaline. The teacher explains that in chemistry, there is a concept like pH level. The teacher demonstrates simulation with the PH environment and shares a link with the students. Students realize the simulation autonomously. Step 10: The teacher experiments with phenolphthalein by adding sodium hydroxide. Then spray the pink liquid in an acidic environment - lemon, where it remained transparent. Discuss the reasons why the lemon did not stay pink. Stem 11: Students are encouraged to do simulations individually with different liquids to determine the PH level.
Evaluation	1. After the experiment, students explain the physical transformations in the balloon, using the knowledge gained at the beginning of the lesson. 2. After presenting the presentation theory, students take a test for physical and chemical transformations of substances. The teacher discusses the test results and answers the students' unclear questions. 3. The teacher conducts a test with students on Danger Signs to determine how much the students know about the labels and significance of hazardous substances. 4. In the simulation, the teacher finds out whether the students understand the substances' environment on the pH scale according to the given examples. 5. After the experiment with lemon, the teacher finds out if the students have understood the acidic environment's interaction with the alkaline environment, asking them to comment on the experiment.

Lesson plan https://youtu.be/mAbDeEvEw8E