

LYCÉE OZANAM

BRIDGING EDUCATION AND INDUSTRY:
BUILDING A MINI FORMULA 1 CAR



Two years ago, the teaching team at Lycée Ozanam decided to take part in the Race to Learn, a multidisciplinary contest whose objective is to encourage interest in scientific and technical areas of excellence through an innovative project.

Challenge:

Set up an annual educational project and manage all stages of the design of a mini Formula 1™ car using SOLIDWORKS software.

Solution:

Implement SOLIDWORKS Education Edition, SOLIDWORKS Flow Simulation, and SOLIDWORKS Sustainability.

Benefits:

- Developed teamwork to enable students to see practical view of product's entire development lifecycle
- Consolidated students' strengths and worked on their weaknesses
- Provided opportunity for industry to support education

ABOUT LYCÉE OZANAM

The Lycée Ozanam belongs to a group offering pre- and post-baccalauréat (high school diploma) training courses in the various branches of engineering and technology. From the 10th grade up to preparation for university engineering courses, 650 students have a choice of various options within the campus of Ozanam: École Professionnelle des Industries Lilloises (EPIL) and a professional school of industry in Lille. These two educational institutions provide a variety of training courses that enable students to build their future. "Our group's strength," says Dominique Dybizbanski, teacher and head of works advisor, "lies in the fact that all links are possible in the ethos of lifelong training." Lycée Ozanam promotes a culture of understanding rather than knowledge, and enables students to experience a successful course of study that will form the basis of all professional, and therefore personal, success.

THE ANNUAL "RACE TO LEARN" CONTEST

Two years ago, the teaching team at Lycée Ozanam decided to take part in the Race to Learn, a multidisciplinary contest whose objective is to encourage interest in scientific and technical areas of excellence through an innovative project. This contest is open to middle and high school students. It is organized by the Race to Learn association with the support of Dassault Systèmes, Renault, and the Plateforme de la Filière Automobile (PFA), an automotive industry platform. The project involves 11th-grade industry and sustainable development science and technology (STI/2D) students specializing in *Innovation Technologique et Eco-conception* (ITEC). This teamwork will follow all phases of a product's development cycle, as happens in industry.

The Race to Learn contest provides the teaching team at the Lycée Ozanam with an industrial project. STI/2D students have all the necessary tools (3D CAD, simulation, eco-design, and digital mock-up) to enable them to progress from know-how and interpersonal skills to knowledge and understanding. According to Lionel Hélin, teacher with responsibility for 11th-grade students. "A teaching project must enable our students to grasp all the problems and all the constraints, and to show the ability to make the best possible use of SOLIDWORKS® solutions."

SEPTEMBER: START OF ACADEMIC YEAR

The first step is for the organizers to study the specifications and define the learning objectives for the teaching team. "We are not setting up an annual project to please our students," says Hélin. "Above all else, we are aiming to establish guidelines for our training courses using real technological issues. The contest is therefore an excellent resource for our work."

After studying the specifications, the 11th-grade STI/2D ITEC teachers conduct an initial study of the project's constraints with the students. "The engine and battery are provided by the organizers, but it is up to us to put in place the shell and all the subsets of a mini Formula 1 car that measures approximately 30 centimeters in length," Hélin continues.

It all starts with a quick pencil sketch for an overall idea of the template. "This leads to creativity sessions by subgroup which allow the students to express their ideas and consider their feasibility," adds Hélin. After a quick sketch at the drawing board to define the car's shape, students use some of the 200 SOLIDWORKS Education Edition workstations at the lycée to model the various parts and gain an overall vision of the mini Formula 1 car.



"The students must succeed in grasping all the problems and all the constraints so they are able to make the best possible use of SOLIDWORKS solutions."

— Lionel Hélin, Teacher

As in industry, roles must be assigned: a project manager, engineers, a marketing manager, and others. The entire engineering of the car has to be designed, such as the shell, chassis, wheels, and so on. Technical constraints—including the position of the engine and the electric battery—must be taken into account and the materials chosen, to name just a few concerns.

The objectives of the contest are defined as a complete mini Formula 1 car, a stand, full engineering record, oral presentation of the project, search for suppliers and sponsors, and a communications plan.

"The students must succeed in grasping all the problems and all the constraints so they are able to make the best possible use of SOLIDWORKS solutions," says Hélin. "We are not omniscient, but thanks to Dassault Systèmes, we do have online tutorials available that provide answers to our queries. There is a very high demand from our students for these course supplements that are based on, and indeed enriched by, the experience of the educational world by Dassault Systèmes."

FEBRUARY: FIRST PROJECT REVIEW

When the 3D modeling is complete, the teaching team organizes an initial project review that compares the different 11th-grade STI/2D groups to choose a winner who will represent the lycée.

Nothing has been left to chance: The aerodynamics of the cart and its parts has been simulated, tested, and validated using SOLIDWORKS Flow Simulation. The decision is a difficult one, but a choice must be made. The leading project will serve as a working basis for the whole class for the rest of the year.

Once the winning mini car model has been selected, it must be optimized; there is work still to be done before the contest. The eco-design—the specialty of the STI/2D ITEC 11th-graders—is particularly important. “When the project is well advanced—that is, when the different subsets have been designed and we are certain of the industrial reality of our vehicle—we can address the choice of materials with SOLIDWORKS Sustainability,” explains Hélin. “Our aim, as in real life, is to build while also taking into account environmental requirements, as far as is possible. This choice also leads to the search for our suppliers, which is another aspect of the contest and an important feature of industrial design.”

The prototyping stage then follows, using the 3D printers at the lycée. Each subset of the mini Formula 1 car is manufactured, then assembled, and the car is created.

MAY: MONTH OF CONTEST

“We have been participating in this event for only three years. Our objective today is not to win the contest,” says Hélin. “Above all, this educational project provides support for our 11th-grade training year. It gives us the opportunity to work in a group, in a practical situation, and to rise to an industrial challenge. It is much more rewarding in terms of transmission. We can see our students develop, work with them to ensure the continuous improvement of their strengths, address their weaknesses, and expand the scope of our training and understanding. This also teaches them that industry is an entire process. There are as many jobs as there are phases in the course of an industrial project and they are all interdependent, interesting, and indispensable. It is a practical form of education, totally in keeping with the ethos of our Ozanam-EPIL group, which is capable of providing both educational choices and human development, with a capital ‘H.’”

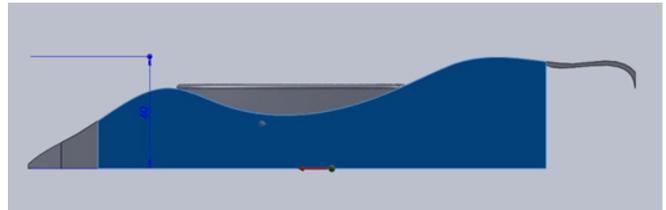
Focus on Lycée Ozanam

VAR: Cadware Systems, Palaiseau, France

Headquarters: 50 Rue Saint Gabriel

Lille, France 59045

Phone: +03 20 21 96 50



Students use some of the 200 SOLIDWORKS Education Edition workstations at the Lycée Ozanam to model the various parts and gain an overall vision of the mini Formula 1 car.

Our 3DEXPERIENCE® platform powers our brand applications, serving 12 industries, and provides a rich portfolio of industry solution experiences.

Dassault Systèmes, the 3DEXPERIENCE® Company, provides business and people with virtual universes to imagine sustainable innovations. Its world-leading solutions transform the way products are designed, produced, and supported. Dassault Systèmes' collaborative solutions foster social innovation, expanding possibilities for the virtual world to improve the real world. The group brings value to over 210,000 customers of all sizes in all industries in more than 140 countries. For more information, visit www.3ds.com.



3DEXPERIENCE®