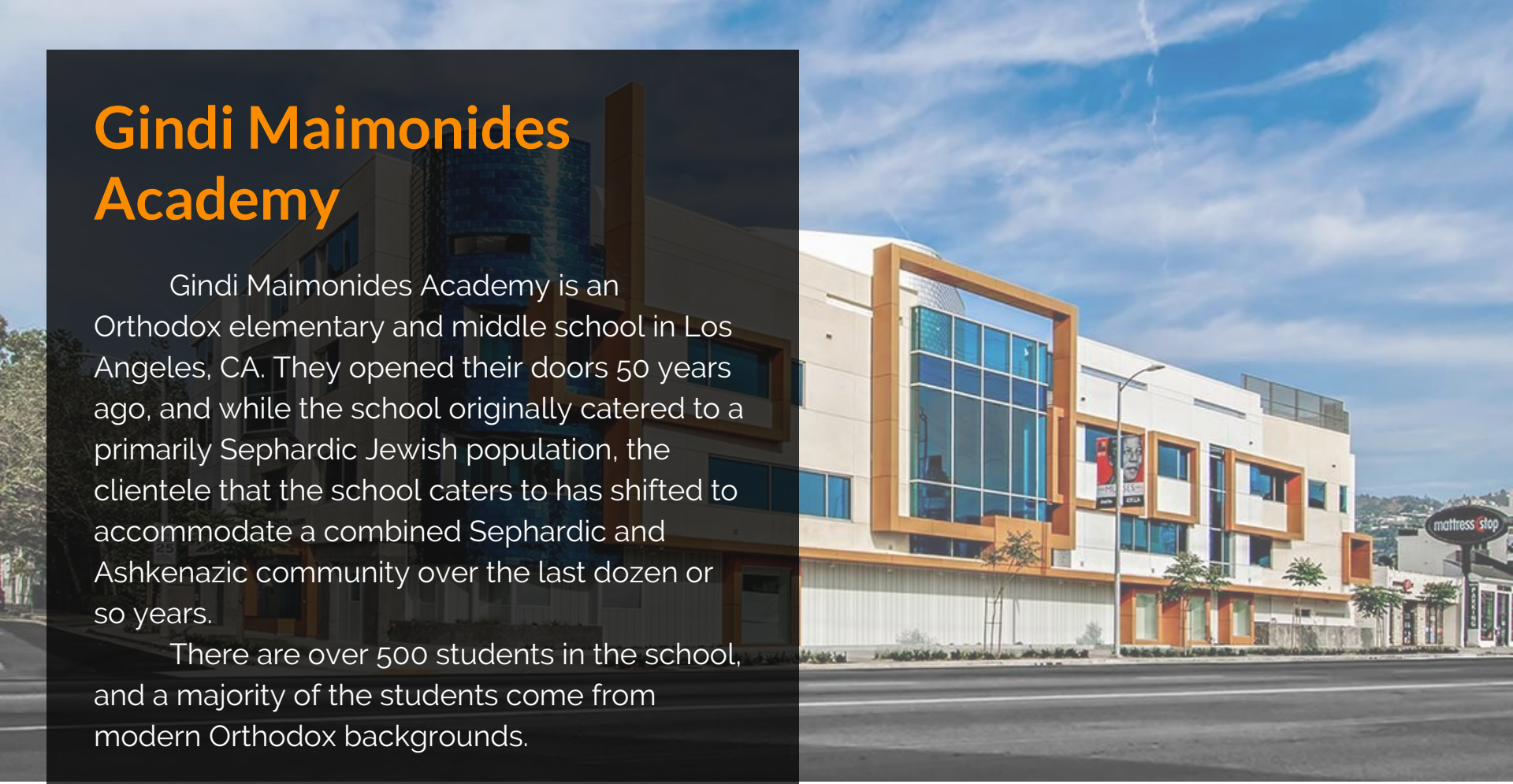
The Innovation Lab: The Space Where Maker Ed and Jewish Ed Inspire

By: Tzvi Hametz

Gindi Maimonides Academy

Gindi Maimonides Academy is an Orthodox elementary and middle school in Los Angeles, CA. They opened their doors 50 years ago, and while the school originally catered to a primarily Sephardic Jewish population, the clientele that the school caters to has shifted to accommodate a combined Sephardic and Ashkenazic community over the last dozen or so years.

There are over 500 students in the school, and a majority of the students come from modern Orthodox backgrounds.



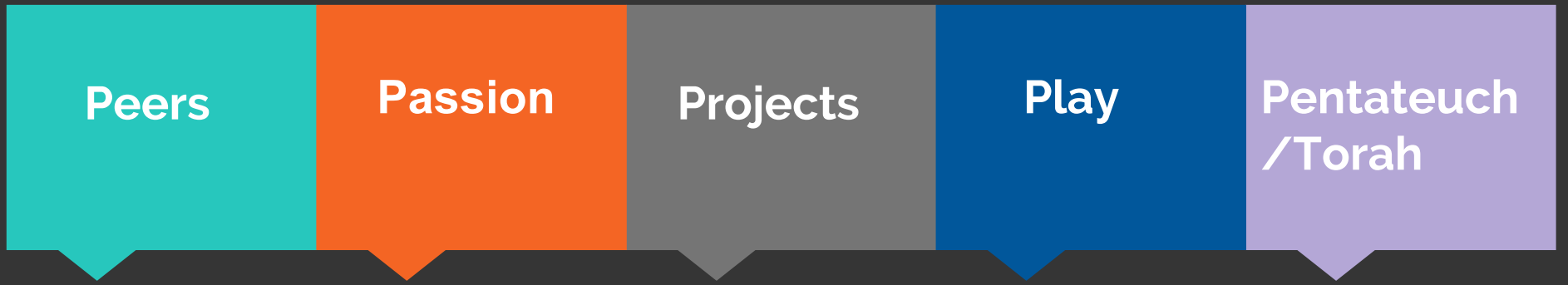
Mission & Vision

We have reached a time in education where we need to challenge our students and teachers to think creatively and collaboratively to prepare ourselves for an unknown future.

At Gindi Maimonides Academy, students are being provided with access to tools and skills that have far-reaching implications for years to come. We have designed a space dubbed the "Innovation Lab" where students and teachers can come together to learn in an organic and playful manner. Our primary guide for learning is the Torah/Jewish values, complemented by Mitch Resnick's 4 P's and the basic tenets of the Maker movement.

The Innovation lab is designed to evolve based on the wants and needs of the students and teachers. It is our goal to transform learning by having the Innovation Lab connect to every individual, every classroom, and every program at the school. Our lab is set up in such a way that encourages and inspires our community to explore their passions further, personalize education, and take their learning to the next level.

4 Ps + 1 P



The first four Ps are from Mitch Resnick of MIT's "Lifelong Kindergarten" Group

1. Peers

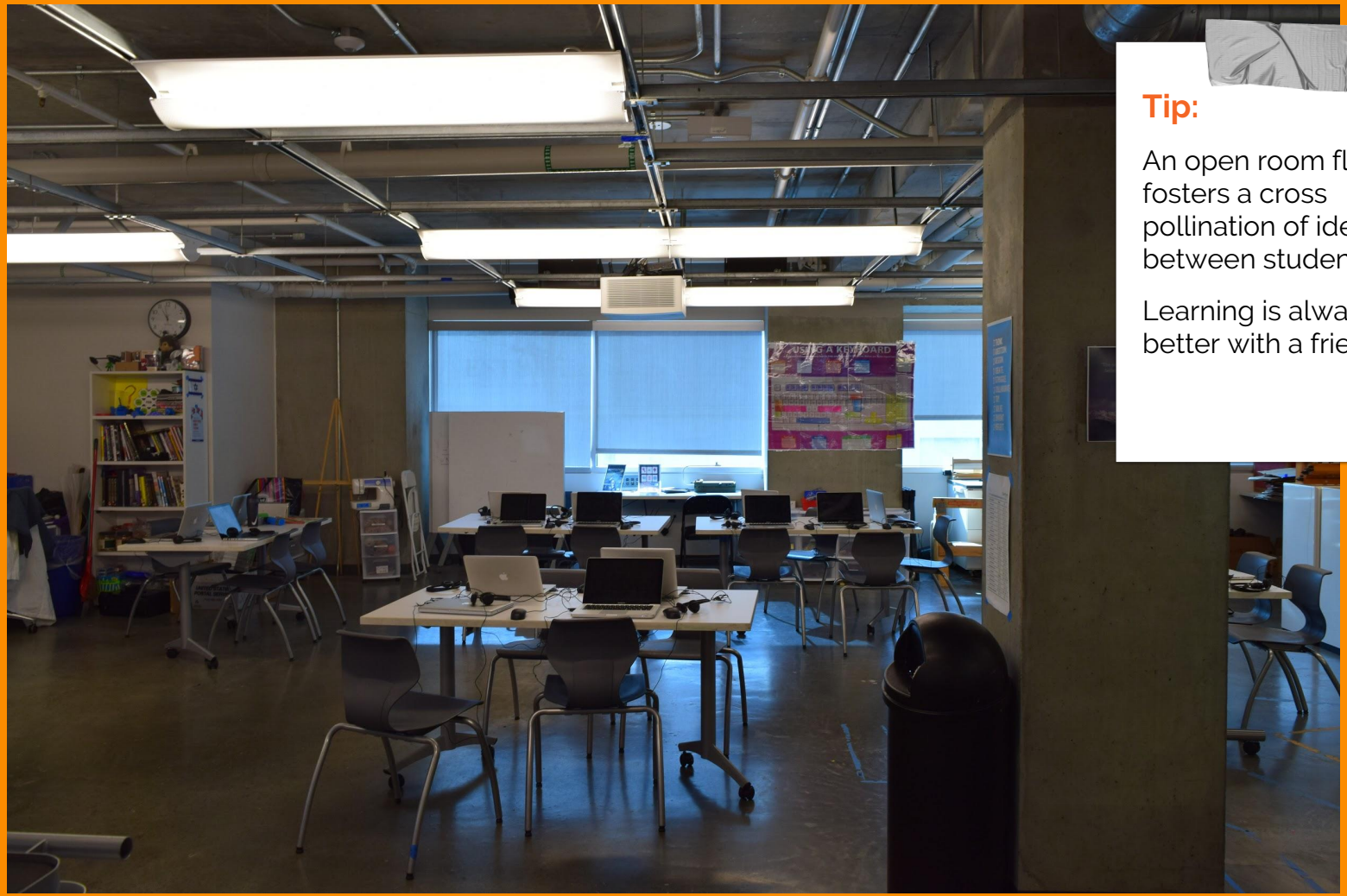
"Learning flourishes as a social activity, with people sharing ideas, collaborating on projects, and building on one another's work."

➔ Students

Students are encouraged and challenged to work together in an open floor plan room designed to encourage collaboration with peers. There are no private areas and seating is generally done together. Our space is designed to allow students to have clear and open access to each other, provoking discourse and interaction with children from various grades and backgrounds.

➔ Teachers

Teachers are encouraged to learn alongside their students both as facilitators and side-by-side learners. Teachers meet in the Lab to teach by example, learning new tools and skills together with their students. The Technology/Maker instructor utilizes the space as a conduit for cross curricular planning amongst the faculty, and encourages educators from various disciplines to congregate in the Lab and discuss what they are working on and how they hope to accomplish their goals.



Tip:

An open room floor plan fosters a cross pollination of ideas between students.

Learning is always better with a friend!

Example: Lego Studios

Check out our video HERE!

Students work together to utilize Lego bricks and minifigures to tell stories through the use of stop-motion animation and comic like story boards. Students are challenged to reflect on their classroom learning with their peers to support the stories they are creating. Our Lego bricks are situated where students and teachers can always get to them. They are often used to create riveting stop-motion movies to depict scenes from Navi class to Science class. Students use the Lego pieces to recreate scenes or processes and work through complicated stories with their classmates to better understand what is going on. This is incredibly helpful for teachers who have complex concepts they want to teach to their students. Students understand better when they can utilize physical manipulatives, and build with their peers in a collaborative environment. Teachers will often come into work the facilitator and side by side with other teachers to learn how to better use Lego in the classroom.

2. Passion

"When people work on projects they care about, they work longer and harder, persist in the face of challenges, and learn more in the process."

➔ Students

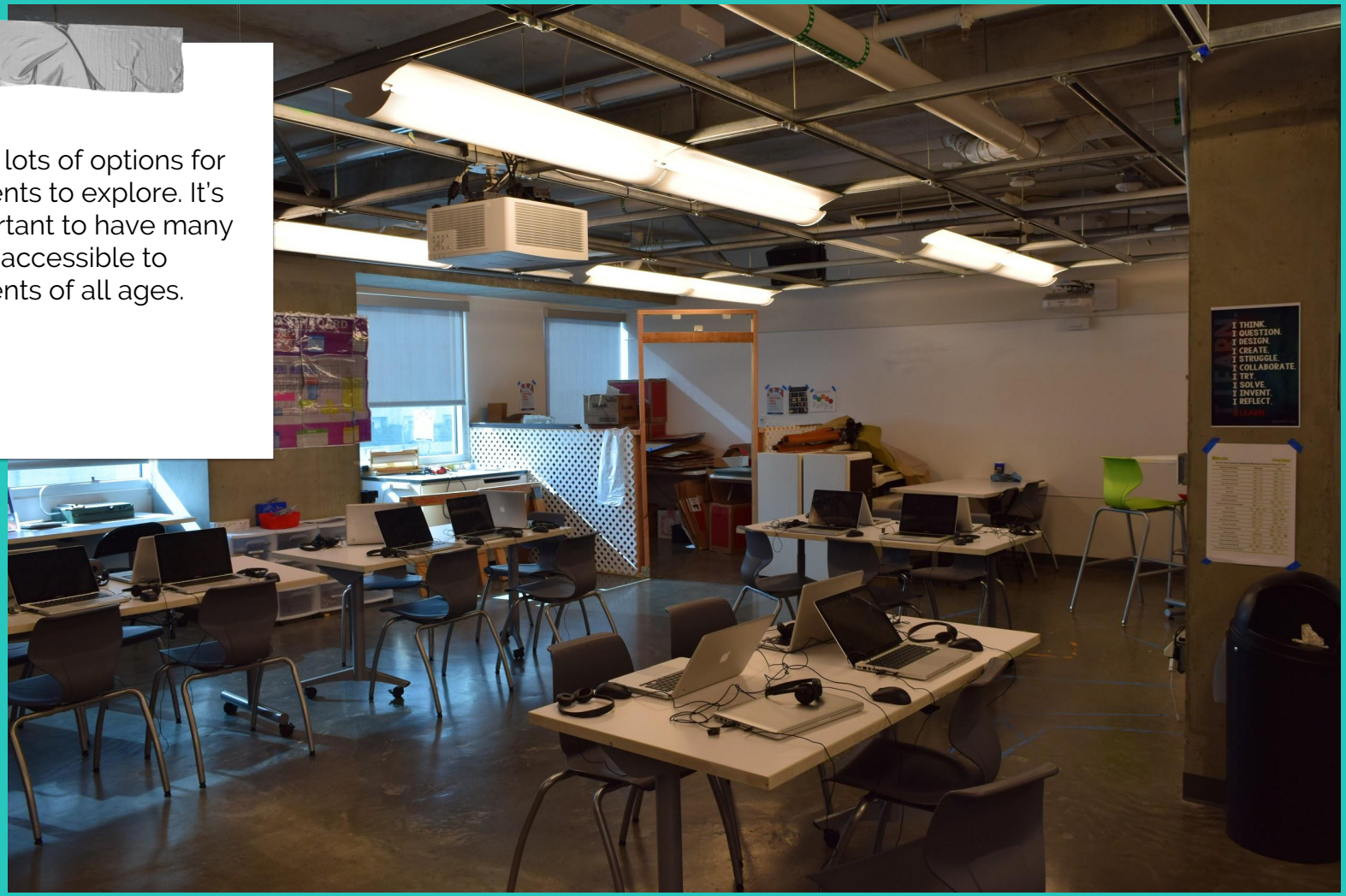
During open lab hours, students are encouraged to come and go as they please, working on projects that interest them. Students are prompted to access information on their own to apply their learning to projects (with the facilitator checking in as they go). Students have easy access to tools and are supported in the use of tools from traditional hand tools (hammers, saws, & glue) to more advanced tools (3D printing, programmable boards and motors.)

➔ Teachers

Teachers are encouraged by a facilitator to work on their own projects and bring their passions and interests to their classrooms. Teachers are provided cubbies to store their projects in alongside the student spaces. They can come in as they please as their schedules permit to work independently or collaboratively with a member of the tech team to guide them through using tools in their own classroom. Teachers work on woodworking projects, 3-D printing, and general electronics projects of their own.

Tip:

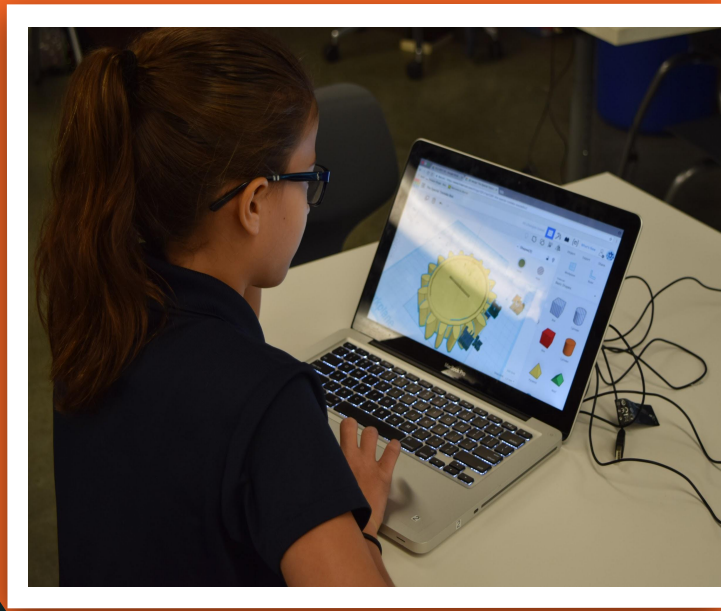
Have lots of options for students to explore. It's important to have many tools accessible to students of all ages.

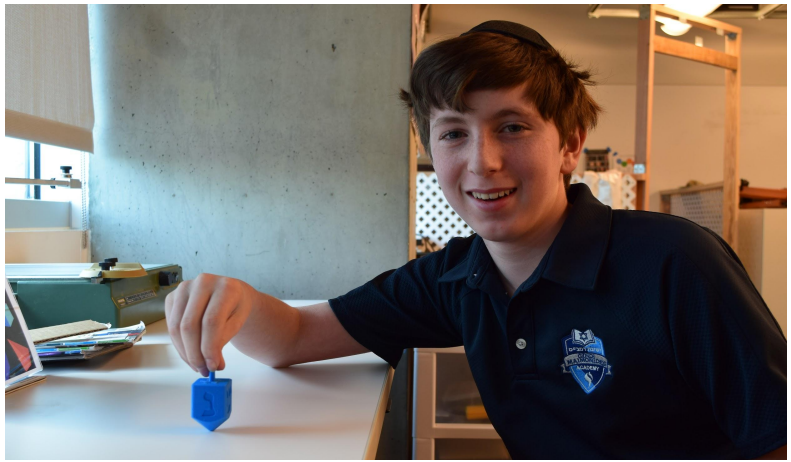


Example: 3-D Judaica Design Build

Fun Fact: 3-D printing has actually been around since the 1980's!

Students approached the instructor early on in the year with a desire to learn how to use the 3-D printer and use its accompanying software. We wanted to encourage this passion and couple it with classroom learning. Students spent weeks learning how to use the Tinkercad.com (modeling) software in our Makerspace, all on their own time. Students worked to learn the requisite math skills including geometry, algebra and unit conversions needed in order to design and create viable 3-D prints. In Judaics, students learned about three pieces of Judaica and their relevant laws. We chose the Mezuzah, Tzedakah box, and a Yad pointer. Students were also encouraged to follow their interests and build a Judaic tool to support any "Mitzvah" they wanted (such as a dreidels, kippah, candlesticks, Kiddush cup, etc.) Students then took their own 3-D printed creations to use in their homes and lives.





3. Projects

"People learn best when they are actively working on meaningful projects – generating new ideas, designing prototypes, refining iteratively."

➔ Students

Students have one 30-minute lab class a week which gives time to teach skills and tools that they can take back to their classrooms and beyond. Students are provided with a broad range of lessons with tools, and given access to these tools regularly.

Students are provided with the opportunity and guidance to work on projects independently, with peers, or with instructors. Teachers design work around the use of our space to allow for projects to be built in the Innovation Lab and in the classroom.

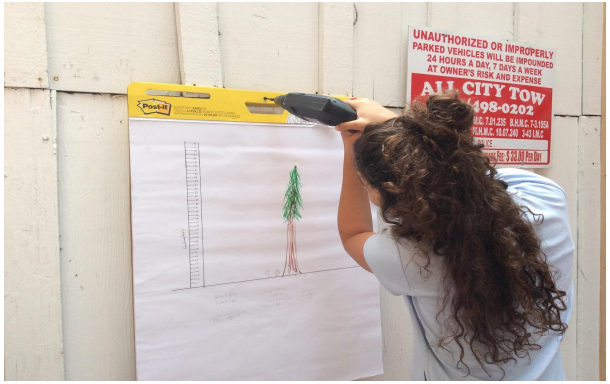
➔ Teachers

Teachers can attend voluntary professional development workshops on current technology classes to learn and be able to utilize the same tools as their students. When the teachers experience firsthand how the tools can be manipulated, they can begin to form ideas of how to use these tools in the classroom.

The Lab is used as a flexible learning space where teachers can bring their students, and learn together with them in a cohesive environment.

QUICK TIP

Students should be given the opportunity to use tools not typically given to kids, but always with supervision.



Example:

Sukkah Build - Watch video HERE

Integration: - Link to the materials HERE

- Writing: students were expected to reflect on every aspect of their build and write according to a rubric what it was that they learned
- Math: students spent considerable time learning about scale, ratio, and measurement conversion
- Torah: students reviewed and learned new laws that pertain to the construction of, and the observance of, the mitzvah of “sukkah”
- Real world application: students built a sukkah for a local bikur cholim chapter that used the sukkah for their apartment that is situated near our school

Tip:

We use projects both as formative and summative assessments. Students tend to learn better when they are building.

4. Play

"Learning involves playful experimentation – trying new things, tinkering with materials, testing boundaries, taking risks, iterating again and again."

➔ Students

Weekly challenges are issued for students to use items in novel ways. Students are then provided with an array of resources to experiment with, and are encouraged to make mistakes - fast, and often. Ample cardboard, batteries, and recycled motors can be found in use everyday. An important note: the tools are less important than the "experiment" attitude we support. Tinkering/Play is purposefully open ended in order to let students have a wide area to play with.

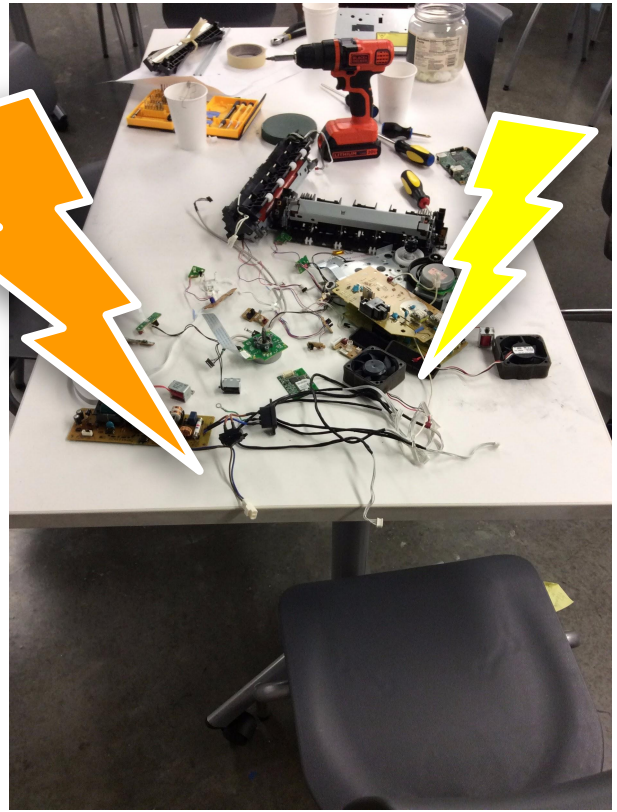
➔ Teachers

Teachers attend technology/maker classes to learn the same tools as the students. When the teachers experience first hand how the tools can be manipulated, they can begin to form ideas of how to use these tools in the classroom.

We use "design thinking" and the "creative learning spiral" to foster thoughtfulness and reflection in our structured and unstructured work. This is done on both student and teacher generated projects as well as in the classroom. These processes are important, because it encourages students and teachers to remember that learning is not a linear process, while still providing support.

Tip:

Designate certain areas for certain tools to help contain the mess that will ensue.



Example: Teardown Tuesday

Tip: Have lots of containers ready for collecting spare parts.

This hands-on instruction in electronic and mechanical devices allows students to take apart, or try to fix, a variety of appliances. Students take copious notes which provides support for others who want to work on similar devices. We then put the devices back together and use them in the lab (if we have fixed them) or take the components for recycling. We try to reuse as many of the parts that we can salvage for other projects. We learn the laws of ba'al tashchit (not wasting) along with the challenges facing the environment due to large quantities of E-waste in the world. We learn about resistors, capacitors, and LEDs, and how all these things are programmed and controlled. We also use this as a time to practice soldering, allowing students to solder and desolder components to a circuit board. We reuse components in conjunction with new projects and programming arduino boards.

All of this has a wide application range, including but not limited to science, engineering, language arts, Mathematics, and Judaics.

5. Pentateuch/Torah

Note: The term Torah is used here in the broader sense of the word, meaning all those things encompassed by Jewish law, faith, and tradition, as opposed to the literal translation of the Five Books of Bible. It is our firm belief that all things connected to a Jewish education need to be deeply rooted in Jewish values. There is no general or Judaic divide - all the "P's"we use are be based in Jewish ideals.

➔ Students

The concept of Maker Torah/Learn by Doing is our primary guide. The Lab is purposefully situated near the Beit Midrash and with a modest sefer collection in the lab, students are encouraged to utilize sefarim as guides to all aspects of their work..

Students take their Judaic learning and apply it everyday to projects that reflect their interest and concerns. The lab is staffed by two instructors, one Judaic studies and one general studies, at all times.

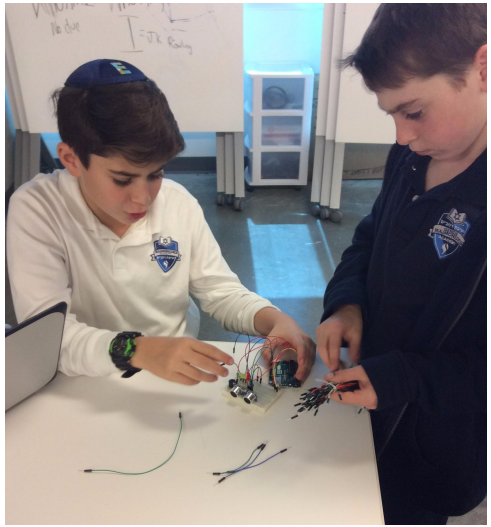
The previous P's all apply to this one - encompassing P. We want students to approach Torah with the attitude to learning that will create lifelong independent learners. Students are encouraged to follow all their P's in the Torah ideas.

➔ Teachers

Teachers collaboratively develop materials utilizing tools and materials found in the Lab. The role of the Innovation Lab director is to coordinate these efforts.

Judaic and General studies teachers cross-pollinate using their areas of expertise. They can take advantage of the full time general studies teacher and Judaic studies teacher who are in the lab facilitating the use of the tools. An instructor works to help teachers find the Jewish values and aspects in all programming that occurs. The instructor helps to creates summaries of lessons which allows teachers to plan collaboration ahead of time.


BUILD YOUR OWN VIDEO GAMES



Example: “SteaMitzvah” Fair

Students are provided with a challenge: to help elevate the world through Torah and STEAM. Students were asked to come up with a way that they could solve a problem that was supported by Torah sources and Scientific information. This could be an issue raised by the Torah and our Sages, or something that they know has Torah sources. It is a prosocial steam fair. This program is run in and out of the actual lab space, across classes, platforms, and tools.

In our school, this is our ultimate expression of the Innovation Lab as a space. It is a space that is used for both deep learning of Torah and masterful real world application that is meaningful and applicable to the students everyday lives.

Design Guide for the Fair: CLICK HERE

Tip:

Previous years work on Halachic measurements Projects

Scope & Sequences/Tech Road Map

2015-2016

Click Here

2017-2018

Click Here

2016-2017

Click Here

Reminder:

We always make sure to take the way we learn in the Lab back to the classroom to be able to implement the learning in a real way!

Thanks for checking out our Innovation Lab

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Stop by anytime!

Check out our full write up HERE

Full list of programs: past, present, and future HERE