

OVERVIEW OF THE TASK

Earphones

Target audience:	2 nd cycle of secondary school (4 th year) AST
Team work	4 people
Class time required:	4 - 75 minute periods

Educational Aim:	
<p>This learning situation allows the student to understand the scientific and technological principles used in earphones similar to those used with an mp3 player. The situation places the student in a work environment where he will have to detect functional problems in defective earphones. At the end of this LES, the student will not only be able to explain the principles used, but also to produce a principles diagram. During the course of the process, the student is also faced with certain aspects of his personality. He will thus be better able to mark out his personal and professional fields of interest.</p>	
Targeted disciplinary competencies:	
<p><i>C-2 Makes the most of his/her knowledge of science and technology</i> <i>C-3 Communicates in the languages used in science and technology</i></p>	
Targeted cross-curricular competencies :	
C-2 Solves problems	
Broad Area of Learning	<p>Career planning and entrepreneurship Axes of development: self-knowledge and awareness of one's potential and how to fulfill it (awareness of his talents, qualities, fields of interest and of his personal and professional aspirations).</p>
Involved worlds and compulsory concept(s)	<p>Materiel World:</p> <p>Electricity</p> <ul style="list-style-type: none"> ▪ Electrical circuits <ul style="list-style-type: none"> • Insulation and conduction • Conductibility of a conductor (size, length and nature) <p>Electromagnetism</p> <ul style="list-style-type: none"> ▪ forces of attraction and of repulsion <ul style="list-style-type: none"> • permanent magnet • magnetic, ferromagnetic et non-magnetic substances • configuration and direction of magnetic field around magnets • force of attraction and repulsion between 2 permanent magnets ▪ magnetic field of a wire with current travelling through it ▪ magnetic field of a solenoid <ul style="list-style-type: none"> • intensity of the field in relation to the number of whorls • intensity of the field in relation to current (volume of sound)

	<p>Technological world:</p> <p>Language of lines</p> <ul style="list-style-type: none"> standards and representations (diagrams, symbols) <p>Mechanical engineering</p> <ul style="list-style-type: none"> adherence and friction between parts linking of mechanical parts (degree of liberty of parts) guiding functions <p>Electrical engineering</p> <ul style="list-style-type: none"> Power supply Conduction, insulation and protection Transformation of energy (electrical --> mechanics of vibration) <p>Manufacturing</p> <ul style="list-style-type: none"> manufacturing (drilling and shaping) measure and control (shape and position, angle)
<p>Community resources</p>	<p>Today's era is "buy, use and discard". It is no longer in style to repair the small items that surround us. Yet using our apparatus longer can be a good way to protect the environment. There is definitely matter for reflection here...</p>
<p>Possible evaluation:</p> <p>An evaluation grid is supplied with the task and particularly targets criteria linked to the components of C-2 (makes the most of his/her knowledge of science and technology).</p>	
<p>Global Context:</p> <p>Each team will work through 8 stations installed in the laboratory. At each station, the team will find defective earphones. The challenge will be to understand the function of the defective part and to imagine its repair. Finally, each team will have to draw a principles diagram for earphones and explain the scientific and technological principles involved.</p>	

WORKING DOCUMENT