A Day as a Bioscientist – Fundação CASA: a Pathway to Reintegration

DIY HP Manual

Team iGEM USP-Brazil - Human Practices Project

Glycosy-N-ation (2025)

I believe that injustice prevails where hopelessness persists. I think hopelessness is the enemy of justice – Bryan Stevenson, professor at the NYU School of Law.

The State has to help these young people rebuild their stories, giving them the possibility of a future – Claudia Carletto, president of Fundação CASA.

1. Inicial notes for iGEM Facilitators:

Volunteering in science education with adolescents in custody at Fundação CASA is profoundly meaningful work. New volunteers sometimes arrive with unhelpful assumptions that the students will be hostile, apathetic, or uninterested in complex topics. In practice, the opposite is far more common: most participants are highly respectful, intensely curious, and deeply reflective about past mistakes, eager for learning that points to a different future. When we approach them with rigor, empathy, tenderness, and clear expectations, they respond with engagement and care.

The personal reward is immense. By opening a concrete pathway into science through hands-on activities, accessible explanations, and honest conversations about study and work, you help expand what these young people see as possible, especially given that most come from precarious socioeconomic conditions. Representation also matters! It is recommended that at least one iGEM facilitator be Black, both to foster identification and because Brazil's structural racism places Black people at systemic disadvantage; witnessing a Black scientist in the classroom can be powerfully inspiring. In short, this volunteer work combines intellectual challenge with civic purpose and the joy of seeing talent and dignity flourish.

At iGEM-USP, we believe that science is not built only within the laboratory walls, but also in the possibility of opening new and hopeful paths for those who, by the misfortunes of life, have not had the same opportunities we did.

2. Introduction

Fundação CASA (Center for Socio-Educational Assistance to Adolescents) is the São Paulo state public foundation responsible for running the juvenile socio-educational system for adolescents in conflict with the law. Created by the state government and linked to the Secretariat of Justice, it succeeded the former FEBEM (Fundação Estadual para o Bem-Estar do Menor) after reforms in the mid-2000s to align institutional practice with Brazil's Statute of the Child and Adolescent (ECA) and the National System for Socio-Educational Services (SINASE), following United Nations's recommendations. The change formalized a rights-based, pedagogical approach in place of the welfare/punitive model proposed by the former FEBEM.

CASA's legal mandate is to execute the socio-educational measures ordered by the juvenile courts, especially those involving deprivation or restriction of liberty: *internação* (closed custody) and *semiliberdade* (semi-liberty). CASA's mission statements emphasize applying these measures within ECA/SINASE guidelines, which frame intervention as education and social reintegration rather than punishment.

Operationally, the foundation manages a network of socio-educational centers across the state that provide schooling, vocational activities, health and psychosocial care, and individualized case planning while youths serve their court-ordered measures. These services are designed to protect rights, restore educational trajectories, and prepare adolescents for family and community reintegration. The rights-based logic and participatory management model are core prescriptions of SINASE and the ECA.

Within Brazil's broader juvenile-justice architecture, CASA complements municipal programs that deliver "open-environment" measures (e.g., probation/assisted liberty), which were progressively municipalized in São Paulo from 2010 onward. In practice, this division of responsibilities aims to tailor responses to offense severity while reserving deprivation of liberty for exceptional cases and prioritizing social inclusion.

The institution operates under judicial oversight and has been the subject of scrutiny by national and inter-American human-rights bodies. That is an oversight that reinforces minimum standards for conditions, due process, and the pedagogical character of custody. Such monitoring is integral to safeguarding adolescents' rights while pursuing the foundation's public purpose: reducing reoffending, promoting public safety, and advancing the social reintegration of young people through education, care, and lawful accountability.

Estimates of recidivism among adolescents who passed through São Paulo's **Fundação CASA** vary by method and period. Official figures reported to Brazil's Congress and later media analyses show about 15% in 2015 and about 22% in 2017 (share of youths who reentered CASA after release). More recent local reporting indicates roughly one in five (~20%) overall, with regional variation of 16%–32% across the past decade.

Recidivism among youths who have passed through São Paulo's Fundação CASA is driven less by a single "individual" cause than by overlapping structural factors. Studies in Brazil highlight school exclusion and weak labor-market prospects, family adversity and unstable living situations, exposure to community violence and peer/gang networks, and substance use and untreated mental-health needs as salient correlates of reoffending. These patterns are documented in facility-based and cohort research. Gaps in the socio-educational continuum, limited continuity between custody and community aftercare, restricted access to quality education and jobs on release, and experiences of stigma or institutional violence can further erode trust and reduce uptake of protective services. Conversely, family support, therapeutic care, sustained schooling, and pathways to decent work are consistently associated with reduced recidivism; accordingly, the iGEM-USP proposal to deliver synthetic-biology workshops to adolescents at Fundação CASA is well justified.

3. General Objectives:

1. Promote inclusion in science education.
2. To provide introductory instruction in genetics and molecular biology, using accessible language, for students who are behind grade level.
3. To offer hands-on, properly supervised experiences in public university laboratories, such as a plant DNA extraction experiment.
4. Demonstrate that science can be engaging and accessible to everyone.
5. To provide adolescents in conflict with the law with clear guidance on how to gain admission to public universities.

4. A Day as a Bioscientist: a step-by-step guide.

4.1. Bureaucracy:

4.1.1. Regarding Fundação CASA:

The iGEM team's volunteer proposal must be submitted in a formal letter to Fundação CASA's Pedagogical Supervision via super1dr2@fundacaocasa.sp.gov.br. Following the online meeting, the iGEM team must submit to the same e-mail address a detailed proposal for the activities to be conducted with adolescents in custody. The proposal should include an introduction (e.g., "What is synthetic biology?") and a day-by-day work plan. Fundação CASA will then deliberate with its pedagogical team to determine which adolescents are qualified to participate, considering their educational level and demonstrated good behavior. This proposal must be submitted at least two months prior to the proposed start date of the activities.

The proposal must include the following required sections:

1. **Resumés of the iGEM team's volunteer instructors;**
2. **Technical justification for the introductory synthetic biology workshop;**
3. **General objective – you must cite explicitly the Brazilian law nº. 8,666/1993, Article 116, Item I;**
4. **Target audience, clearly stating the minimum educational level required for workshop participants.**
5. **Description of the activities to be delivered; thematic structure; methodologies, equipment, and human resources to be employed;**
6. **Number of beneficiaries — minimum and maximum number of teenagers in the workshop;**
7. **Goals to be achieved (Brazilian law nº. 8,666/1993, Article 116, Item II);**

8. **Phases or stages of execution (Brazilian law nº. 8,666/1993, Article 116, Item III);**
9. **Estimated start and end dates for execution of the object, as well as for completion of the execution stages or phases (Brazilian law No. 8,666/1993, Article 116, Item IV);**
10. **Responsibilities of Fundação CASA (what the iGEM team demands from the foundation; e.g.: "participation must be voluntary; no one should be compelled to take part");**
11. **Responsibilities of iGEM team (e.g.: "To provide a safe laboratory experience with minimal risk");**
12. **Assessment (if necessary).**

If the proposal involves classroom-based theoretical sessions on Fundação CASA premises, the iGEM members who will serve as instructors must provide in advance their full names, identification documents, and proof of address so their entry can be authorized by the institution. Fundação CASA provides free transportation to iGEM volunteers from Luz metro station, in the city of São Paulo.

At least one week before the laboratory experiment, staff members from Fundação CASA must visit the venue where the activity will be conducted to assess site safety and devise strategies for escorting the youths in custody on the day. Each student will be accompanied by an educational officer from Fundação CASA.

Photographic and video records of adolescents in custody at Fundação CASA are not permitted, as they are minors and their identities must be safeguarded. Any filming or photography may be carried out by Fundação CASA staff, who will blur the adolescents' faces so that the materials can be disseminated while respecting the imperative of anonymity.

4.1.2. Regarding University of São Paulo:

Each university has its own protocols for authorizing laboratory use. In the specific case of the University of São Paulo, you must contact the Culture and Extension Committee of the Institute of Biomedical Sciences at ccext@icb.usp.br to schedule the reservation in advance, at least one month prior to the activity. All visitors from outside the university must be pre-registered with their full names and identification documents so that an access badge can be issued for entry to the faculty. The iGEM members who will serve as teaching assistants/monitors must also be pre-registered. A faculty member must be designated as the person responsible for the experiment day, and this professor must remain present for the entire duration of the activity.

5. Schedule.

Day	Duration	Activity	Description	Location
1	3 hours	Introductory genetics and molecular biology class.	A theoretical class taught by iGEM team students.	Fundação CASA
2	4 hours	Biological experiment (e.g., extraction of DNA from strawberries).	Hands-on activity led by students from the iGEM team and supported by Fundação CASA pedagogical staff.	University laboratory
3	2 hours	Icebreaker conversation: how to access a public university?	An informal conversation about strategies for admission to Brazil's public universities, featuring testimonials from iGEM team students from less privileged backgrounds who have benefited from social programs.	Fundação CASA

Table 1: example of schedule for the event.

5.1. Day 1: Introductory genetics and molecular biology class.

iGEM team instructors who have been pre-registered with Fundação CASA must report to the institution's headquarters across from Luz metro station if they wish to use the free transportation provided.

It is recommended that the iGEM team be available to offer two theoretical classes: one for a unit of male residents and another for a unit of female residents.

If a projector or TV is required, this must be indicated to Fundação CASA in the project description; otherwise, only a whiteboard will be available.

iGEM team instructors should keep in mind that they will be working with students who have varying educational gaps; therefore, it is essential to adapt the language and minimize technical jargon as much as possible.

Picture 1: iGEM-USP at CASA Diadema - Rehabilitation center for adolescent girls.

5.2. Day 2: Biological Experiment: extraction of DNA from strawberries.

Complexity level: low.

Materials:

- Ripe strawberries;
- Table salt (NaCl);
- Detergent;
- Commercial alcohol (98%);
- Mortar and pestle;
- Spatula;
- Beaker;
- Graduated cylinders;
- Filter paper;
- Funnel;
- Test tubes;
- Glass stirring rods.

Initial Guidelines:

To ensure smooth progress throughout the activity, at least three iGEM members must lead the whole experiment. One of the instructors must begin the activity by providing a detailed briefing on laboratory safety procedures. Not only the iGEM instructors, but also the adolescents in custody at Fundação CASA must wear gloves and lab coats supplied by the university.

Laboratories generally have multiple benches, and students should be divided into groups of five per bench.

Fundação CASA's pedagogical staff will remain in designated seats within the laboratory.

Picture 2: the lab activity day.

Experiment:

Step 1: Each group must select 5 strawberries and remove their green stems.

Step 2: The students must place the strawberries in the mortar and crush them with the pestle until obtaining an almost homogeneous paste. Transfer the strawberry paste to a beaker.

Step 3: In another beaker, the students must mix 150 ml of water, one teaspoon of detergent, and one teaspoon of table salt. They must stir well with a glass rod, but slowly to avoid forming foam.

Step 4: Each student must pour about one-third of the water-salt detergent mixture over the crushed strawberries. They must be oriented to stir gently with the glass rod.

Step 5: Incubation at room temperature for 30 minutes. Each student must stir occasionally with the same rod.

Step 6: Each group must place a funnel with filter paper over a beaker and pour the mixture through the filter to remove the remaining strawberry pieces.

Step 7: Each group must pour half of the filtered liquid into a test tube. They must fill only about three fingers' height from the bottom of the tube.

Step 8: The students must gently pour down the wall of the test tube, over the solution, twice the volume of alcohol. They must not mix the alcohol with the solution! They must wait for about 3 minutes for the DNA to start precipitating at the interface.

Step 9: Finally, they must use a stick to spool the DNA molecules, rotating the stick at the interface between the solution and the alcohol.

Picture 3: the lab activity day.

5.3. Day 3: Icebreaker conversation: how to access a public university?

As on Day 1, members of the iGEM team will go to Fundação CASA to speak with adolescents in custody about strategies for admission to public universities, detailing social benefits, Brazil's quota law (*Lei de Cotas*), and any other information that can help mitigate candidates' socioeconomic disadvantage. Preferably, these iGEM members should come from economically vulnerable backgrounds themselves, so they serve as living examples.

It is worth noting that the University of São Paulo has launched an initiative independent of the iGEM-USP team to support adolescents from Fundação CASA upon their release from custody. The project *Da ponte para cá: da*

Fundação CASA à USP, coordinated by sociology professor Bruna Gisi, offers a free preparatory course for the college-entrance exam (*vestibular*) for adolescents in conflict with the law. The instructors are all USP students.

6. Tips for Creating Your Own Event.

Organizing an educational activity or outreach project requires careful planning and clear objectives, above all when you are dealing with adolescents in conflict with the law. Based on our experiences as an IGEM team, here are some practical tips for anyone who wants to create their own event:

1. **Define a Clear Goal!** Decide what you want participants to learn or experience. Is it about inspiring them, teaching a specific concept, or building skills? A clear goal will guide all the next steps.
2. **Know Your Audience.** Consider the background knowledge, interests, and potential difficulties of your target group. Adapt language, pace, and examples so the activity is accessible and engaging.
3. **Plan a Step-by-Step Structure.** Break down the event into manageable parts: introduction, main activity, and closing reflection. Each stage should flow naturally into the next.
4. **Prepare Materials in Advance.** Make a checklist of everything you will need: equipment, printed handouts, safety items, or digital resources. Always have backups in case something fails.
5. **Focus on Interaction!** Events work best when participants are active. Use group discussions, hands-on experiments, or small challenges to keep energy levels high.
6. **Collaborate with Institutions.** If your event takes place in schools, universities, or public centers, communicate early with staff and respect their protocols. This ensures safety, smooth logistics, and institutional support.
7. **Build Trust and Respect.** Show genuine interest in the participants. Listen carefully to their contributions and validate their experiences. Mutual respect is the foundation for meaningful engagement. Remember that you are working with adolescents whose life stories include the underestimation of their abilities. Simple acts, like knowing their names and looking them in the eyes with a smile, make an enormous difference!
8. **Use Simple and Relatable Language.** Avoid academic jargon and complex explanations. Connect science and activities to everyday life examples that adolescents can relate to.
9. **Encourage Expression!** Allow space for creativity: drawing, writing, or informal discussions. Giving participants a voice helps them feel valued.
10. **Be Flexible and Patient.** Some activities may not go as planned. Be prepared to adapt, simplify, or change the approach while keeping the group engaged. Remember that you are working with young people who

already carry a strong sense of guilt for past mistakes. So, correct them gently.

11. **Promote Positive Teamwork.** Include group activities where cooperation is more important than competition. This helps strengthen social bonds and reduces conflict.
12. **Highlight Achievements.** Celebrate small successes during the event. Recognition increases self-confidence and motivation!
13. **Ensure a Safe Environment.** Always prioritize clear rules and respectful behavior. A structured yet friendly atmosphere helps adolescents feel secure and willing to participate.
14. **Evaluate and Improve!** After the event, gather feedback from participants and facilitators. Reflect on what worked well and what could be improved for future editions.

Remember: every activity you organize has the power to inspire these adolescents to believe in themselves and envision a brighter future! When you help a young person move away from a path of conflict with the law, you not only change their life for the better but also contribute to building a safer, stronger, and more compassionate society.

Picture 4: Adolescents from the CASA Diadema girls' center, proud and empowered on their day as bioscientists.

This manual is dedicated to the President of Fundação CASA, Carla Carletto, whose humanitarian leadership and unwavering commitment have transformed lives and inspired hope for a better future.