



OFFICINA EMILIA | LABORATORIO DI STORIA DELLE COMPETENZE E DELL'INNOVAZIONE NELLA MECCANICA  
UNIVERSITÀ DEGLI STUDI DI MODENA E REGGIO EMILIA

**Workshops, activities and guided tours school year 2010-2011**

# OFFICINA EMILIA AND SCHOOLS

Proposals for schools, teachers and students  
School Year 2010-2011



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## Workshops, activities and guided tours school year 2010-2011

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# The didactic offer for schools

The didactic offer of Officina Emilia is characterized by its multidisciplinary character that alloy science and technology with the knowledge of social and economic organization to understand the material, cultural and human development and the main problems of the community.

All activities are within a "background integrator", consisting of the context of the industry in its many forms of organization: from the workshop to a factory of average size, to a technical study and to an analysis laboratory. The "background integrator" is therefore constituted by the work of men and women from the example of the machinery sector, which is the most important economic sector in the Provinces of Modena, Reggio Emilia and Bologna.

Experiments, tests and games can be realized in workshops; you can dismantle and assemble objects and, through these activities, we capture the relationship of cause and effect, we identify the problems and we meet different cores of knowledge. The development of communication skills, exchange and confrontation of ideas and information is a goal for each activity with the classes. In the workshop we produce oral histories and written ones in the form of text, a simple note or web page, to remember and recall, some time later, the experience gained.

The history of the development of the territory, the history of work and workers are elements of knowledge and interpretation of the context within which young people and teachers live. Officina Emilia is a place of encounters for people who have a story to tell and skills to be transmitted. The interviews are an effective process to gather information in a fresh and motivating way.

The visits to the partner companies are another important tool to gather information on the field. The guidance of experienced staff help to transform what is seen in the production departments in paths of knowledge, help to give value to what you study, but also to deepen the ideas about what you can get at the end of studies. Cultural production, especially in literary and artistic forms, is introduced to broaden perspectives on contemporary and past reality and integrate knowledge tools.



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### INFORMATION AND RESERVATIONS

Some workshops are included in the catalog "Itinerari scuola-città (School Town Routes)" by Memo-City of Modena. Schools that wish to take advantage of contributions from the Municipality of Modena must reserve in the manner contained in the website of the Municipality of Modena-MEMO. Schools that do not want or can not receive assistance from the Municipality of Modena can get in touch with the secretariat of Officina Emilia.

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**Officina Emilia is located in Modena in Via Tito Livio No 1 in front of the store Chateau d'Ax. It can be reached by bus lines 9 and 9A from the train station or bus station (bus stop "Globo".)**



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### *Iron, tools and machinery*

<b>TYPE</b>	Guided tour in the workshop-museum with "hands on" activities
<b>RECIPIENTS</b>	Preschool 5 years, Primary School, students aged from 6 to 7 years
<b>AIMS</b>	<p>The workshop-museum Officina Emilia builds very specific learning paths, involving boys and girls, through noise, sounds, smells, images, unusual objects and huge machinery and giving them the chance to manipulate materials, tools and products. Direct observation of the transformations produced by an industrial lathe and the meeting with the worker who uses it to work on iron, give the chance to approach a workplace even to very young children. Commonly used tools, that children are educated to see just as "dangerous" and strictly to "do not touch", become accessible.</p> <p>The fine craftsmanship can be obtained with tools other than the package of school, imagination and creativity are cultivated with screwdrivers and metal shavings.</p>
<b>DESCRIPTION</b>	<p>The tour includes the observation of tools, materials, products and machinery in use and the interaction with the worker, who produces metal shavings.</p> <p>The tutors of Officina Emilia introduce narratives and stresses inherent to the objects and machinery on display.</p> <p>The workshop is itinerant, the class is divided into groups, which move between the different areas, equipped for animation activities, object manipulation, verbalization and drawings.</p>
<b>DURATION</b>	Approximately 2 hours with an interval
<b>PERIOD OF PERFORMANCE</b>	From October 2010



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## Workshops, activities and guided tours school year 2010-2011

### *How it works ... let us look inside*

<b>TYPE</b>	Workshop
<b>RECIPIENTS</b>	Primary School, students aged from 6 to 7 years
<b>AIMS</b>	<p>The workshop conducts boys and girls to observe the parties of everyday objects, to question how they work, to interpret the movement of the mechanisms, to discover that even the smallest details have a role in the construction of an object and its functioning.</p> <p>The workshop aims to develop the manual skills to use common tools and the ability to communicate accurately.</p> <p>We introduce some simple elements of mechanical technologies.</p> <p>We encourage creative practices from "mechanical" stimuli.</p>
<b>DESCRIPTION</b>	<p>A narration, which introduces a fictional character, starts the activity from the observation of a machine in action and its ferrous products. Boys and girls, divided in groups, move into classrooms on the first floor. They are invited to observe a common object, to describe the functioning and make assumptions about the mechanisms that produce it. The teacher and the tutors take note of the observations. The students proceed to remove the object, to minute the stages and describe the tools necessary. They observe and draw the parties and interpret the movement of the mechanisms.</p> <p>At the end, the students are encouraged to create a self-made toy using poor materials.</p>
<b>DURATION</b>	Approximately 2,5 hours with an interval
<b>PERIOD OF PERFORMANCE</b>	From October 2010



## Workshops, activities and guided tours school year 2010-2011

### ***Ferrous pawns***

<b>TYPE</b>	Workshop
<b>RECIPIENTS</b>	Primary School, students aged from 8 to 10 years
<b>AIMS</b>	<p>The workshop conducts boys and girls to observe and use small metal objects. “Nuts and bolts” are sometimes clearly visible in everyday objects and sometimes well hidden. Boys and girls question the role of these small objects in the construction of common objects, they discover their names and characteristics. They listen to the story of those who produce them in factories close and far away.</p> <p>The workshop intends to develop manual skills and observation ability. It’s possible to make some practice of classification and construction of classes of belonging. We introduce some simple elements of mechanical technologies.</p> <p>We encourage creative thinking and creative practice from “mechanical” stimuli and the competition in accuracy, in compliance with the rules.</p>
<b>DESCRIPTION</b>	<p>The students have access to a box filled with metal “nuts and bolts” of different size and design. They discover its names and exercise on classification.</p> <p>They look for “nuts and bolts” around them, in everyday objects and verify its role.</p> <p>The last task is to assemble a set of metal “nuts and bolts” to build the pieces of a chess board, competing with each other on precision and timing.</p>
<b>DURATION</b>	Approximately 2,5 hours with an interval
<b>PERIOD OF PERFORMANCE</b>	From October 2010



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### *Robot crocodile*

<b>TYPE</b>	Workshop
<b>RECIPIENTS</b>	Primary School, students aged from 8 to 10 years
<b>AIMS</b>	<p>Workshops on micro robotics offered by Officina Emilia are supported by a covenant of collaboration with LEGO ® DACTA and the School of Robotics in Genoa.</p> <p>Boys and girls learn to recognize the structure of a robot in its main parts, make contact with the basic principles of programming and practice confrontation and discrimination. Programming is introduced by the analysis of a flowchart. The focus is oriented on the process, the logical relationships among the steps taken and the result. We encourage verbalization and the description of the process.</p>
<b>DESCRIPTION</b>	<p>The students have access to a set of LEGO ® including some "intelligent bricks". They are driven to produce a crocodile that makes some automatic movements and sound.</p> <p>They analyze the sequence of motions and describe this sequence in several ways: including the programming with iconographic language. They transfer the program to the "machine" and come into contact with some basic concepts of programming.</p> <p>First they build and program the crocodile and then, they operate repeatedly to find a more detailed description of experience and actions.</p>
<b>DURATION</b>	Approximately 2,5 hours with an interval
<b>PERIOD OF PERFORMANCE</b>	From October 2010



## Workshops, activities and guided tours school year 2010-2011

### ***A robot that follows a line***

<b>TYPE</b>	Workshop
<b>RECIPIENTS</b>	<p>Secondary School from 11 to 19 years old.</p> <p>The workshop has three modes of conduct in relation to the age of the students and the level of education.</p>
<b>AIMS</b>	<p>Workshops on micro robotics offered by Officina Emilia are supported by a covenant of collaboration with LEGO ® DACTA and the School of Robotics in Genoa.</p> <p>Students recognize the structure of a robot, they practice scientific and technological knowledge acquired only in theory, they make contact with the basic principles of programming and apply these principles in a new technological environment and calibrating sensors and solve problems related to operation of an automatic machine in a structured environment, they think about the choices that lead to a goal in a complex and indeterminate environment.</p> <p>Students aged from 16 to 19 years learn the characteristics of industrial robots production in the Province of Modena and in the in the national and international competitive environment.</p>
<b>DESCRIPTION</b>	<p>The students are guided to produce a robot that follows a black line on white background. Students who have some computer skills produce the program needed to operate the robot.</p> <p>Alternatively, a deductive process, starting with a flowchart, describes the basic instructions of programming with the iconographic language to stimulate the solution of the problem.</p> <p>Students carry out testing and auto-correction of errors and verify the correctness of the program and the calibration of sensors.</p> <p>After final inspection, the groups are compared in a race on the accuracy and reliability of their product.</p>
<b>DURATION</b>	Approximately 3,5 hours with an interval
<b>PERIOD OF PERFORMANCE</b>	From October 2010



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### *Roberta*

<b>TYPE</b>	Workshop
<b>RECIPIENTS</b>	Secondary female-dominated School, students aged from 14 to 19 years.
<b>AIMS</b>	<p>Workshops on micro robotics offered by Officina Emilia are supported by a covenant of collaboration with LEGO ® DACTA and the School of Robotics in Genoa.</p> <p>The workshop is led by young women tutor and it is directed especially to girls, to put them in touch with the latest technology, incorporated in many everyday objects and machines.</p> <p>The discussion concerns the personal experience of the girls in the use of machines and the educational and career choices influenced by gender stereotypes.</p>
<b>DESCRIPTION</b>	<p>Girls (and boys) recognize the structure of a robot, they practice scientific and technological knowledge acquired only in theory, they make contact with the basic principles of programming and apply these principles in a new technological environment, calibrating sensors and solve problems related to operation of an automatic machine in a structured environment, they think about the choices that lead to a goal in a complex and indeterminate environment.</p> <p>Divided into group, the girls experience the features of five different sensors and identify the machines in everyday life that are taking advantage of different sensors. Examples of robotic equipment used in healthcare, industrial and domestic attract attention to the pervasiveness of technology.</p>
<b>DURATION</b>	Approximately 4 hours with an interval
<b>PERIOD OF PERFORMANCE</b>	From October 2010



## Workshops, activities and guided tours school year 2010-2011

### *How many things are there?*

<b>TYPE</b>	Workshop
<b>RECIPIENTS</b>	Secondary school, students aged from 13 to 19 years. The workshop has two modes of conduct in relation to the age of the students.
<b>AIMS</b>	The workshop promotes the basic technological education, as knowledge and experience of production techniques and characteristics of the products of industry. Concrete activities are planned about assembly and disassembly of industrial products. We promote the understanding of important concepts of mechanics, organization of production and work. The focus is oriented on communication within the technical community and the documentation that accompanies the organization of production. The workshop is completed with a description of changes in the work of some of the mechanical industry professional figures
<b>DESCRIPTION</b>	The students dismantle the "bottom bracket" of a bicycle, they recognize the components, observe the drawings (two and three dimensional )and analyze the typical documents of the organization of production. They observe the working phases of a component. They can distinguish between production and assembly, they meet the division of labor between companies and supplier. They reassemble the pieces to regain the initial situation. Discuss the change in the work of the designer and other professional figures involved in industrial production.
<b>DURATION</b>	Approximately 3,5 hours with an interval
<b>PERIOD OF PERFORMANCE</b>	From October 2010



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### ***Melt the engines***

<b>TYPE</b>	Workshop
<b>RECIPIENTS</b>	<p>Secondary school, students aged from 14 to 19 years</p> <p>The workshop has three modes of conduct in relation to the age of the students.</p>
<b>AIMS</b>	<p>The workshop promotes the basic technological education, as knowledge and experience of production techniques and characteristics of the products of industry.</p> <p>During the workshop are planned concrete activities about assembly and disassembly of industrial products and the realization of a manufacturing step.</p> <p>We promote the understanding of important concepts of mechanics, organization of production and work.</p> <p>For the students aged from 16 to 19 year, the workshop proposes descriptions of careers and experiences of workers assigned to different tasks in the industry.</p>
<b>DESCRIPTION</b>	<p>Students disassemble the engine of a small motor bicycle, they discover the names of the different parts and reconstruct the same function in the creation of the movement.</p> <p>They identify a single component, produced by fusion, and produce a copy through a plaster casting.</p> <p>In this context we provides information about the division of labor between the companies involved in the mechanical production.</p> <p>The workshop can deepen socio-economic and social historian aspects.</p>
<b>DURATION</b>	Approximately 3,5 hours with an interval
<b>PERIOD OF PERFORMANCE</b>	From January 2011



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### *It is a matter of thousandths of a millimeter*

<b>TYPE</b>	Workshop
<b>RECIPIENTS</b>	Secondary school, students aged from 13 to 19 years. The workshop has three modes of conduct in relation to the age of the students and the level of education.
<b>AIMS</b>	<p>The workshop is made possible by donations of the company “Utensileria Modenese” and promotes the basic technological education, as knowledge and experience of production techniques and characteristics of the products of industry. During the workshop are planned concrete activities about assembly and disassembly of industrial products. We promote the understanding of important concepts of mechanics, organization of production and work.</p> <p>For the students aged from 16 to 19 years, the workshop proposes descriptions of careers and experiences of workers assigned to different tasks in the industry.</p>
<b>DESCRIPTION</b>	<p>Students discover that the size of a component can be measured with increasing precision instruments (meters, calipers, micrometers ...) and appreciate the complexity of avoiding the influence of the environment on the determination of the measure.</p> <p>We provides information about the division of labor between the companies involved in the mechanical production and about competition based on product quality and qualifications of the job.</p> <p>The workshop can deepen socio-economic and social historian aspects, in agreement with the teachers.</p>
<b>DURATION</b>	Approximately 3 hours with an interval
<b>PERIOD OF PERFORMANCE</b>	From January 2011



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### *Where there was grass there is now a city*

<b>TYPE</b>	Workshop
<b>RECIPIENTS</b>	Secondary school, students from 13 to 19 years. The workshop has three modes of conduct in relation to the age of the students and the level of education.
<b>AIMS</b>	The workshop promotes the knowledge of the urban, economic and social transformation in the city of Modena. Students perform activities of manipulation of historical maps as well as the satellite map of the municipality of Modena. the workshop promotes good organization, thoroughness, cooperation, monitoring of results, the use of hand tools and the use of software for communication.
<b>DESCRIPTION</b>	The exploration of the territory through historic maps and photographs, shows the changes of areas for housing, for roads and for collective buildings (schools, hospitals , etc.). The guided use of multimedia materials, available on the web, produces documents with descriptions and interpretations of social, economic and cultural development, from the fifties of the 20th century to the present.
<b>DURATION</b>	Approximately 2,5 hours with an interval
<b>PERIOD OF PERFORMANCE</b>	From January 2011



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### *Manufacturing companies open*

<b>TYPE</b>	Guided tour of industrial facilities and meeting with entrepreneurs, technicians and workers
<b>RECIPIENTS</b>	Secondary school, students aged from 16 to 19 years.
<b>AIMS</b>	<p>Visiting industrial plants gives the chance to know, through observation and reflection, the characteristics of the products of mechanical companies from Modena, the internal production process, with reference to the type of technology used, the relationship between the company, the market suppliers (of goods, services, processes) and customers, the professionalism and working conditions of workers, technicians, employees and entrepreneurs.</p> <p>During the workshops are encouraged reflections on technology, in relation to working conditions, and economy, in relation to personal income and overall wealth of the territory.</p> <p>The partner companies of Officina Emilia, allow, in some cases, an interview with the entrepreneur, with a manager or an officer of the company</p> <p>On the territory of the Province of Modena, the companies involved in the mechanical sector are small and medium-sized.</p>
<b>DESCRIPTION</b>	<p>During the first encounter in the classroom, students are guided to research about the main features of the local mechanical sector and the characteristics of the company to visit.</p> <p>The visit to industrial plants takes place in conditions of maximum security, accompanied by two tutors from Officina Emilia and employees of the company.</p> <p>The visit is followed by an activity of guided reflection that can be done by the teacher with materials specifically provided by Officina Emilia.</p>
<b>DURATION</b>	Three meetings (one optional)
<b>PERIOD OF PERFORMANCE</b>	From October 2010



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# The offer of collaboration with teachers

Officina Emilia promotes a process of qualification and support for school teachers of all levels. This process is structured in different ways.

### Light collaboration

There are two kind of teachers who chooses the light collaboration. There are teachers who choose one or more educational activities of the Officina Emilia and enter them in the planning of teaching with their classes. They accompany the classes in the Workshop-museum and use the offer of Officina Emilia as a stimulus for their students. They decide how to activate and how to develop, within the individual or collegiate programming, the connections that are solicited by the activities in the Workshop-museum. Other teachers ask the researchers of Officina Emilia to change slightly the activities proposed to take into account the special needs of their classes. Both teachers who choose the light collaboration can take advantage of the documentation center of Officina Emilia to review the documentation of multimedia materials.

### Medium Collaboration

Teachers, who choose the medium Collaboration, work together with researchers of Officina Emilia to amend or supplement the educational activities that take place in the Workshop-museum.. Researchers produce alternative proposals to meet the specific needs of programming, they produce and make available materials for the exploration and development of disciplinary connections. The teachers observe the effects of teaching activities, in terms of learning and, in collaboration with Officina Emilia, collect the results after a certain time after the workshop.

### Strong collaboration

Teachers may attend a training course for inclusion in programs of Action-Research, in accordance with protocols controlled by the Scientific Committee of Officina Emilia, on issues related to the development of skills and multidisciplinary knowledge and context in the area. For the 2010-2011 school year, the issues that Officina Emilia aims to develop include:

1. The vertical curriculum for the active knowledge of the local area from childhood to secondary school: a practical autonomy in research for individual schools
2. The technological education in the high school.



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3. A book, a movie, a concert as a result of the production process: concrete experience of knowledge of technologies and organizational models that help to spread cultural content.

Teachers who are interested in this type of collaboration are invited to submit their application. An interview will follow.

The number of projects that will be activated depends on the resources available and on the decisions of supervision of the Scientific Committee of Officina Emilia



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### The elective workshop for the excellence

The elective workshops meet the needs of a growing number of young people who are interested in deepening knowledge and skills that go beyond the school curriculum: students highly motivated and curious about the contemporary world and the tools, useful to interpret what is happening and the nowadays problems. The elective workshops offered by Officina Emilia are held by researchers and teachers who adopt an active and engaging methodology.

At the end, the participants can produce a paper based on qualitative and quantitative criteria and submit it to the assessment of a Committee, that will certify the level of knowledge and skills achieved. The participants will present this certification to their own schools, which will consider it in the determination of credits.

During 2010-2011, Officina Emilia plans to promote the following elective workshops:

1. The robots among us - we and the robots
2. The pins and the Network: technologies, development and complexity.

The workshops are aimed at students aged from 16 to 19 years and will be held in the afternoon, with a duration of 5 or 6 encounters.

The workshops are to be paid. Officina Emilia, in collaboration with partner companies, will provide a number of free seats.





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