

After completing this session, students should have a general understanding of 3D printers, the format and expectations of the project, and the roles required to see the project through.

Preparation

- Schedule a 3D printing demonstration and invite interested students, teachers, and parents.
- Identify at least one Subject Matter Expert (SME), at least two teacher-sponsors, and other parents, if possible, to help with the project.

Goals

- Demonstration
- General overview
- Goals of club

- Requirements of club members
- Funding requirements
- Choose roles / teams

Assignments

Looking Ahead

- Announce teams and key roles
- Discuss parts and part categories (printed parts, hardware, electronic, mechanical)
- Create Bill of Materials (BOM)
- Start raising funds

Agenda

Preparation Have the SME set up before the beginning of the session to be sure everything is working properly. Ask the SME to prepare a 60 minute (maximum) print to serve as a demonstration. Suggest a plate of small objects that can be distributed to students at the end of the demonstration.

Prepare a contact list to collect phone numbers and email addresses for team members.

General Overview & Team Goals (10 minutes) The purpose of the club is to build and operate a 3D printer, with the end goal of helping other schools do the very same thing. After the 3D printer is completed, there may be other similar projects that the club could expand to pursue. Regardless, this club will require serious dedication and hard work—the schedule is very tight, and active participation is required both during and outside of club meeting hours. Everyone will need to pull his or her own weight on this team, but it should also be a very fun and rewarding experience for everyone involved.

Demonstration (30 minutes) Have the SME give a brief overview of the major components of the printer, pointing out the power supply, electronics, motors, filament, extruder, hot end, and axes of motion. Start a demonstration print and allow everyone a chance to see the device work and ask questions about its operation. Printing can continue in the background during the next section of the meeting.

Organizing the Team (30 minutes) There are five key roles, and a number of team members who will work closely together to make this project happen. The team members will be responsible for organizing and carrying out every step of the project, from funding to operation. Those in Key Roles will have the additional responsibilities of making sure the work for their role is accomplished effectively, and for training an apprentice for that role. If the team spans grade levels, the apprentices should be in lower grades.

Describe the Key Roles (below) and explain that students will be chosen for these roles based on both their interest and aptitude. Make note of who is interested in each role.

Closing (5 minutes) Close the meeting with an overview of assignments and what will happen next (see Assignments and Looking Ahead, above).

Key Roles

SMEs and Faculty Advisors These are the parents, subject matter experts, and teachers who are part of the team. Their responsibility is to help guide the project along and to provide assistance where needed so that no student is left out in the cold on this difficult and challenging project.

Build Master The Build Master needs to work very well with other club members. He or she is responsible for

keeping the project running smoothly and coordinating communication among team members. This student must have a keen understanding of the build process and work closely with the BOM Manager to identify which parts are needed and when. The Build Master must keep communication going even outside of regular meetings.

- Develop and manage the build schedule
- Keep up frequent and meaningful communication with other team members
- Provide status reports as required by other members

Accountant The Accountant needs to be very detailed oriented and good at math, including percentages. He or she will be responsible for the overall budget and recording money coming in and going out. All purchases must be approved in advance by the Accountant, and the Accountant should provide regular updates to the Blogger. The accountant must work closely with the BOM Manager to keep the project on budget.

- Keep a detailed accounting of funds and transactions
- Manage the overall budget
- Approve expenses
- Provide biweekly status reports

BOM Manager The BOM Manager needs to be very detail oriented and good at managing tabular data. He or she will be responsible for managing the bill of materials (BOM), which is a list of the all the parts we need, have on hand, and have received, as well as their expected costs and when they'll be needed for the project. The BOM Manager will need to work closely with the Accountant and the Build Master to be sure the project is kept in budget and ensure that parts are available when they're required.

- Keep and manage a detailed BOM (costs, required dates, etc.)
- Secure parts on time and on budget
- Provide biweekly status reports

Blogger / P.R. Manager This person needs to be an effective verbal and written communicator, and will be responsible for providing detailed updates on build progress and challenges to the rest of the world. He or she will work close with the Build Master and have a good general understanding of where the team is on the project at any given time. He or she will be the primary student contact for outsiders who are seeking more information about the project, and also be in charge of capturing the progress on camera (still and video).

- Write and publish detailed status updates, at least biweekly

- Develop and provide promotional materials to interested parties
- Photograph and video project progress

Membership Coordinator This student must have good “people skills” and know the team members and their roles. Should positions open up or should extra help be required in some areas, this person will be responsible for helping to recruit the necessary help. He or she will work closely with the Build Master, Faculty Advisors, and SMEs to this end.

- Keep and manage a list of members and roles
- Recruit to fill open positions

Maker-Operators The rest of the team is made up of Makers—these are the researchers, engineers, builders, designers, and helpers who make the whole project possible. They work closely with many other team members, where necessary, to carry out the work that needs to be done. This may include doing research, creating documents, sourcing materials, ordering/making parts, experimenting with build techniques, designing modifications or enhancements, troubleshooting, and learning everything they can about how to operate, troubleshoot, and repair the machines or inventions the club produces.

Student Assignments

- Read about the technology and various models.
<http://www.reprap.org/wiki/RepRap>
- Identify possible funding sources.
- Begin to form teams based on areas of interest and expertise.

In the Interim

- Decide who will fill the key roles, and encourage students to form teams around those roles.
- Arrange to have the demo printer brought back to the next meeting, if possible. Otherwise, bring several detailed photos of the printer. This will be used to discuss the parts of the printer and to help create the BOM.
- Prepare a BOM to use as a guide for the next session.
- Create a blog site that students can use for progress updates.
- Purchase and label science notebooks for each team member.