



How It All Began

Curiosity Hacked, originally called Hacker Scouts, began in the Spring of 2012. Chris and Samantha Cook had been participating in the maker movement since the beginning of the latest revival. Eager to pass along the maker values that play such a significant role in their own family, they began seeking out classes and programs that would help their kids learn new skills and assist in achieving their goals. Unfortunately, most of what they found was curriculum or programs that consistently followed directions to a single end, so in the spirit of the maker movement they decided to build a program that focused on mentorship, collaboration, and individual vision.

Curiosity Hacked Mission:

Curiosity Hacked is a non-profit, inclusive organization dedicated to addressing the needs of the global maker community through STEAM education and skill building. The Curiosity Hacked model provides knowledge, application, and retention of concepts and skills while supporting independence and interest. Our innovative open source programs promote learning through a variety of developmental and educational methods which prepare our children to adapt to new technology and give them the ability to achieve individual goals. Curiosity Hacked encourages the relentless pursuit of knowledge through relevant hands-on activities, mentorship, community and family engagement, and the development of a strong moral character and leadership skills through our core values.

Curiosity Hacked Objectives:

- To prepare the next generation for a complex world through supporting creative innovation, the ability to adapt to new technology, and to value collaboration as well as sustainability.

- To give kids the opportunity to work with a variety of experts and mentors from the community and ensure a well rounded and high level of attention and skill building for all ages through programs that meet the different needs of our young makers.
- To reach as many kids as possible and support them in building their own education through programs that are both accessible and affordable.
- To provide open source material and a support program for Curiosity Hacked programs globally.

Curiosity Hacked Learning:

Everything we do at Curiosity Hacked, from building activities to mentoring to organizational decisions, stems from how children learn. We believe that children are naturally curious and attracted to learning more about themselves, others, and their world. We were, in part, inspired by the old method of apprenticeship and mentorship promoted by Guild organizations that have existed since the middle ages, where youth would enter a specialized workshop and learn to master a particular skill under the tutelage of an expert. It was, and still is, this relationship that produced amazing work and a deep understanding of concepts and skills, which is why we have badges to mark an accomplishment, but these are not achieved independently. They are achieved by children working with our mentors to meet the objectives together. That way, kids in our program are able to individualize their learning, mentors are able to adjust to the learning style of each kid, and together they can explore a concept or skill in it's fullest capacity.

We also take a deep constructivist theory approach to learning. That is, the learner controls the learning and that learners generate knowledge and meaning through their own ideas and experience. There is always an external set of knowledge that exists, compiled by observation and experimentation by experts in a particular field. Just as this information is often guided by the interests of those experts, the learner will interact with this knowledge in a way that is valuable to him or her, therefore resulting in a deeper and more meaningful interaction and outcome. This means that the background, culture, and passions of the learner can play a crucial role in the learner developing his or her goals, taking responsibility for his or her own learning, and see learning as an active, social process.

Indeed, both Sparks and Guild programs are based on experiences we have had as educators around how children learn, including a museum education method of object based learning- meaning you can explore an object (idea, skill, etc) in multiple ways that build on the experience of an individual and allow that individual to leave with the knowledge that is most meaningful to him/her. We do not have ranks, although like the inspiration of Guilds

mentioned above, there are self-identified levels of knowledge and understanding that give each youth the recognition of an accomplishment and the privilege of mentoring and designing activities/projects in their Guild. Kids work with mentors on their path of discovery, to seek new skills, new ideas, new industry and identity. They then use the design thinking process to hack their curiosity into a shareable product. Sometimes this quest is solitary, sometimes with others, but always unpredictable. This is why we are careful to create just enough structure to guide our kids and their mentors, but leave enough flexibility for the unexpected to be embraced and the individual value to be constructed and explored.

Our focus is about instilling confidence and self-direction while giving kids the concepts and skills they need for the future. It is about adapting technology, supporting sustainability, celebrating diversity, and building community. It is most importantly about curiosity, discovery, wonder, and delight. We feel this approach instills the innovative and creative spirit that our kids will need to not only work in jobs that haven't even been invented yet, but be responsible for and assertive with their own happiness. The foundation of everything we do honors and caters to the developmental range, needs, and passions of the kids we serve.

Curiosity Hacked Mentorship:

Curiosity Hacked believes that mentorship is the foundation of what we do. All our mentors are volunteers, and have joined our community because of a deep desire to support the curiosity and innovation of children.

Mentorship is ultimately about trust. The kids who come to our programs are trusting their mentors to help them achieve their personal goals. They are trusting their mentors to honor whatever experience they are coming in with and what they may want to explore with us. They are trusting their mentors to guide them through the design, build, and share process while allowing enough autonomy to challenge themselves.

In return, mentors have to trust the children they are working with to know themselves. They have to trust that what the child sees as personal and important is the catalyst to mastery. They have to trust the process. They have to trust themselves.

These are the five most important tools mentors use to facilitate our programs:

1. Model what you would like to see.

The process for learning is similar for adults and kids. When children see us working hard, trying new things, accepting failure as a challenge and an opportunity, they are inspired to do the same. Modeling also sets up a deeper relationship, much like that of an apprentice. There is a subtle transfer of information that happens from mentor to student. The body language, verbal communication, storytelling/history, and observation between student and

expert is irreplaceable. Mentors serve as a role model and a source of safety in both attempt and failure.

2. Failure is an option.

Showing both success and failure in the process of Making exposes the reality that not everything works the first time. Solving a particularly hard challenge after many attempts can build confidence and self esteem., and turns the idea of mistakes into learning and growth. In fact, the word “failure” is often used by adults, but not kids. We attribute this to a shift in alternative and STEAM education, giving this generation a unique benefit by working with the design process. The opportunity to see when things don’t work the way they expected or wanted as a part of the process and a beginning, instead of as a “failure” or an end is one of the greatest values we can give children. It also supports the development of empathy, patience, persistence and delayed gratification.

3. Honor the stages of development.

Be aware if the child you are working with is truly capable of what you are asking. Children in the 6-12 year old range, for example, can not usually think both abstractly and logically. Instead they are limited to thinking concretely. Their knowledge is tangible, definitive, and exact based on real, concrete experiences rather than abstractions. One of the reasons math and science becomes so attractive in this age period, is because their thinking process is moving from imagination to fact and classification. They are also developing memory strategies for retention of knowledge and skills. Children are recognizing and actively seeking out the ability to gain new knowledge and skills, assessing their personal method, and competence, often comparing themselves to peers. This is an essential time for self esteem, the building of relationships, and providing opportunities for success as well as failure. Children in this age range need quite a bit of praise and reinforcement around competence and self-image, mentors to help them recognize and develop their own unique talents and abilities, and guidance with relationships, problem solving, and communication. Learning, or the forming of synapses in the brain, occur through repeated experiences, and like younger children they are still learning mostly through movement and tasks their body must perform physically. These pathways become more complex when subjected to multiple sensory input, language, and relationships. But the problem is that these pathways are a “use it or lose it” system, so if a function is not repeated to ensure retention, that pathway disappears. In other words, when you plan activities that build upon previous experiences, you are helping to form a more complex understanding and knowledge of a subject. Short term projects are often best with this age group, because they often lack the focus and the ability to visualize the end result of a long term project. They need concrete results in a timely, regular manner. So then, in order to truly meet the developmental needs of this age group, we need to recognize their strengths and limitations and foster activities and community that supports children where they are as much as their potential.

4. Encourage confidence and independence while building community.

Often, starting kids off with structured or pre-designed activities is an excellent way to build interest in Making. One benefit is that it helps them build new skills they will need later on for their own projects in a way that promotes correct technique and use. You have to know the rules before you can break them, after all. It also builds confidence by giving the child a taste of success. Making something that turns out exactly how it is supposed to is exciting and satisfying, resulting in a higher level of risk-taking down the road. When all the kids work together in community, they often teach each other skills by exposure or intentional instruction, inspiring new ideas and a willingness to try new things while maintaining their own interests and identity. Simply the act of being in the same room with other Makers can promote a sense of belonging and security in their own passions. Also, document the experience. This not only shows kids how far they have come both independently and together, but also allows the mentor to see patterns of interest and skill and support the learner in where they are and where they want to go.

5. Respect the autonomy of the children.

It is very easy for adults to make judgements about what children should or could be learning, but it is not about us, it is about them. Try to offer a diverse array of projects at your open lab that will appeal to different learning styles and interests. Then get out of the way. Even children come in with their own set of experiences and ideas, which need to be respected. Let them choose what they will, even if they choose it every single time. Most often, there is something in that skill or subject they are trying to work out for themselves. Eventually, most kids try something new after a while. But even if they don't, there is value in simply being exposed to a variety of activities, whether they ever choose them or not.

Curiosity Hacked Programs:

Children are more than naturally curious. They come to us with experiences and knowledge. When we designed our programs, we wanted to create an experience in which that experience and knowledge was honored, and we knew that meant something different for every family.

Our Open Lab program, which was actually the program that started it all, is about community engagement and experimentation. It gives families the chance to make and take chances together, trying things they might have never tried before, and taking those ideas home to inspire and instigate new interests. Open Lab is an all ages program based on how children learn through various developmental and educational theories as well as a desire we see in the Maker culture for community and family inclusiveness. The idea is this: Multiple times a month we hold Open Labs where we have experts/mentors available to help kids with any project they bring in. There is also a featured project that a whole workshop is built around that specifically targets skill building. In addition, there is always

a menu of other kits/activities that are available for kids that focus on a variety of interests, skills, and ways of learning. The structure has a method- it creates consistency and the opportunity for mentoring and improvement, the provided activities and featured workshops are designed to teach to multiple learning styles, the format supports autonomy and independence, and the program is inclusive and adaptable. Kids can earn badges or not for their skill building, and they can come every week or once in a while. The result is exceptional and exciting- families have come and learned, shared, hacked and formed community in our hackerspace while thriving on the opportunity to learn new skills, reinforce knowledge, and benefit from mentoring to explore their own interests and achieve their unique goals.

The Curiosity Hacked Guild is a weekly program for older children (8 and up) who are ready for more complex skill building and a focus on their individual goals while building relationships within a community. The program is designed to balance between structure and autonomy, uniquely addressing the developmental, intellectual, and social needs of this age group. Most Guilds begin with the Hackerling Circuit project, which is an Arduino Shield (circuit board) that gives all of our a well rounded education in STEAM concepts and exposing them to the fundamentals of skills, resources, and ideas. Topics covered include circuit and hardware science and function, soldering, LEDs, sewing, design, laser cutting, and more. Not only does this project give our kids a strong foundation to work from, but it also allows them the opportunity to make autonomous decisions around their own interests and what badges they may want to pursue later on. In our Guilds, kids pursue badges based on their own interests, invest themselves in smaller projects, and/or work on group projects. Mentorship plays a crucial role in our Guilds, both from experts to learners and peer to peer, offering a variety of opportunities for exploration and sharing of skills and knowledge. Every meeting also includes exposure to our core values, provoking thought and discussion. Meetings can also include field trips that offer an opportunity to try new skills and explore ideas.

Curiosity Hacked Sparks is a program for younger children (4-7) who are ready and interested in basic skill building and concepts. Sparks approaches the same high level of education, skill building, and self-determination in an appropriate way for the younger kids, using independent modules which will explore in an interdisciplinary manner the same concepts and skills approached on our badge tree. Same dedication to child development, high expectations, high levels of mentoring and experience.

The Role of Badges:

Badges have been used by many organizations for a variety of means for many years. The structure has rarely varied, however, usually following a fairly predictable path of identifying a goal, providing the steps to achieve said goal, and then be tested by an expert on acquisition and retention to receive the badge.

Curiosity Hacked sees the role of badges differently. We see them as a tool that can be used to master a skill or concept, stemming from the interest of the child. In most cases, interest does not begin with the badge, but rather a project the child is interested in taking

on. The badge serves as a catalyst for project completion, acknowledging that the exploration of mastery is served best when it comes from a place of deep interest and need.

All our badges have a common template, so that they are easy to understand, follow, and contribute to:

Each badge begins with a reminder of what we are trying to accomplish together. No badge is arbitrary, it has a unique value and purpose to the young hacker who has decided to meet his or her goals in this concept/skill area. The values of autonomy, self direction, community, resourcefulness, mentorship, persistence and documentation are inherent in every badge.

The throughlines illustrate the reasoning behind pursuing a badge. They encourage kids to think about their own learning as limitless, driven by their own curiosity and wonder. They remind kids that they are responsible for reaching their goals, that they always have some level of experience and knowledge to assist them in getting to the next level of skill or concept mastery, and that through collaboration and sharing they are able to make a positive impact in their community.

- **Guild Throughlines**

1. What kinds of ideas and projects catch my attention and make me excited to explore and learn? What concepts and skills would be valuable to me?
2. What steps do I need to take in order to take charge of my own learning?
3. How can I use the resources available to meet my goals?
4. How can I share what I learn with others?
5. How will mastery of a concept or a skill assist my goals?

The design process lays out the path of mastery along which, while a young hacker may have a goal in mind, there will be a journey as well as a destination. Many badges begin as a tool to complete a complex project, rather than simply mastery of the skill itself. In either case, identifying the possibilities and the value of those ideas to the learner helps to define the project in a concrete way. By spending some time planning and identifying resources, the kids will either have a concrete roadmap to move forward or they will be inspired to change their project and begin again. Starting from a place of discovery and exploration ensures that by the time the kids have started designing their project, they will be confident and ready to work. The design, create, test, evaluate, and redesign phase has no time constraint. Kids may find that their design alters or their end goal evolves. The overview and objectives of each badge (more on these below) serve as a guideline to help them, so when they are evaluating their project they have access to the set of skill mastery identified by experts in that particular field. How they apply them is individual, but this simple structure is very helpful not only for completion of a project with enough knowledge

to retain and apply the knowledge again, but also for consistency when our young hackers are ready to share what they have made with the community.

- **Badge Design Process**
 1. Identify goals
 2. generate ideas
 3. design
 4. create
 5. test
 6. evaluate
 7. redesign (and repeat 4-7 as necessary)
 8. share

From there, the badge becomes specific to the concept or skill to be mastered. It is not enough to say something is important. What makes it useful? Does it's history contribute to the knowledge and use of the skill? Why is it important that this skill be passed on? How are others using this skill? An overview takes us through the intention and possibilities of a badge.

- **Badge Overview**
(what is the intention of this badge? Why are we doing this? Why is it important?)

Following the overview, the objectives set the level of mastery for the badge. We are very conscientious of the age and developmental needs of each group. The objectives are not set up as requirements or a static checklist, but rather a set of knowledge we have collected from experts in that particular field to describe what mastery is. It is from here that mentors are able to help guide the kids into integrating these objectives into their project goal or to help define what it is they would like to get out of mastering this concept or skill. Again, lifelong learning comes from personal interest and internal motivation, so our goal as mentors is to find what inspires the kids we work with and help them shape their badge experience around their vision.

- **Badge Objectives**
(what info needs to be acquired, retained, and applied for skill/concept mastery?)

Often, a mentor does not have extensive experience in a badge area or the young hacker may not have decided on an end goal quite yet. What they both do know is that they are interested in the badge. Or perhaps the end goal is extensive and it makes more sense to do a series of activities and/or kits that build skill knowledge first, before tackling a larger project that the child has designed. This is why we include a section of resources and activities to support the badge.

- **Mentor Resources:**

(websites, etc we have found helpful for supporting mentors in guiding this badge)

- **Lessons and Activities to support Badge Objectives:**

Note: These are activities and resources meant to help facilitate the acquisition and retention of the skill or concept being mastered. They are not, however, mandatory. A dialogue between the Mentor and young hacker should result in a plan to meet the requirements of this badge with the child's vision as the guide. That may include some or all of the activities below, or it may be designing a new project. The mentor will help to shape the plan so that the child can master the skills through what he or she deems valuable, while still ensuring a comprehensive education in this skill/concept.

- **Additional Resources:** (any other resources that may be related to the badge skill, but not essential to the objectives)

Finally, as part of the design process, young hackers are asked to document and share their work. This could be in an online blog, with their peers in their Guild, at a maker or science fair, or however they are most comfortable. By sharing their work in a particular skill area, they not only demonstrate and affirm their own learning process, but are able to act as a mentor to others, therefore completing the circle.

- **Share:**

How can I share my knowledge with others? Did I document my project through notes and/or photos? Did I find an activity or resource that was particularly interesting or helpful?

Mentors will help our Curiosity Hackers finish their badge by sharing the above on our wiki in the appropriate badge section.

Our badges are meant to be organic, constantly growing as new information and ideas are discovered, tried, and contributed.

Curiosity Hacked in Libraries and Museums

Curiosity Hacked is a natural fit with museums and libraries, where often our values and vision are very similar. As the maker movement has grown, many libraries and museums have expanded their offerings to include public access to new technology and skills. We are excited to be able to collaborate with museums and libraries to connect these new programs to their existing offerings, learn how to best facilitate the public's use of technology within the museum or library, and creating meaningful experiences for both visitor and staff.

Curiosity Hacked in Schools

While many of our programs run in community organizations and hackerspaces/makerspaces, we also have a growing community of schools in our

community. While many schools are attempting to embrace the maker movement, and often focus on fitting activities into the existing educational standards. Our pedagogy is based on how children learn best as individuals, and offers children a chance to control their own education.

Therefore, our participation in schools has been more strategic. Helping teachers to identify interest and how to integrate more making into the standards they must meet, supporting staff in learning new skills and how to mentor kids in a very different way than they have been expected to within the classroom, and finding the best collaboration with each school, whether it be a recess club, an elective, or an after school program.

Collaboration:

Curiosity Hacked often collaborates with other organizations for a common good. We believe that through the collective gathering and sharing of STEAM concepts and skills through affordable and accessible programs and the dissemination of knowledge through open source tools, we can reach as many kids as possible and put the natural process of learning back into the hands of the learner.