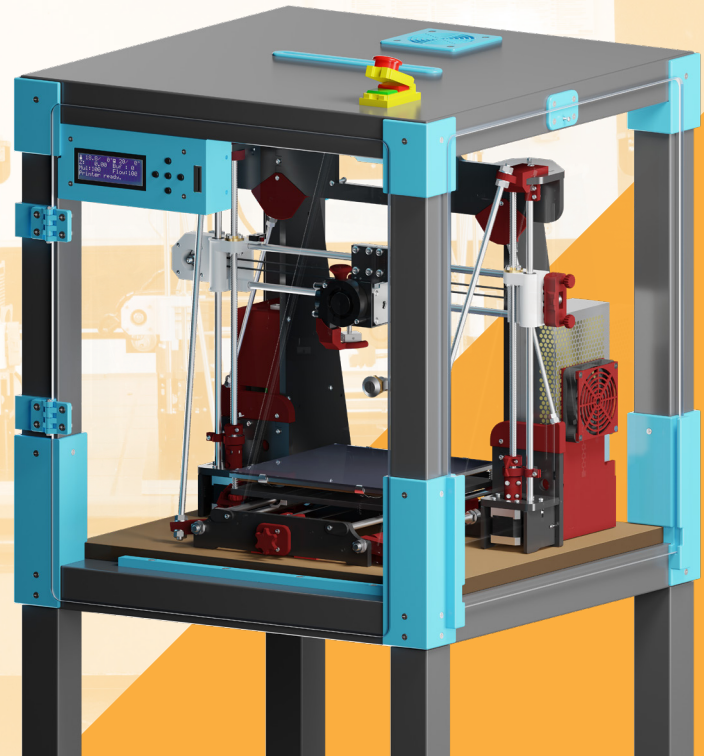
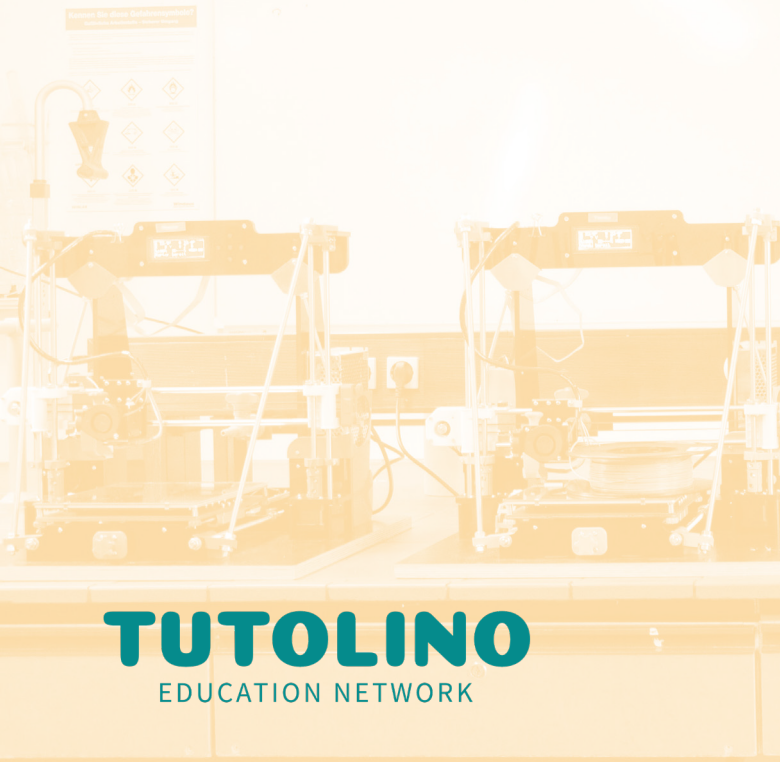


3D-DRUCK MACHT SCHULE



TUTOLINO
EDUCATION NETWORK



WHY 3D PRINTING?

3D printing is one of the most innovative and forwardthinking technologies of today and tomorrow. The potential of additive manufacturing for the home is becoming increasingly attractive and, along with „Smart Home“ and „Industry 4.0“, is the greatest advance of the last decade. Many companies are now converting parts of their production to 3D printing or integrating additive manufacturing into their production process. For example, in the form of small series or prototype construction.

This requires more and more skilled workers.

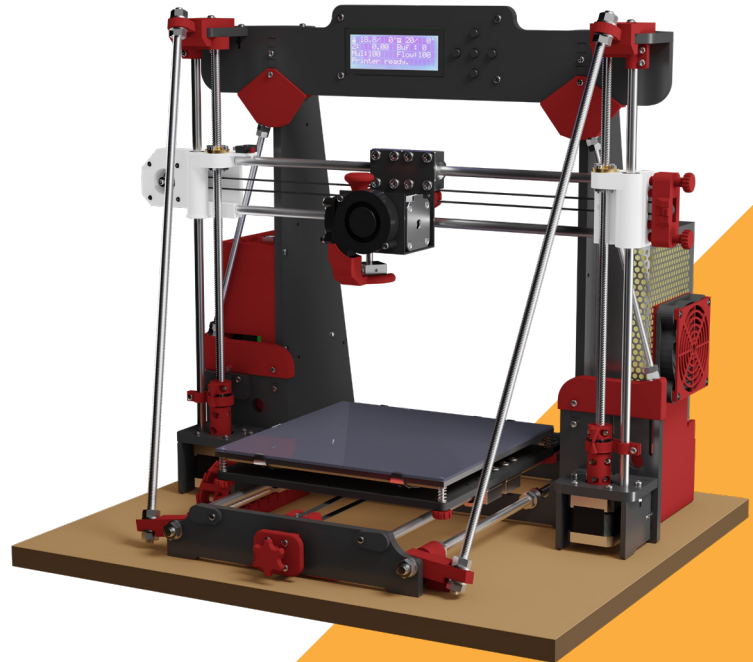
Of course, finding your interests begins at school and is one of the foundations for your future career choice.

THE KIT

Students will receive the Anet A8 3D printer as a kit with various 3D printed attachments that greatly improve the printer's function and handling.

The complete set published by Tutolino and developed together with 3dk.berlin, contains far more than 100 individual parts and should be assembled with patience and care. Even the lockable case comes in individual parts and is assembled independently. The students not only have fun building a 3D printer, but also significantly expand their technical understanding.

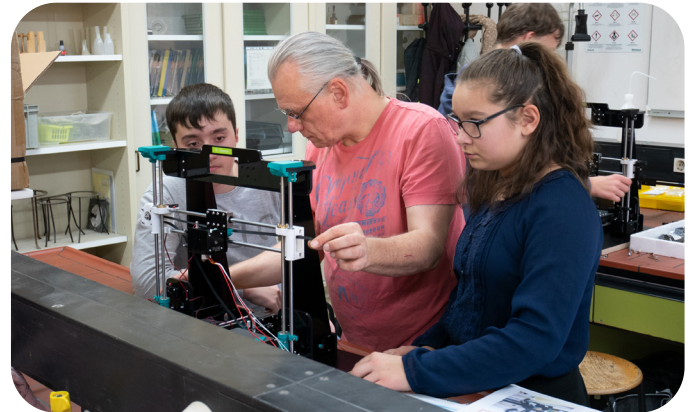
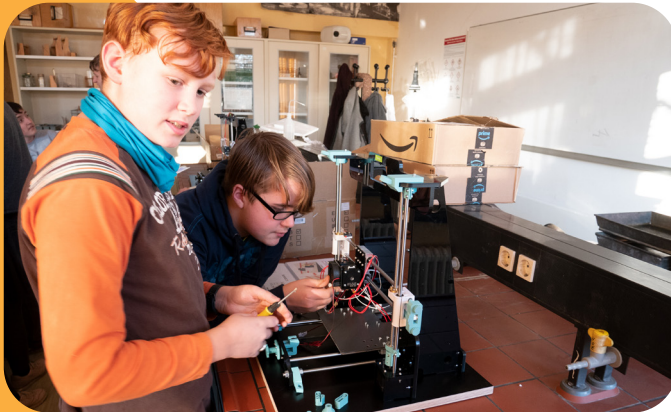
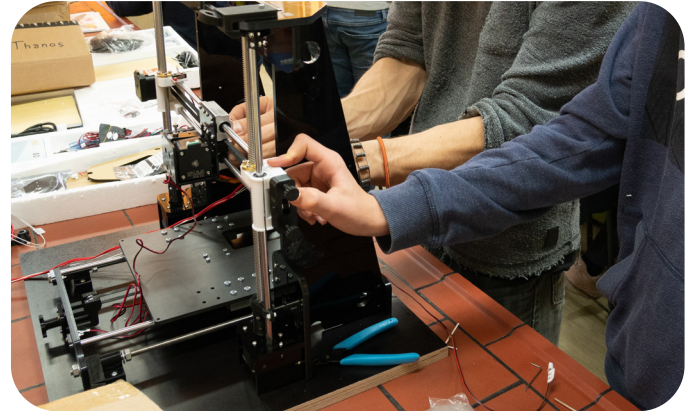
They learn to perform a complex task, from start to finish, largely independently. The reward is a self-built, fully functional 3D printer that is ready to use and safe for use in school.



THE ASSEMBLY

There is a lot going on in the classroom and the students never get bored. Everyone has something to do, the teachers are there to help the students with advice and assistance and can also answer many technical questions during assembly.

In addition to the teachers, the children also have access to detailed assembly instructions for setting up the printer. In these instructions, each step is explained individually and supported by informative illustrations.

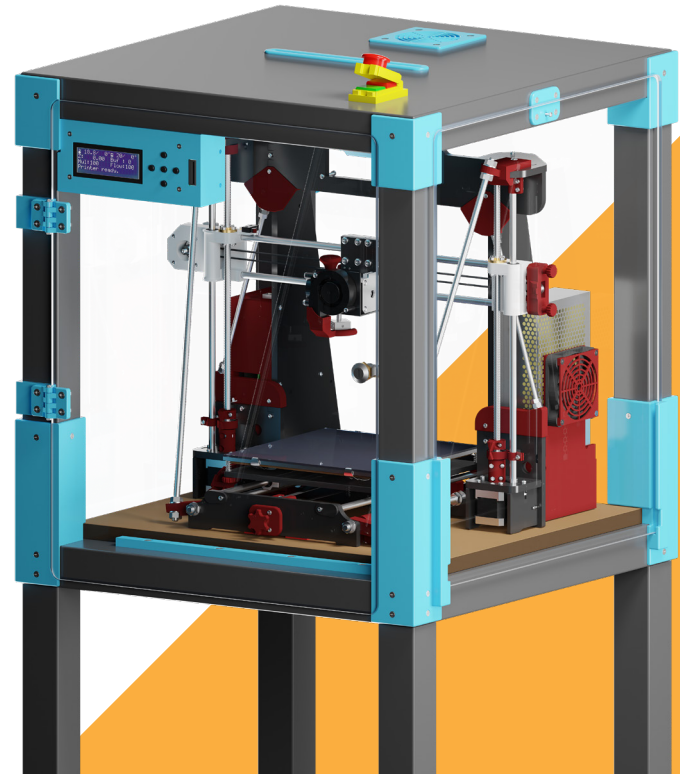


THE FIRST PRINTS

From the screwing of the first parts of the printer to the finished machine with its own protective casing, a few weeks will certainly pass. But once that work is complete, testing can begin and the kids will be printing the first parts on their self-built 3D printer.

In this part of the learning phase, children are taught the basic functions and initial setup of the printer. They will be trained until they are able to start printing on „their“ 3D printer and easily spot and correct simple errors.

The 3D printing system presented here is designed to print objects completely unattended and risk-free. At least during the maximum possible school time. The students can, if the respective school supports this, also create small projects completely independently and use them in class.



3D CONSTRUCTION

In addition to building 3D printers, 3D design is naturally part of the curriculum for students as well. Here, they learn about the features of the 3D object design program „Tinkercad“. The program is free and browser-based. The first own 3D projects are created here, which can be printed out in the following lessons.



SLICING

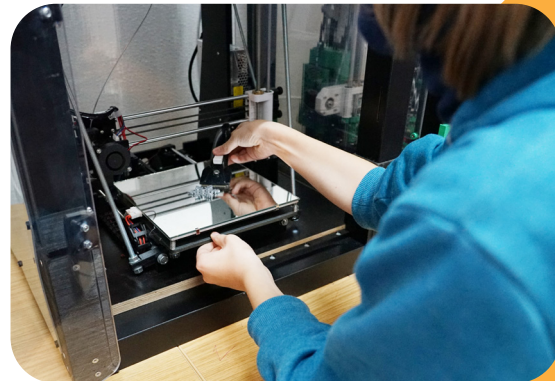
Slicing is one of the most important steps in 3D printing. The software required for this is in most cases a free computer software that converts the previously designed 3D object into a code that can be read by 3D printers, the so-called GCODE. Here, the children learn about the interrelationships between the software's various setting options and the resulting effects on the actual printing process and outcome.



SENSE OF ACHIEVEMENT

The sense of achievement is enormous. The children/ adolescents experience how an object, which they have imagined themselves, is created layer by layer by a device which they have assembled, maintained, cared for and put into its function. They realize all the small connections why an object with this technology should better be constructed in one way or another. You can explore the limits of this very special technology on your own and let your imagination run wild. Suddenly everything becomes possible. Suddenly you can form, design and even create things yourself.

One of the first objects designed and printed by the students here in Berlin was, for example, key rings.





Carl-Friedrich-
von-Siemens-
Gymnasium



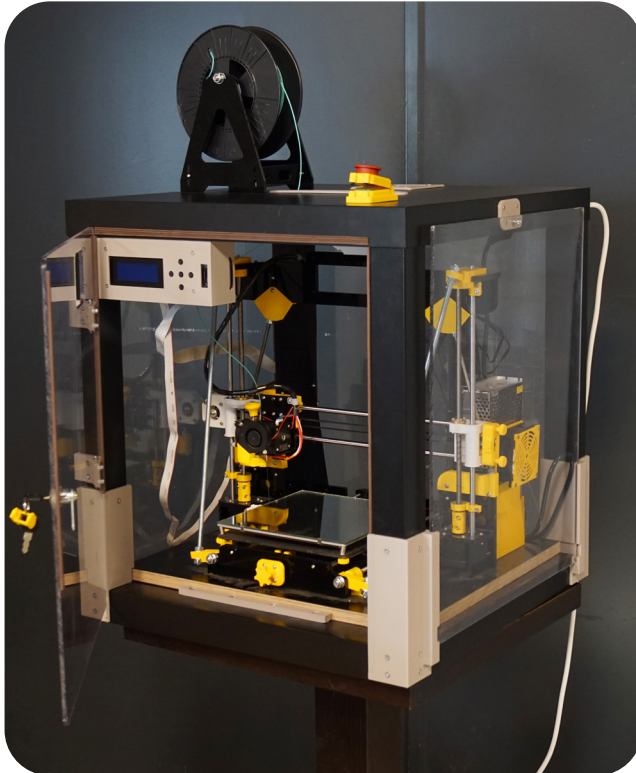
THE MODEL SCHOOL

The **Carl-Friedrich-von-Siemens-Gymnasium**

(secondary school) in Berlin Spandau, under the direction of its principal Mrs. Claudia Kremer, was the first school in Berlin to participate very successfully in the project.

The school's desire to set up its own 3D-Printing club was implemented in a way that was successful in finding a sponsor who would cover 50% of the equipment costs and the school would provide the remaining amount from its own resources. Since 2018, a total of 5 kits were purchased and installed within the framework of the so-called Schul AG (mandatory extra curricular activities) by students between 12 and 14 years of age.

Currently, the printers are used independently by the now firmly established 3D-Printing club and are even used for specific purposes, such as printing articles for the school's own christmas market. Here the specially designed, food safe PLA from 3dk.berlin is used. In the future, after a detailed introduction, biodegradable plastics will also be printed.



SAFETY

Printing with the 3D printer should not only be fun, but also has to be as safe as possible. To this end, the printer, once it is finished, is given a special housing that provides the following features:

- emergency stop
- Switch-on protection for Power failure
- Filter system (activated carbon/hepa filter)
- Lockable printing space
- External power supply
- Overheating protection
- External control elements
- External filament supply
- Maintenance device



Lockable printing space



Filter system



Modified attachments



Emergency stop switch



External control elements

PARTNER

We would like to thank all companies and partners who support the project **3D-DRUCK MACHT SCHULE**.



3D-DRUCK MACHT SCHULE

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