# Fab-Nat

*Digital Fabrication Laboratory*

*Three Years Serving a Community*

*2023-2024-205-2026*

## 251 completed projets

Students · Teachers · Staff · Parents

## *Campus des Nations*

International School of Geneva

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***https://sites.google.com/ecolint.ch/nat-fab-lab/***

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# 1 — Presentation & Mission of the Fab Lab

Fab-Nat is the design and fabrication laboratory of the Campus des Nations, part of the International School of Geneva. Launched in 2023, it embodies a simple conviction: creativity and making are powerful tools for learning, motivation and building community.

## Mission

To unlock the creative potential of every member of the educational community — students, teachers and administrative staff — by giving them the means to turn their ideas into concrete realisations.

## Core Values

- Accessibility — the Fab Lab is open to everyone, with no technical prerequisites
- Interdisciplinarity — every project crosses multiple subjects and skill sets
- Learning by doing — we learn better by building than by reading
- Sharing — knowledge, failures and successes belong to everyone
- Innovation — encouraging experimentation and embracing failure as a step forward

## The Fab Lab as Community Glue

More than a workshop, Fab-Nat is a meeting place. It builds bridges between people who would not naturally cross paths: a Year 11 student and a science teacher, an administrative service and an arts department, an abstract idea and a tangible object.

By pooling existing resources — Design Labs, CAD, DTP, laser cutting, 3D printing — it gives everyone access to technologies that would otherwise be out of reach, without letting technical complexity stand in the way of creativity.

# 2 — How the Service Works

Fab-Nat operates as an on-demand service — flexible, accessible, both online and in person.

## A Blended Service: Digital and Physical

Requests can be submitted in several ways:

- Via the online form on the Fab-Nat website
- By email directly to the lab coordinator
- In person during weekly drop-in sessions
- Informally, in the corridors or staffroom

This flexibility is intentional. The Fab Lab should never feel like a bureaucratic process — it is a human, responsive service that adapts to the real needs of the community.

## The 4-Step Process

1. Request received — via form, email or in person
2. Feasibility study — pedagogical and technical assessment of the project
3. Personalised guidance — from concept to fabrication
4. Delivery and follow-up — final handover, feedback and lessons learned

## Who Can Make a Request?

- Students — for personal projects, creative work, IB Personal Projects
- Teachers — for pedagogical models, demonstration tools, prototypes
- Administrative staff — for communication needs, signage, custom objects
- Departments — for collective, interdisciplinary or institutional projects

Student requests must be supervised by a teacher.

# 3 — Equipment, Software & Materials

## Machines


### Laser Cutter

*#Laser #Wood #Acrylic #Engraving*

The laser cutter is the key element of Fab-Nat: it is what allows ideas to become reality through ultra-fast prototyping. It cuts and engraves with precision across a wide range of materials — wood, acrylic, cardboard, leather and fabric. Used for prototypes, signage, scale models and artistic creations.


### 3D Printer (FDM)

*#3Dprint #PLA #PETG #Prototyping*

Alongside the laser cutter, the 3D printer is the other key element of Fab-Nat: it enables instant prototyping with no shape constraints. FDM printers build three-dimensional objects from digital models. Used for scientific models, mechanical parts, custom objects and functional prototypes.

### Large Format Printer (A1)

*#Poster #DTP #Illustration #Communication*

The large format printer produces posters and communication documents up to A1 size. Used by departments, students and staff to showcase their projects. It also opens the door to large format plans — technical drawings, maps, timelines — as well as art printing, allowing visual creations to be reproduced with gallery-quality results.

## Software

- Fusion 360 — 3D modelling and CAD
- Inkscape / Illustrator — vector drawing for laser cutting
- Ultimaker Cura / BambuStudio — slicing for 3D printing
- Adobe InDesign — layout and desktop publishing
- TechSoft 2D Design — technical 2D design
- Arduino IDE / Thonny Python — microcontroller programming
- Raspberry Pi OS / Linux — embedded systems

## Available Materials

- Wood (plywood, MDF, balsa)
- Acrylic / Plexiglas (multiple colours and thicknesses)
- PLA, PETG, TPU filaments for 3D printing
- Cardboard, paper, fabric for laser cutting
- Electronic components (Arduino, Raspberry Pi, sensors, LEDs...)
- Fasteners, adhesives and finishing materials

# 4 — Overall Activity Report

Fab-Nat was launched in October 2023. Over three years of activity, it has handled more than 251 requests and supported hundreds of students, teachers and staff members in their projects.

| | |
|---|---|
| **Projects and activities completed** | **251+** |
| **Hours of activity (2025-26 alone)** | **314 h** |
| **Logged activities (2025-26)** | **230** |
| **Success rate** | **> 95%** |
| **Nationalities represented** | **130+** |
| **Community members reached** | **2,000+** |

These figures only tell part of the story. Behind every log entry is a student who learned something new, a teacher whose lesson was enriched, or a service that could communicate more effectively.

## Growth Over 3 Years

The first year (2023-2024) was a launch phase, initially reserved for Year 11 students. From February 2024, the service opened to the entire secondary school. The second year saw strong growth, with expansion to the whole Ecolint community. The third year consolidated the service and broadened institutional partnerships.

# 5 — Analysis by Activity Type

Fab-Nat activities fall into several categories, reflecting the diversity of community needs.

| | |
|---|---|
| **Design & Conception** | **97 activities (42%)** |
| **Technical discussion & advice** | **27 activities (12%)** |
| **Cutting & Printing** | **44 activities (19%)** |
| **Physical creation (assembly, finishing)** | **19 activities (8%)** |
| **Project discussion (scoping)** | **18 activities (8%)** |
| **Promotion & communication** | **13 activities (6%)** |
| **Other (meetings, training...)** | **12 activities (5%)** |

"Design & Conception" is by far the largest category — confirming that the Fab Lab is not merely a fabrication workshop, but first and foremost a space for thinking and designing. Intellectual and creative support always precedes physical making.

## 6 — Analysis by Beneficiary

Fab-Nat serves three main categories of beneficiaries, each with distinct needs.

| | |
|---|---|
| **Teachers** | **75 activities (33%)** |
| **Students (all year groups)** | **64 activities (28%)** |
| **Year 11 — IB Personal Projects** | **30 activities (13%)** |
| **Administrative staff** | **26 activities (11%)** |
| **Other year groups (Y7, Y8, Y9, Y13...)** | **12 activities (5%)** |
| **Fab Lab (internal / R&D)** | **23 activities (10%)** |

### Students

Students use the Fab Lab primarily for their IB Personal Projects (Year 11), but also for class projects, personal creations and service projects. Laser cutting and 3D printing are the most requested tools.

### Teachers

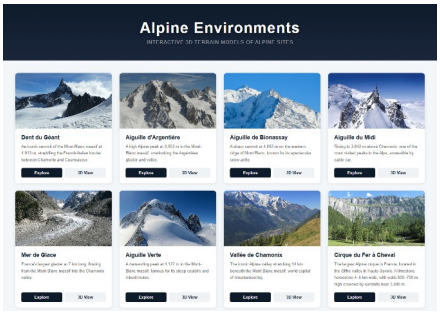
Teachers call on the Fab Lab to create pedagogical models, demonstration tools and teaching aids. Collaboration with the science department is particularly active — physical models allow complex phenomena to be illustrated intuitively.

### Administrative Staff

Administrative services use the Fab Lab for their communication and signage needs: labels, signs, badges, custom objects. This is an often overlooked but very concrete dimension of the service's impact.

# 7 — Gallery — Digital Projects

This gallery presents projects with a digital and web focus, combining programming, interface design and online creation.




## Alpine Environments

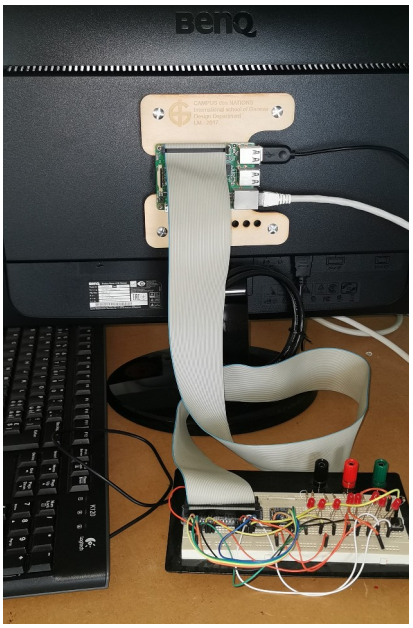
*#Web #Design #Environment #STEAM*

A flagship Fab-Nat project: a website dedicated to alpine environments, combining natural sciences, photography, mapping and digital design. A concrete interdisciplinary project merging technology and environmental awareness. Site: https://nationsdesign.online/alpine-environements/


## Timelapse Device

*#RaspberryPi #Linux #Coding #Design #Electronic*

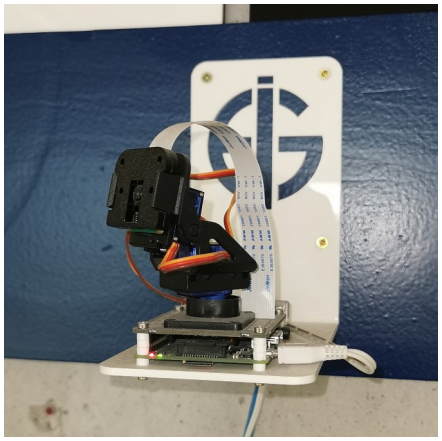
An autonomous timelapse machine built around a Raspberry Pi. It produced the first timelapses documenting the educational life of Campus des Nations. The enclosure runs a dedicated application that makes it simple to configure a timelapse: interval between shots, start time and end time. Battery-powered and fully self-contained, this system has been deployed on many occasions during school events to capture and preserve a living visual record.




## Python / Raspberry Pi Laboratory

*#RaspberryPi #Linux #Coding #Design #Electronic*

A hands-on laboratory for controlling Raspberry Pi inputs and outputs using Python. A concrete pedagogical tool for learning embedded programming. Behind this project: a simple idea — build low-cost workstations by mounting a Raspberry Pi on the back of a screen. Each station comes in at under €200 — a complete, silent, energy-efficient computer whose GPIO pins are directly accessible and connected to a breadboard via a ribbon cable. A clean and elegant build that opens the door to electronics, coding and science in any classroom.



## Servo - Camera Lab

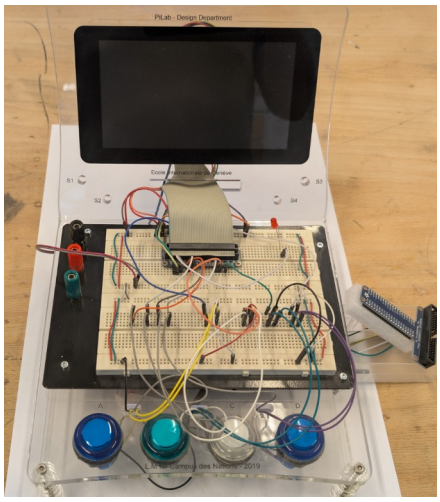
*#RaspberryPi #Coding #Design #Electronic*

A camera control system using servo motors and a Raspberry Pi, illustrating the convergence of mechanics, electronics and programming. Still built around the Raspberry Pi, it allows students to explore servo motor control and understand Python programming logic in a hands-on, visual way. Another unparalleled pedagogical window — watching a camera pivot in response to your own code is an experience that stays with you.

## WiFi Camera — GoPro Like Raspberry Pi

*#RaspberryPi #Laser #Coding #Design #Electronic #WiFi #Streaming*

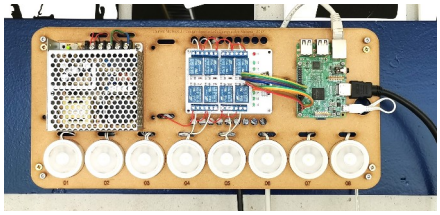
An embedded, connected camera built from a Raspberry Pi camera module and embedded software that films in real time and streams the live video feed to a website. The design is entirely Campus des Nations: the camera is worn like a head torch, the lens fixed at the front and the Raspberry Pi housed where the battery would normally sit. An ingenious, lightweight and functional object, perfectly illustrating Fab-Nat's ability to design original solutions by repurposing everyday objects.



## Raspberry Pi Lab — Programming Console

*#RaspberryPi #Laser #Acrylic #Coding #Design #Electronic*

An embedded programming console built around a Raspberry Pi with a 7-inch screen integrated into a bent acrylic chassis made at Fab-Nat. The console panel is fitted with push buttons that allow students to program games directly and test them in real time. A functional and aesthetic object that makes programming tangible and playful.



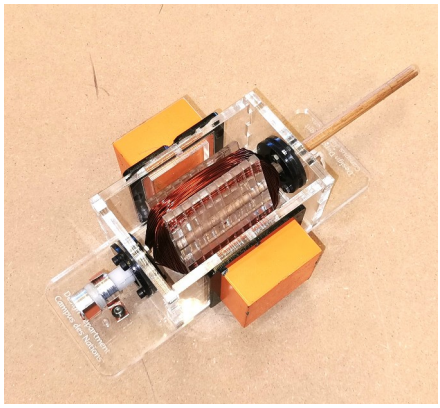

## Raspberry Pi Chenillard — Interactive Board

*#RaspberryPi #Laser #Coding #Design #Electronic #Python #Classroom*

A LED chaser model driven by a Raspberry Pi, installed above the teacher's interactive whiteboard. Each student programs their own light sequence from their computer — the sequence is then played in real time on the model above the board. The whole class can simultaneously visualise the result of their programming: the LEDs light up in sequence on the model while the code is displayed on the interactive board. An immediate, collective pedagogical tool that makes programming visible and shared.

# 8 — Gallery — Electronics & Technical Projects

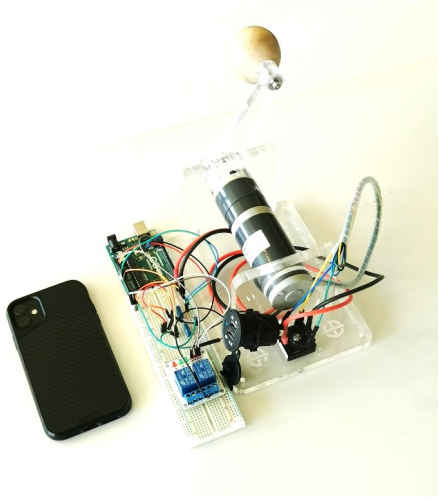
Prototypes and models with a scientific and technical purpose, designed to illustrate physical phenomena or develop electronics and programming skills.



## AC Generator

*#Science #Design #Laser #Electronic*

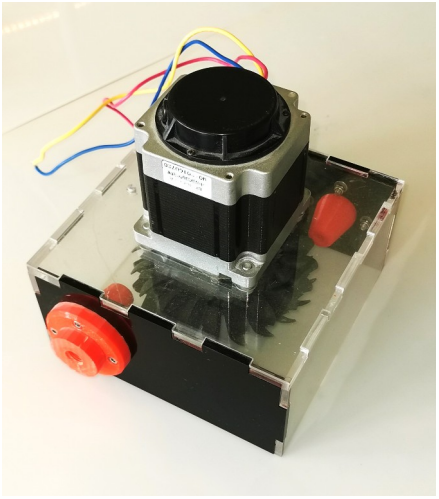
A model illustrating the principle of electromagnetic induction. All components — stator, rotor, coils, magnets — are clearly visible and identifiable, making it an ideal teaching aid for physics lessons. The model is fully functional: its wound rotor and two brushes allow the alternating current waveform to be visualised in real time on an oscilloscope.



## Hand-Crank Smartphone Charger

*#Arduino #Laser #Coding #Design #Electronic #Science*

A mini USB charger build, focused on mastering the USB protocol and 5V DC power supply. The whole system is controlled by an Arduino board combined with a power relay, with advanced programming that requires a minimum of thirty seconds of physical effort on the crank before allowing charging to begin — preventing current spikes and ensuring a smooth, safe voltage ramp-up. A project spanning power electronics, coding and electrical physics.



## Pico Hydroelectric Turbine

*#Laser #Design #Electronic #Science*

A Pelton-type hydroelectric turbine prototype — a flagship and captivating project drawing on Laurent Moreau's expertise in pico-hydroelectricity. The turbine drives a three-phase BLDC motor, enabling the study of AC current generation, rectification and energy conversion. The Pelton wheel is fully modelled and 3D printed — a fine example of the synergy between digital fabrication and applied physics. A project that genuinely fascinates students and gives real meaning to lessons on electricity and renewable energy.

## Simon Says Game

*#Arduino #Laser #Coding #Design #Electronic #Maths*

A Simon Says memory game built with an Arduino. The four coloured buttons and laser-cut acrylic enclosure are entirely designed and made in the Fab-Nat. A great classic of playful electronics that exercises memory to the full — and demands a thorough understanding of every programming step to achieve the result: light and sound sequences that the user must reproduce with increasing precision. A complete project, from circuit design to game logic.

## Fidget Meter

*#Laser #Design #Electronic #Science #Maths*

A machine designed to measure the rotation speed and spin duration of fidget spinners made by Year 8 students in design class. A project crossing design, physics and mathematics. The device displays in real time the rotation speed in RPM as well as how long the spinner can keep turning — driven by a standardised 100-gram weight falling from a height of one metre, ensuring identical test conditions for every student. An objective and rigorous comparison tool, purpose-built for the design classroom.


## Magic Digit

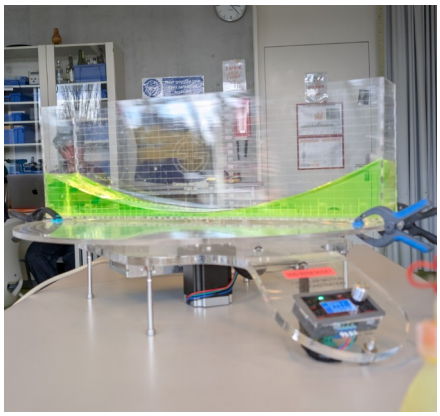
*#RaspberryPi #Laser #Coding #Design #Electronic*

A counting machine prototype designed for learning Python programming. Built around a 7-segment display controlled remotely, it generates number displays by combining design aesthetics and programming logic. Students see their code executing in a concrete, immediate way — each instruction translates directly into a displayed digit. Python is used for more advanced programming, while Scratch provides a first graphical and intuitive approach to programming logic.

## Arcade Game

*#RaspberryPi #Laser #Coding #Design #Electronic*

A full arcade cabinet built from scratch by a Year 11 student — a flagship project, from A to Z. The plywood enclosure is entirely laser-cut, the screen is a salvaged monitor given a second life, and the buttons and joystick were sourced and integrated by the student himself. The whole system runs on a Raspberry Pi. A project spanning programming, industrial design and electronics — and a powerful demonstration of what a talented, motivated student can design and build independently at Fab-Nat.



## Rotating Plate — Science & Visualisation

*#Laser #Design #Science #Electronic #Motor #Coriolis #Physics*

A project carried out at the request of the science department, designed for a teacher wishing to measure and visualise Coriolis forces. The plate is set in rotation by a stepper motor whose speed can be incrementally adjusted. Sensors placed on the plate measure the forces at play. The project evolved with the addition of a tray for liquid — the rotation produces a perfect hyperbola, visible to the naked eye, generated by the liquid pushed towards the edges of the container. A striking pedagogical tool, entirely designed and built at Fab-Nat.

# 9 — Gallery — Design & Artistic Projects

Creations with a primarily aesthetic and artistic focus, where the Fab Lab serves creative expression and visual design.


## Smell & Guess

*#Design #Science #Sensory #Wood #Laser*

A box with six rotating compartments containing aromatic substances — rosemary, cloves, fennel, lavender... By turning the lid, the user releases each scent in turn and must identify the substance without seeing it. A sensory and playful project combining mechanical design, laser-cut fabrication and scientific experimentation.

## Artistic & Decorative Creations

*#Laser #Design #Art #Engraving*

Fab-Nat has produced many artistic pieces illustrating the versatility of the laser cutter as a tool for creative expression. Pictured here: a high-quality jewellery box with precision-cut details, a pendant engraved with a Buddhist symbol, a wireless inductive USB charger, and a small architectural chair — all entirely designed and fabricated using the laser cutter. Objects that prove digital technology can produce pieces of remarkable finesse and elegance.


## Personalised Objects & Gifts

*#Laser #3Dprint #Design #Personalisation*

Fab-Nat regularly fulfils requests for custom objects for the community — key rings, badges, labels, trophies, frames. Each piece is made to measure, in line with the school's visual identity or current projects. Pictured here, a hinged wooden box created for Ecolint's centenary, in partnership with the philanthropy department, as a gift to thank donors. Inside the box: a magnet bearing Ecolint's QR code and the word 'Thank you'. A simple, elegant and meaningful object — made entirely at Fab-Nat.

## Initials & Logo — Walnut Key Ring

*#Laser #Wood #Walnut #Design #Art #Identity*

In this project, students began by drawing their initials on paper in an artistic way to create a unique personal logo. They then used Bézier curves to digitally model their initials according to their imagined logo. The final result is laser-cut from a piece of walnut and fitted with a ring — an elegant, fully personalised key ring at the intersection of drawing, digital design and fabrication.

## Acrylic Decoration — Light Design

*#Laser #Acrylic #Design #Art #Decoration*

A decorative piece in laser-cut acrylic. The transparency and cutting precision of acrylic allow for play with light and reflections to produce striking visual effects. An example of the aesthetic possibilities offered by laser cutting on transparent or coloured plastic material.


## Mind Map — A 5-Layer Work of Art

*#Laser #Wood #Design #Art #Multilayer #Portrait*

In this artistic design project, a student created a work in five layers of wood of different species and colours. The composition depicts a woman's face in profile, with a speech bubble in which her thoughts unfold as a mind map. Each layer of wood contributes its own texture and shade, creating remarkable visual depth and material richness. A work that is both technical and poetic, perfectly illustrating Fab-Nat's ability to put digital fabrication at the service of the most personal artistic expression.

## Europe — Precious Wood

*#Laser #Wood #Design #Art #Engraving #Puzzle*

Three precious wood creations from the same project: a complete chess set with its pieces and storage box, and a map of Europe in which each country forms an independent puzzle piece to be assembled. Objects of remarkable finesse, entirely designed and laser-engraved, perfectly illustrating Fab-Nat's capacity to produce high-quality craftwork.

## Fidget & Culture — Design by Iteration

*#Laser #Wood #Design #Art #Culture #Year8*

In this design project, Year 8 students must design a fidget spinner through three successive iterations. Each proposal incorporates a graphic element linked to their cultural background — a landmark from their country, a pattern characteristic of a culture, an identity symbol. The result is laser-cut and reflects both the student's technical mastery and their cultural uniqueness. A project that proves design is also a vehicle for personal expression and openness to the world.


## Wood Engraving — From Drawing to Gift

*#Laser #Wood #Design #Art #Engraving #Gift*

In this project, students repurpose IKEA chopping boards into genuine personalised graphic pieces. Each student draws a logo, illustration or graphic artwork, then reworks it with Bézier curves before engraving it onto the wooden board with the laser. The result is a unique, elegant and personal object — ideal as a gift for Father's Day, Mother's Day or any other occasion. A project showing that with a little creativity and the right tools, an everyday object can become a work of art.

# 10 — Gallery — Institutional Projects

Projects made in service of the wider community — departments, administrative services and institutional events.


## STEAM Summit 2025 Badge

*#Design #Laser #Event #Institutional*

Design and production of the official badge for the STEAM Summit 2025, organised by the Ecolint ICT department. Two hundred badges produced at Fab-Nat for this event hosted by the International School of Geneva. The badge features two sides: one bears the QR code of the Campus des Nations Fab-Nat, the other displays the event programme and the participant's name. A concrete institutional project demonstrating Fab-Nat's capacity to produce professional-quality communication objects, in series and on time.

## Garden Labels — Primary School

*#Laser #Wood #Institutional #Community*

Plant labels bearing the names of primary school classes at Campus des Nations, requested by the school's gardening committee — service to the community in its most everyday dimension.


## Signage & Communication

*#Laser #Design #DTP #Institutional*

Fab-Nat regularly handles signage and communication needs for campus services: directional signs, event posters, door plates and space identity. Pictured here, a magnet crafted from high-quality wood — one side bearing a QR code linking to school resources, the other displaying Ecolint's motto. A highly effective marketing object, elegant and durable, distributed to campus visitors as an ambassador of the school's identity.


## Marketing & Promotion

*#Design #DTP #Print #Communication*

Fab-Nat puts its skills at the service of the community's visibility — posters, flyers, visual presentations. Pictured here, a Fab-Nat promotional key ring, distributed to all Year 11 students. A clever and practical object: on the back, a QR code linking directly to the Fab-Nat website with all the information needed to submit a request. A tangible first point of contact between the student and the service.

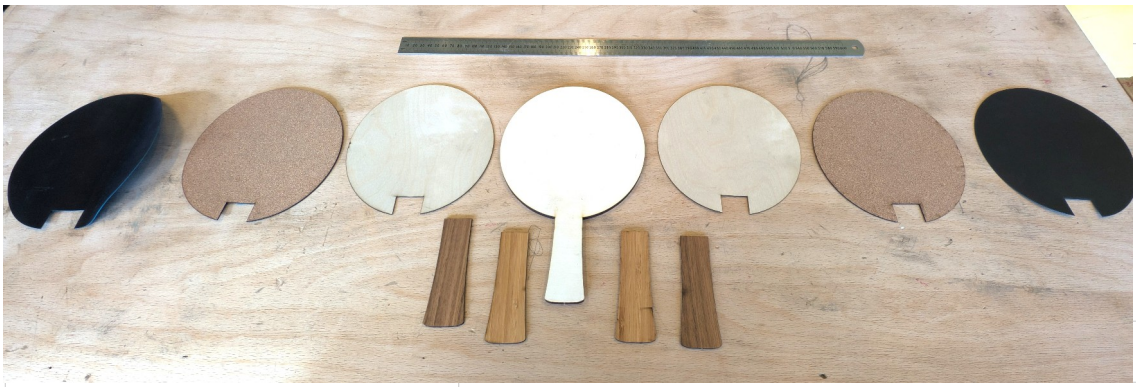
# 11 — Gallery — IB Personal Projects

The Personal Project is an individual project that every Year 11 student in the IB MYP programme must complete independently. Fab-Nat is a natural partner, providing technical and creative expertise.

## 3Table tennis Paddle

*#Laser #3Dprint #Design #Bois #Acrylique*

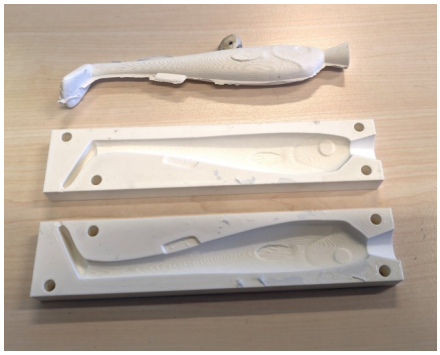
As part of his Personal Project, this student designed and built his own table tennis paddle from scratch. The paddle design was entirely conceived by the student, then broken down into successive layers cut by laser — each layer contributing to the final shape, thickness and balance of the paddle. One photo shows the finished paddle; a second image details the individual cut layers before assembly. A project combining product design, technical precision and aesthetic sensibility.



## Architectural Scale Model

*#Laser #Design #Architecture #3Dprint*

A student transformed a piece of artwork created in art class into a unique and unforgettable gift: his drawing was printed onto a three-ply plywood sheet, then laser-cut into puzzle pieces. The whole set was carefully placed in a custom-made box and given to a friend at the end of their studies. A beautiful and deeply personal creation, at the intersection of art, design and emotion — proof that Fab-Nat can be at the service of friendship and memory.



## 3D Fishing Lures

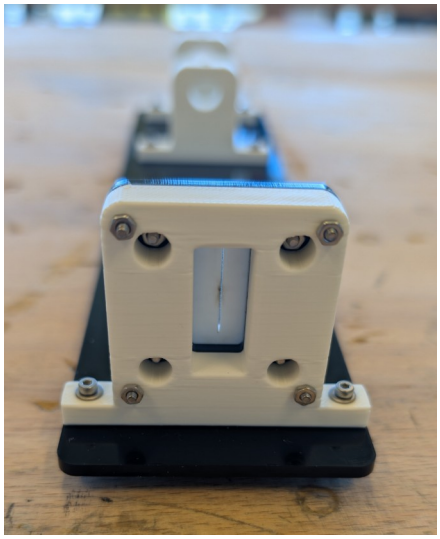
*#3Dprint #Design #Modelling*

As part of his Personal Project, this student used Fab-Nat to design and 3D print a mould for casting silicone fishing lures. He mastered 3D design using Fusion 360, from modelling the lure itself to designing the two-part mould. The resulting lures are fully functional — a project at the intersection of product design, biology and digital fabrication, carried out from start to finish with rigour and passion.

## Acoustic Guitar — Personal Project

*#Laser #Wood #Design #Music #PersonalProject #Assembly*

As part of his Personal Project, this student took on a remarkable challenge: designing and building an acoustic guitar from A to Z, with his own design. Every single piece — soundboard, neck, bridge, sides — was laser-cut at Fab-Nat and then carefully assembled by the student. The guitar was perfectly functional at the end of the project. An exceptional achievement that illustrates what a passionate and determined student can accomplish when given the right tools and the right support.



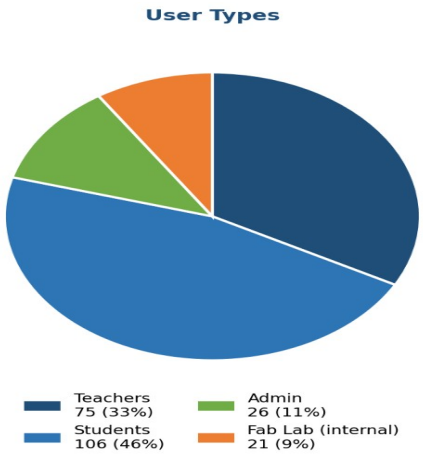
## Double Slit — Miniature Prototype

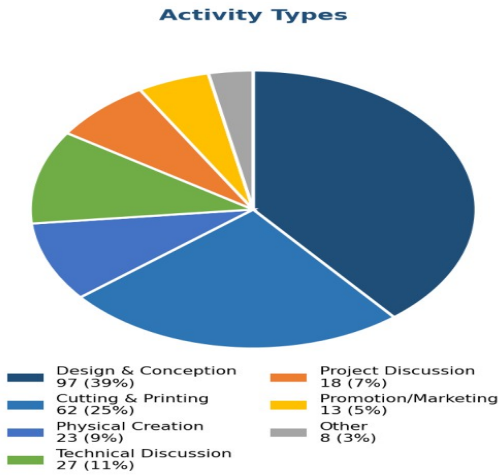
*#Laser #Design #Science #Physics #PersonalProject #CERN*

As part of his Personal Project, this student recreated the double-slit experiment — a fundamental quantum physics experiment inspired by CERN's work. The prototype uses a laser pen whose beam passes through a finely calibrated slit, reproducing the characteristic beam splitting. Entirely designed and built at Fab-Nat, the prototype was fully functional and was presented at the school's open days — a remarkable achievement combining fundamental physics, design and digital fabrication.

# 12 — Complete Activity Log

228 activities recorded over 3 years of Fab-Nat operation (2023-2026). Each entry corresponds to a concrete interaction with the community.




## Complete log — 228 entries

*Activities listed in chronological order, covering the three years 2023-2026.*

| Date | Activity | Type | Beneficiary |
|---|---|---|---|
| 18/09/2025 | Fab Lab presentation — Personal Projects | Presentation | Teacher |
| 05/09/2025 | Meeting with Nunana and Martial | Meeting | Admin |
| 10/09/2025 | ICT helpdesk open/close sign | Design | Students |
| 30/09/2025 | Double-slit experiment setup | Technical discussion | Students |
| 02/10/2025 | PP magazine — printing questions | Project discussion | Students |
| 03/10/2025 | Architectural model PP — cardboard & Techsoft 2D | Project discussion | Students |
| 03/10/2025 | Label cutting | Cutting/printing | Admin |
| 03/10/2025 | Double-slit prototype — design | Design | Students |
| 03/10/2025 | Double-slit prototype — cutting | Cutting/printing | Students |
| 06/10/2025 | PP Diorama mental health — Malatavie HUG | Project discussion | Students |
| 09/10/2025 | 3D modelling fishing lures for PP | Project discussion | Students |
| 09/10/2025 | InDesign — magazine layout | Technical discussion | Students |
| 09/10/2025 | Illustrator — book cover, printing techniques | Technical discussion | Students |
| 09/10/2025 | Learn to Swim token — design + print + cut | Physical creation | Teacher |
| 10/10/2025 | Software research, student accounts | Technical discussion | Teacher |
| 10/10/2025 | Fidget cut prototype N°1 — Year 7 | Cutting/printing | Fab Lab |
| 11/10/2025 | Meeting — Students, Richard, Carla, Nunana | Project discussion | Teacher |
| 14/10/2025 | Miniature particle accelerator — materials & software | Design | Students |
| 14/10/2025 | Donors gift meeting | Promotion/marketing | Admin |
| 14/10/2025 | Director pitch — student & parent invitations | Promotion/marketing | Admin |

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|---|---|---|---|
| 27/10/2025 | PP table tennis paddle — discussion | Project discussion | Students |
| 28/10/2025 | Techsoft 2D — method and materials | Design | Students |
| 28/10/2025 | Fusion 360 — install, getting started | Design | Students |
| 28/10/2025 | PP film — camera, consent, WeVideo | Technical discussion | Students |
| 30/10/2025 | Donors event — preparation and attendance | Promotion/marketing | Admin |
| 31/10/2025 | Prototyping — Fusion 360, Illustrator, laser cut | Technical discussion | Students |
| 02/11/2025 | PP project email follow-up | Technical discussion | Students |
| 03/11/2025 | Double-slit prototype — design | Design | Students |
| 04/11/2025 | Particle accelerator — design and materials | Design | Students |
| 04/11/2025 | Paddle — Bézier curves | Design | Students |
| 06/11/2025 | Paddle — Fusion 360, sketch export to laser | Design | Students |
| 06/11/2025 | Fidget cut prototype N°2 — Year 7 | Cutting/printing | Fab Lab |
| 07/11/2025 | Double-slit — concept change, micro-screws | Technical discussion | Students |
| 11/11/2025 | Double-slit — calibration wire new concept | Design | Students |
| 12/11/2025 | Feedback documents donors event | Promotion/marketing | Admin |
| 13/11/2025 | Web hosting — DNS, hosting | Technical discussion | Students |
| 14/11/2025 | Kung fu film hosting solution | Technical discussion | Students |
| 17/11/2025 | Website update + software list | Promotion/marketing | Admin |
| 17/11/2025 | PP student emails | Technical discussion | Admin |
| 18/11/2025 | Final prototype correction | Design | Students |
| 20/11/2025 | Layers — DXF export Fusion, Techsoft import | Cutting/printing | Students |
| 20/11/2025 | Booklet printer setup | Design | Students |
| 20/11/2025 | 3D mould + lure printing | Cutting/printing | Students |
| 20/11/2025 | Materials — power supply + coil wire | Design | Students |
| 20/11/2025 | Fidget cut prototype N°3 — Year 7 | Cutting/printing | Fab Lab |
| 20/11/2025 | Filling, cutting, adjusting laser prototype | Assembly | Students |
| 25/11/2025 | Silicone lure injection into mould | Physical creation | Students |
| 25/11/2025 | PP pre-iPhone device — concept discussion | Project discussion | Students |
| 25/11/2025 | Wood piece cutting for PP | Design | Students |
| 25/11/2025 | Coil correction, support cutting/printing, bending | Physical creation | Students |
| 27/11/2025 | 3D model correction, Fusion, export, print | Cutting/printing | Students |
| 27/11/2025 | New design, sketch export from 3D | Design | Students |
| 27/11/2025 | Poster design + print + helpdesk | Design | Students |
| 28/11/2025 | Design + cut + print | Design | Students |
| 28/11/2025 | Final booklet print, cutting, binding | Design | Students |

*Continued — entries 56 to 110*

| Date | Activity | Type | Beneficiary |
|---|---|---|---|
| 28/11/2025 | Paddle layers — cut, deburr, glue, press | Physical creation | Students |
| 01/12/2025 | HODS meeting | Project discussion | Teacher |
| 01/12/2025 | Mass-Mover website — start | Design | Teacher |
| 02/12/2025 | Wood cut, sanding + syringe injector axle | Physical creation | Students |
| 02/12/2025 | Poster + print new version + cut + binding | Cutting/printing | Students |
| 02/12/2025 | Poster design + print | Cutting/printing | Students |
| 02/12/2025 | Product photo collection | Promotion/marketing | Admin |
| 02/12/2025 | Last-minute print/cut/glue for exhibition | Physical creation | Students |
| 09/12/2025 | Fusion 360 — registration, installation | Technical discussion | Students |
| 09/12/2025 | Techsoft file + laser cut | Cutting/printing | Students |

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|---|---|---|---|
| 11/12/2025 | Kick boxing certificate — design + print + cut | Cutting/printing | Admin |
| 12/12/2025 | Gift cards printing — 300g paper | Cutting/printing | Admin |
| 28/12/2025 | Fab Lab website update — PP projects | Promotion/marketing | Admin |
| 05/01/2026 | Meeting Samuel and Virginie — digital terrain models | Project discussion | Teacher |
| 06/01/2026 | Material order | Other | Admin |
| 06/01/2026 | QuantumGIS installation and settings | Design | Teacher |
| 07/01/2026 | RGE maps grid by geographic zone | Design | Teacher |
| 09/01/2026 | Raster creation from downloaded tiles | Design | Teacher |
| 12/01/2026 | Fidget cut prototype N°2 — Year 7 | Cutting/printing | Students |
| 12/01/2026 | Double-layer plate design and printing | Design | Teacher |
| 13/01/2026 | Mass-Mover site — calculation aids | Project discussion | Teacher |
| 15/01/2026 | 3D map model generation from raster | Design | Teacher |
| 16/01/2026 | 3D Môle — settings and printing | Design | Teacher |
| 20/01/2026 | Fair Play trophy project — start | Design | Teacher |
| 23/01/2026 | IGN 3D map — Cirque fer à cheval — 3D print | Technical discussion | Teacher |
| 23/01/2026 | IGN 3D map — raster prep + IGN top 25 | Design | Teacher |
| 26/01/2026 | Howto web page — IGN + QGIS + KML | Design | Teacher |
| 27/01/2026 | Maps design and print + 3D model | Design | Teacher |
| 27/01/2026 | Material order | Other | Admin |
| 29/01/2026 | Mass-Mover site — Formula 1 | Design | Teacher |
| 03/02/2026 | Ink print design (stencil) | Design | Admin |
| 02/02/2026 | Scan software install + calibration | Cutting/printing | Teacher |
| 03/02/2026 | Online training, scan test | Training | Teacher |
| 08/02/2026 | 3D model — conception | Design | Teacher |
| 09/02/2026 | 3D model — fabrication | Physical creation | Teacher |
| 10/02/2026 | 3D model — assembly | Physical creation | Teacher |
| 19/02/2026 | Trophy plate | Cutting/printing | Admin |
| 20/02/2026 | Fidget cut prototype N°3 — Year 7 | Cutting/printing | Students |
| 20/02/2026 | Transparent label model design + print | Cutting/printing | Admin |
| 03/03/2026 | Model print — 220 labels | Cutting/printing | Teacher |
| 04/03/2026 | Material order | Other | Admin |
| 05/03/2026 | Fidget cut prototype N°1 — Year 7 | Cutting/printing | Students |
| 06/03/2026 | Stencil for UX design | Design | Students |
| 10/03/2026 | Fab Lab website update | Promotion/marketing | Teacher |
| 11/03/2026 | Student software choice discussion | Project discussion | Students |
| 17/03/2026 | DC generator — brush + collector — design + print | Design | Teacher |
| 17/03/2026 | Plate cutting | Cutting/printing | Admin |
| 19/03/2026 | Photos, emails | Promotion/marketing | Teacher |
| 19/03/2026 | Software table update | Technical discussion | Students |
| 20/03/2026 | Stencil cut x24 | Cutting/printing | Students |
| 21/03/2026 | 3D printer network analysis | Technical discussion | Admin |
| 20/03/2026 | Fair Play trophy — iteration v1 and v2 | Design | Students |
| 24/03/2026 | 3D printer issue — laptop boot room 514 | Other | Admin |
| 24/03/2026 | Tournament plate cutting | Cutting/printing | Teacher |
| 24/03/2026 | Fair Play trophy — design + outline + laser settings | Design | Students |

*Continued — entries 111 to 165*

| Date | Activity | Type | Beneficiary |
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|---|---|---|---|
| 24/03/2026 | Fair Play trophy — translucent orange acrylic/wood cut | Design | Students |
| 26/03/2026 | Tournament plate cutting | Cutting/printing | Teacher |
| 27/03/2026 | I&S project — 2D to 3D maps — start | Design | Teacher |
| 27/03/2026 | Rotating plate — Coriolis visualisation component | Design | Teacher |
| 27/03/2026 | Design, build and assemble water receiver component | Design | Teacher |
| 31/03/2026 | Acrylic plate cutting 600x300 | Cutting/printing | Students |
| 01/04/2026 | Pop-art portrait Y11 — B&W model cutting | Cutting/printing | Students |
| 02/04/2026 | Pop-art portrait Y11 — B&W model cutting | Cutting/printing | Students |
| 21/04/2026 | 3D basketball on hand modelling discussion | Technical discussion | Teacher |
| 23/04/2026 | Maps 1 — Dent du Géant — coordinates, scales | Design | Teacher |
| 23/04/2026 | Maps 2 — Aiguille de Bionnassay | Design | Teacher |
| 24/04/2026 | Telescopic sword for drama department | Design | Students |
| 24/04/2026 | Maps 3 — Arête des flammes de pierre — Hautes-Pyrénées | Design | Teacher |
| 28/04/2026 | Logo design | Design | Admin |
| 28/04/2026 | 3D maps project organisation | Design | Teacher |
| 30/04/2026 | Display stand, coordinate labels + 4 mini maps | Design | Teacher |
| 01/05/2026 | Pushchair brake pedal — repair example | Design | Students |
| 05/05/2026 | Maps 5 — Arête — Aiguille du Chardonnet | Design | Teacher |
| 05/05/2026 | Maps 6 — Arête des Cosmiques | Design | Teacher |
| 05/05/2026 | Maps 7 — Cirque de Gavarnie | Design | Teacher |
| 07/05/2026 | Maps 8 — Le bout du monde — Sixt-Fer-à-Cheval | Design | Teacher |
| 07/05/2026 | Maps 9 — Vallée des Glaciers | Design | Teacher |
| 07/05/2026 | Maps 10 — Le Bout du Monde Haute-Savoie | Design | Teacher |
| 08/05/2026 | Telescopic sword drama — 6 pieces — cut | Cutting/printing | Students |
| 08/05/2026 | Thank-you card for retirements | Design | Teacher |
| 02/09/2024 | Calculator boxes maths — project discussion | Project discussion | Teacher |
| 05/09/2024 | Calculator boxes maths — design, prototype, cut | Design | Teacher |
| 10/09/2024 | PP presentation update | Promotion/marketing | Y11 |
| 10/09/2024 | Key fob design for PP students | Design | Y11 |
| 20/09/2024 | Year 13 science project — discussion | Project discussion | Y13 |
| 26/09/2024 | Casino token Year 13 — science | Project discussion | Y13 |
| 21/09/2024 | Year 11 PP key fob assembly | Assembly | Y11 |
| 30/09/2024 | Personal Project presentation | Presentation | Y11 |
| 10/09/2024 | Fab Lab website | Promotion/marketing | Teacher |
| 11/09/2024 | Scanner — calibration, setup, research | Design | Teacher |
| 07/10/2024 | Variable rotation speed plate — discussion | Technical discussion | Teacher |
| 08/10/2024 | Magnetic levitation train — Year 11 | Physical creation | Y11 |
| 07/10/2024 | Steam Summit — lanyard design | Design | Teacher |
| 14/10/2024 | Local Raspberry Pi server for storage — Year 8 | Technical discussion | Y8 |
| 22/10/2024 | Intracampus private sales site — BB forum proposal | Technical discussion | Y11 |
| 04/11/2024 | ICT Steam Summit — lanyard design | Design | Teacher |
| 05/11/2024 | Magnetic levitation train — follow-up | Technical discussion | Y11 |
| 07/11/2024 | PP car button extension — discussion | Project discussion | Y11 |
| 07/11/2024 | Node-Red Raspberry Pi | Design | Teacher |
| 08/11/2024 | Smart greenhouse light & solar panel PP | Technical discussion | Y11 |
| 18/11/2024 | Smart greenhouse design correction | Design | Y11 |
| 18/11/2024 | BioBucks — design correction, double-sided engraving test | Design | Y13 |
| 19/11/2024 | Fidget spinners Year 7 — precise engraving | Physical creation | Y7 |
| 21/11/2024 | 3D model — discussion and correction | Cutting/printing | Teacher |

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| 22/11/2024 | BioBucks — cutting | Cutting/printing | Teacher |
| 25/11/2024 | Reptile evolution map — container for explanations | Cutting/printing | Y11 |
| 28/11/2024 | 2D file correction — new method | Design | Y11 |
| 28/11/2024 | Textile pattern design for mannequin | Design | Y11 |
| 28/11/2024 | Signage engraving | Technical discussion | Teacher |
| 28/11/2024 | Steam Summit — final lanyard design | Design | Teacher |

*Continued — entries 166 to 220*

| Date | Activity | Type | Beneficiary |
|---|---|---|---|
| 02/12/2024 | Veneer plant pots — final cut | Cutting/printing | Y11 |
| 02/12/2024 | Magnetic levitation train — cutting | Cutting/printing | Y11 |
| 02/12/2024 | PP board game — correction and cutting | Design | Y11 |
| 02/12/2024 | Brenus Cup PE — plate editing and engraving | Design | Teacher |
| 02/12/2024 | Signage engraving | Cutting/printing | Teacher |
| 03/12/2024 | PP website hosting — nationsdesign.online | Design | Y11 |
| 03/12/2024 | Light panel Year 11 | Cutting/printing | Teacher |
| 03/12/2024 | Gift boxes for mum Year 7 — design + cut | Cutting/printing | Y7 |
| 05/12/2024 | Stencil for Cova | Design | Teacher |
| 06/12/2024 | GDPR — PP website hosting | Technical discussion | Teacher |
| 06/01/2025 | Plane prototype Year 7 | Design | Y7 |
| 06/01/2025 | Steam Summit lanyard | Design | Teacher |
| 15/01/2025 | Steam Summit final design | Design | Teacher |
| 20/01/2025 | Steam Summit — final merge + box | Physical creation | Teacher |
| 21/01/2025 | Steam Summit — cutting | Cutting/printing | Teacher |
| 22/01/2025 | Steam Summit — extra cutting | Cutting/printing | Fab Lab |
| 17/01/2025 | Physics rotating table meeting | Project discussion | Teacher |
| 20/01/2025 | Rotating table physics — materials, order, PWM | Design | Teacher |
| 21/01/2025 | Rotating table physics — first design | Design | Teacher |
| 04/02/2025 | Trolley door handle — technical services | Design | Admin |
| 17/02/2025 | Email communication — website update | Promotion/marketing | Teacher |
| 03/03/2025 | Philanthropy dept meeting — gift design | Project discussion | Admin |
| 05/03/2025 | Box and magnet — philanthropy specifications | Design | Admin |
| 10/03/2025 | Institutional reports | Promotion/marketing | Admin |
| 10/03/2025 | Fidget Year 7 | Design | Y7 |
| 11/03/2025 | Print + cut badges Uni Fair | Physical creation | Admin |
| 13/03/2025 | Photobooth for Nowruz Mobarak | Physical creation | Admin |
| 10/04/2025 | Fidget Year 7 | Cutting/printing | Y7 |
| 07/05/2025 | Fidget Year 7 | Cutting/printing | Y7 |
| 08/05/2025 | Security camera logo engraving | Design | Admin |
| 08/05/2025 | Security camera logo engraving (2) | Design | Admin |
| 12/05/2025 | Rotating table physics — second design | Design | Teacher |
| 06/06/2025 | Rotating table physics — fabrication | Physical creation | Teacher |
| 07/06/2025 | Donors gift — philanthropy visit | Technical discussion | Admin |
| 08/06/2025 | Cut master — magnet gluing template | Design | Admin |
| 29/09/2023 | Fab Lab logo design | Design | Fab Lab |
| 29/09/2023 | Logo cut master file prep — 100 units | Design | Fab Lab |
| 03/10/2023 | Brenus shield PE — materials and solutions | Design | Fab Lab |
| 12/10/2023 | Colour-changing feather wings — PP Y11 | Technical discussion | Y11 |

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| 15/10/2023 | PE key fob — cut master file 100 units | Design | Fab Lab |
| 17/10/2023 | 3D bone design for PP — Fusion 360 discussion | Technical discussion | Y11 |
| 19/10/2023 | Happy Diwali 2023 — design and cut | Design | Fab Lab |
| 20/10/2023 | Fab Lab website | Design | Fab Lab |
| 21/10/2023 | Fab Lab presentation to Year 11 PP | Project discussion | Fab Lab |
| 01/11/2023 | Wing design V2 — PP Y11 | Technical discussion | Y11 |
| 07/11/2023 | ADSIR championship plate design | Design | Fab Lab |
| 09/11/2023 | Happy Diwali 2023 — cut, glue 4 items | Physical creation | Fab Lab |
| 10/11/2023 | ADSIR championship plate cutting, drilling | Physical creation | Fab Lab |
| 21/11/2023 | Arthur V3 wing cut — PP Y11 | Cutting/printing | Y11 |
| 22/11/2023 | Candle holder for PP — design | Design | Y11 |
| 23/11/2023 | Fidget spinner cutting Year 8 | Design | Fab Lab |
| 24/11/2023 | Stand cutting for PP | Cutting/printing | Y11 |
| 29/11/2023 | Candle holder V2 — cutting | Cutting/printing | Y11 |
| 29/11/2023 | Arthur V3 optional pieces cutting | Cutting/printing | Y11 |
| 29/11/2023 | Campus model design help — window addition | Design | Y11 |

*Continued — entries 221 to 228*

| Date | Activity | Type | Beneficiary |
|---|---|---|---|
| 29/11/2023 | Garden label design help — class names | Design | Fab Lab |
| 06/12/2023 | Master creation, prototyping and series production 25 stands | Physical creation | Fab Lab |
| 08/12/2023 | Blender — 3D bone modelling for PP | Design | Y11 |
| 13/12/2023 | PP poster print for Blanca | Physical creation | Y11 |
| 13/12/2023 | PP piece cutting for Isa | Cutting/printing | Y11 |
| 13/12/2023 | Campus model cutting for PP | Cutting/printing | Y11 |
| 15/01/2024 | 3D modelling Jens — Year 9 | Design | Y9 |
| 16/01/2024 | Jens design print — Year 9 | Physical creation | Y9 |

Y9

# 13 — Conclusion & Outlook

Over three years, Fab-Nat has established itself as an indispensable part of life at Campus des Nations. What began as an experiment for Year 11 students has become a structuring service for an entire community.

## What We Have Learned

- The demand is real and often exceeds the capacity to respond
- Interdisciplinarity cannot be decreed — it emerges when people are given the right tools and the right space
- Pedagogical models are a powerful lever for enriching teaching
- Administrative staff are just as important a beneficiary as students
- The simplicity of the process is key to adoption

## Outlook

- Stronger integration of the Fab Lab into curricula — STEAM projects planned from the start of the school year
- Development of pedagogical models for the science department — designed and built by students, for students
- Opening to new equipment — vinyl cutting, digital embroidery, advanced electronics
- Systematic documentation of projects to build a shared resource library
- Strengthening of human resources and a dedicated budget to ensure sustainability

## A Transferable Model

The Fab-Nat experience shows that a pedagogical fabrication laboratory can work with modest means, provided there is a clear vision, a dedicated coordinator and community support. It is a model that can be applied in any school — and beyond.

**Learn by creating. Succeed by innovating. Grow by sharing.**

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https://sites.google.com/ecolint.ch/nat-fab-lab/

https://hydroturbine.info/ | https://www.picohydro.net/