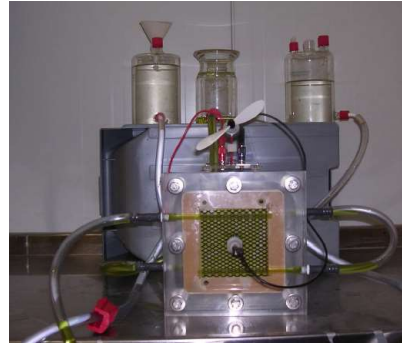



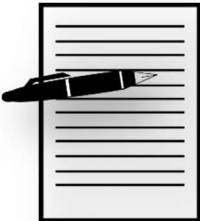




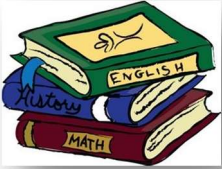




Summary

Blue Energy



	<p>Target age</p> <p>Age 15 and over</p> <p>Level of difficulty</p> <p>High</p>	
	<p>Key words:</p> <p>Sustainable energy, semi-permeable membranes, osmotic pressure, energy source, raw materials in batteries</p>	
	<p>Abstract of the activity:</p> <p>Blue Energy is a sustainable technology for electricity generation. The electricity is generated by using the salinity gradient between river water and seawater (fresh and salt). Ions move through semi-permeable membranes to create an energy flow, which is converted into electric energy by using electrodes.</p> <p>With Blue Energy a new technique is developed which could help using less dangerous and environmentally toxic batteries, like the Lithium ones. In this way less raw materials are wasted, the products used can be thrown away in the sea again. The next step will be the Blue Battery, in which the generated electric energy is also stored.</p>	
	<p>Learning Goals</p> <ul style="list-style-type: none"> • Explain how Blue Energy could help to use less raw materials • Give physical and chemical explanations for the phenomenon that energy is released when fresh and salt water mix • Describe how and where this energy can be converted into useful electrical energy. • Describe how the various parties in the development of Blue Energy should cooperate with each other and which parties this involves 	

Summary

	<p>Specific Abilities - <i>At the end of the activity the student will be able to:</i></p> <ul style="list-style-type: none"> • Build a Blue Energy stack • Perform an experiment, in which you measure and calculate your energy potential
	<p>Cross-curricula Links</p> <ul style="list-style-type: none"> • Ecology/Environment • Chemistry • Geography • Physics • Technology
	<p>Prerequisites - <i>Knowledge and skills necessary for carrying out the activity</i></p> <ul style="list-style-type: none"> • Physics: basics of force, pressure, electricity, energy and power with the symbols of these quantities and associated units such as kilowatt hour, megawatt and joule (kWh, MW and J respectively). Also the General Gas Law is important. • Chemistry: redox reactions, chemical equilibrium, the unit mole, what is a salt solution, what are ions, unit of concentration (mol/L) and that under certain conditions a mole of gas has a constant volume, the molar gas volume. You should be able to calculate with logarithms.
	<p>Time requirement <i>plus eventually other boundary conditions</i></p> <p><input type="checkbox"/> 20 h Instruments <i>(eventually):</i> 10 h</p>
	<p>Learning and Teaching Support Materials - What you can find in the toolkit</p> <ol style="list-style-type: none"> 1. Theory 2. Background information 3. Manual Blue Energy stack 4. Assignments
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