

OVERVIEW OF THE TASK

The cardiac pump

Target audience:	1 st year of cycle two
Team or individual work:	2
Class time required:	8 - 60 minute periods

<p>Educational Aim</p> <p>Allow the student to learn about the heart's function by the study and fabrication of objects that resemble a pump. The student will be required to make a pump model and to build a mechanism that will activate this pump. The student will establish similarities between the object he studied, the object he built and the cardiac apparatus.</p> <p>Recommended step(s): Analysis and design</p>	
<p>Targeted disciplinary competencies:</p> <p>C-1 : Seeks answers or solutions to scientific or technological problems C-2 : Makes the most of his/her knowledge of science and technology C-3 : Communicates in the languages used in science and technology</p> <p>The student is at the heart of a process that will allow him to develop these three disciplinary competencies. He will have to take into account the constraints associated with the fabrication of his mechanism (specifications, construction of mechanism from existing components, interpretation of technical drawings). He will have to ponder the function of a technical object.</p>	
<p>Targeted cross-curricular competencies :</p> <p><i>Adopting effective work methods</i> is at the heart of this learning situation. The student will have to evaluate the available resources, anticipate the steps to come readjust his actions as needed and complete the task. He must judge his methods and justify his choices.</p>	
<p>Broad Area of Learning</p>	<p>Health and Well-Being Development Axis: <i>Awareness of the impact of his/her choices on health and well-being</i></p> <p><i>The introduction to the matter is made by the analysis of a technical object to bring about the understanding of the heart's workings. Deficiencies in the components of this organ result in serious health problems.</i></p>
<p>Compulsory concept(s)</p>	<p>LIVING WORLD: Circulatory system Functions of blood constituents (plasma, formed elements) Compatibility of blood types</p> <p>MATERIAL WORLD: Compressible and incompressible fluids Pressure Pressure/volume relationship</p>

	<p>TECHNOLOGICAL WORLD: Exploded view Cuts and sections Standards and representations Typical mechanical part links Function, components and use of transmission of motion Function, components and use of transformation of motion</p>
<p>Cultural references</p>	<p>Pumping systems; The artificial heart</p>
<p>Possible evaluation: The student booklet can easily allow the teacher to judge the development of disciplinary competency 1. The steps worked through in the student booklet allow the evaluation of this competency. Direct observation during the laboratory design stages may also be prescribed.</p> <p>An evaluation framework of competency 1 is suggested with the task.</p>	
<p>Global context: Students are invited to analyse a water pistol. They must attempt to establish the scientific principles and organization of components allowing the water to be expelled from the apparatus in order to, in the end, establish links between this object and the heart.</p>	

Working Document