

## PR2.A – TEACHING SOURCES

<i>Title</i>	<i>States of Matter</i>
<b>Duration</b>	<i>1 session</i>
<b>Age Group</b>	<i>14 – 16 YO</i>
<b>Dimension of the advised group of students</b>	<i>The dimension of the group can be unlimited</i>
<b>Area</b>	<input type="checkbox"/> <i>Area 1: Reading, writing and literature</i> <input type="checkbox"/> <i>Area 2: Math</i> <input type="checkbox"/> <i>Area 3: Second language learning</i> <input checked="" type="checkbox"/> <i>Area 4: Sciences (chemistry)</i> <input type="checkbox"/> <i>Area 5: Soft skills</i>
<b>Specific objectives</b>	<i>-Describe a molecular model for solids, liquids and gases.</i> <i>-Extend this model to phase changes.</i> <i>-Describe how heating or cooling changes the behavior of molecules.</i> <i>-Describe how a change in volume can affect temperature, pressure, and state.</i> <i>-Relate a pressure-temperature diagram to the behavior of molecules.</i>
<b>Needed Materials</b>	<i>Computers or laptops</i> <i>Internet connection (HTML5 simulations can be run on iPad, PC, Chromebook, Mac and Linux systems)</i>
<b>Software</b>	<i>The activities are online.</i>
<b>Description</b>	<i>The PHET simulation from the University of Colorado shows what happens at the microscopic level during changes in physical states by changing the temperature and pressure.</i>
<b>Procedure on how to put in practice</b>	<p><i>The explanation for the differences between solids, liquids and gases lies in the way their molecules move. In a gas, the molecules are in constant and random motion in a large empty volume; in a liquid, the molecules move freely, but are very close together, leaving little empty volume. Thus, they can flow but cannot be compressed since the empty volume is minimal. Finally, solids are composed of particles which are in fixed positions and cannot move so they cannot be compressed and flow.</i></p> <p><i>Solids retain their shape, unlike fluids (gases and liquids) which flow easily and occupy the container in which they are placed. Liquids do not compress, unlike gases which can be compressed. Rigidity and compressibility are the properties that separate solids, liquids and gases.</i></p> <p><b><i>What phenomena of melting, liquefaction, coagulation, sublimation do you encounter in your daily life?</i></b></p>
<b>Link</b>	<a href="https://phet.colorado.edu/sims/html/states-of-matter/latest/states-of-matter_en.html">https://phet.colorado.edu/sims/html/states-of-matter/latest/states-of-matter_en.html</a>