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Summer 2021

CONTENTS

FROM THE EDITORS

As we are halfway through the summer, we suspect many of you are starting to think about the fall. Purchasing curriculum, signing up for classes, planning field trips, buying supplies; the anticipation for the new academic year is tangible in late summer! During one of our many meetings recently, we were discussing this ritual of preparation, and how it feels to be on the other side of the homeschooling journey. Blair's son will be entering his third year at university after a summer of interning at a construction management company. Samantha has three kids at different stages: her oldest has transferred from the community college and is moving in a few weeks to university, her next oldest is at the community college full-time this fall, and her youngest is the last homeschooler left, with just a couple years left before moving on.

Upon reflection, the most awesome part of this homeschooling journey for the both of us has been the relationship we've cultivated with our kids. Even the ones who don't homeschool anymore still come to us for help or advice, because we laid a foundation of trust and confidence over many years of focusing on how learning best happens in our house and supporting the interests of our learners. Neither one of us are perfect- we made plenty of mistakes, but we always figured it out. In fact, all of our children have expressed in some way that they are glad we took this journey. The oldest two who are at university have made it clear to the both of us that they are grateful they had the opportunity to explore who they are as a person, what interests might ignite a passion, and that we taught them to make the most out of both. They both felt very prepared for college and for life, and dismiss anything they may have missed in a school setting in favor of the experience they got instead. We realize that every kid and every homeschooling journey is different, but for our families, it has been a catalyst to a different kind of life. A life in which we could give our kids the better, more collaborative, experiential education we wanted for them. A life that cultivates growth, love, empathy, justice, and self-determination.

We sharing this with you all because we think it helps to hear that down the road, everything we have done matters. As many other veteran homeschoolers can probably attest, it is worth the hard days and the good days and the days we don't remember. It's worth the planning, and the re-planning, and the side tangents. It's worth the kitchen science experiments, researching the best books, and trying as many things as possible- from video games to field trips- to encourage understanding and interest in a concept. If you need to hear this today, then know that it's true.

As we worked together a few days ago on a new project, one of the themes we came across was hope. We ended up discussing at length how we need hope more than ever these days. The world is opening back up in some ways, but it won't be the same. You all, and especially your kids, have shown incredible resilience during a very rough year and a half. Our hope for you is that the magic, adventure, and love of learning lays the foundation for a great homeschool year ahead, and that your journey is exactly what it needs to be for you and your family.

In the spirit of getting ready for the new year, mark your calendars for the next *SEA Conference*, happening August 27-29, 2021. Amongst a host of incredible speakers, Blair will be speaking on teaching science for the non-scientist and homeschooling middle school while Sam will be giving the second part of her workshop on Historical Thinking, Research, and Writing for Young Historians through modeling picture and object-based strategies. You may also want to check out the amazing, learner-centered classes now open for registration at *SEA Online Classes*. And you don't want to miss the August Sale at the *SEA Bookstore* which has fantastic products to add to your homeschool year.

Cheers to a new homeschool year,
Samantha Matalone Cook and
Blair Lee

Handcrafting a Culture of Thinking: Metacognition

By Blair Lee

This is part two of **The Learner's Toolbox**, a multi-part series that focuses on learning skills that are an essential skill set lifelong learners.

What are your plans for the coming school year? Language arts? Math? Science? History? What learning skills are you planning on having your children work on? Wouldn't it be great to handcraft a culture of thinking in your home that is personally meaningful for your learners while providing support for a learner-centered education?

If you were thinking these skills are something kids will just pick up, think about how many adults you know who have not mastered all the learning skills. For something as important as the skills needed for and used in learning it is a good idea to intentionally weave those into your learning plan, along with academic subjects. Plus, if you spend some time intentionally focusing on those learning skills the subjects are easier to learn and students are more likely to gain mastery of those.

Metacognition Defined

Metacognition is the ability to use prior knowledge to plan a strategy for approaching a learning task, solving a problem, evaluating results, and modifying an approach. When we do purposeful thinking about our thinking, we engage in metacognition. It encompasses an important skill set that enhances learning and helps learners understand their own learning processes, how their unique brain works.

6 Metacognitive Skills You Can Weave into the Coming Schoolyear

1 Retaining, Retrieving, and Discussing/Using Knowledge

An important metacognitive skill is the ability to retain, retrieve, and discuss knowledge. These might sound like they are three different skills. However, they are partnered when scaffolding them and when learners demonstrate skill with them.

How to Work on this Skill

Multi-step instructions – Give students multi-part oral instructions. They cannot start until you have given all parts of the instructions. Start with one step, then progress to two step instructions, and so on.

Socratic Method – Asking genuine "I wonder" questions followed by "What do we

already know?" is a great way to assess what has been retained. When your learner retrieves information showing they are learning, stop and engage in a discussion, casually and intentionally pulling in more retained knowledge. Let your child know you're proud of them for pulling that sort of information into the conversation.

Casual Conversation – A great way to measure if learning is being retained is to look for learners to retrieve information and discuss it outside a school setting. Incorporate work on this skill into the fabric of daily life. And don't just make this about your kids. Discuss what you're learning. Model how you retrieve and discuss knowledge you have retained.

2 Directing their Own Learning

In terms of metacognition, self-directed learning incorporates

1. critical thinking,
2. locating resources that support the growth and development of ideas,
3. exploring those for validity and impact, all of which leads to
4. the ability to connect learning to new experiences. Work on these four steps requires oversight from a mentor and benefits from scaffolding.

How to Work on this Skill

Scaffold good entry points that meet a learner academically. When your learner is interested in a topic, it can be difficult for them to know where to start. Provide the needed scaffolding to get them started at a level that is challenging enough to be engaging. As they progress and their learning evolves, new questions emerge, and new resources are needed. Pay attention when that happens to provide those.

Teach students how to find adequate & accurate resources! – The more students feel the pride of figuring it out on their own, the more they will feel empowered to keep learning, and will repeat the pattern of discovery when applied to other interests and subjects. The problem is that there is a wealth of information at our fingertips, including a lot that is not credible. As students direct their learning, they need intentional teaching about how to select materials from good sources.

Promote Design Thinking – One way to foster self-directed learning is to use Design Thinking. You can scaffold this by asking, "How can you design something to solve a problem?" With design thinking, learners define a "problem" something that needs attention, they brainstorm to come up with a possible solution, they build a protype, and they test it. These last two steps can go on for a while in an iterative process.

Scaffold this as needed, and look for evidence of learners retrieving, retained knowledge during the design process.

3 Using Subject Specific Vocabulary

The ability to think about your thinking in the context of learning new information requires a certain literacy with the words being used. For example, in a science course, if a student encounters unfamiliar words, they will likely be unable to assess their knowledge. It may keep them from knowing what they know. If that happens, the learner will not recognize what information they have retained in order to retrieve it.

How to Work on this Skill

Learn Vocabulary with Learner – If you see issues with vocabulary, look at where students are using the vocabulary. If it is only in the context of coursework, that is the likely problem. The best way to learn subject specific vocabulary is to begin using it regularly in and outside of learning time. This can mean you have to learn the vocabulary too.

Words in Context – Retrieving the correct meaning of a word based on its context is a metacognitive skill. Understanding the specific definition for certain contexts is important. Think of the word theory. Is it used casually or a science class? Knowing the context provides the information needed to understand ideas.

Latin Root Words or a book like Decoded – Studying Latin roots are a good way to work on this skill. A root has a specific historic meaning that relates, morphs, and evolves in modern day language. For older students, a book like Decoded (which has a lot of cursing and some drug use) where there is a collection of lyrics and their meanings in the context of rap music that tells the story of a culture, an art form, a moment in history, and is also part memoir.

4 Making and Using Models

Speaking of words in context, I will give you tips for two types of modeling. First, where you model metacognitive skills, and second 2- and 3-dimensional models that are simplified, stripped down presentations to help focus in on specific concepts and thinking processes.

How to Work on this Skill

Metacognitive modeling you do – Model Metacognition for learners by interpreting information, data and vocabulary, analyzing statements, and making conclusions about learning. In this way, you are explicitly articulating the underlying thinking process you use. Just make sure that when using modeling to scaffold, you meet students where they are.

Use 2- and 3-dimensional visual models: Visual models help learners think through what they are learning. They are great tools to draw out the information students have retained and help to scaffold them with retrieving their knowledge.

5 Perseverance and Stick-to-itiveness

The ability to purposefully work through the "steps" for better understanding is an important metacognitive skill. Think stick-to-itiveness as a demonstration of this skill. Does your learner bounce from activity to activity without finishing many, or do they work toward completion? No parts of any project are fun, they just aren't. Learners who generally see a project through to the end learn more. They have deeper, broader, and more nuanced understanding of knowledge and information. This skill is also important for making connections across disciplines. I have seen cases where people didn't do this for learners, and it created issues where students knew topics at a high level within a very narrow scope that was too narrow for them to make connections to other topics and information. That limits student's ability to do anything outside of a specific area.

How to Work on this Skill

Model this behavior – Make sure you are modeling this behavior.

Discuss the importance of perseverance – Make this a focused skill one that everyone takes seriously.

Incentives: Use incentives if you must but do what it takes to have students work on the habit of completing projects.

6 Evaluating their Own Work

Metacognition is the ability to think about your thinking. It is important that learners can evaluate what they know as they do that. Students who know what they know do a better job of recognizing when they are working on new skills and learning new things. This is where real learning occurs as students build on retained knowledge. This ability to evaluate your own work is an important metacognitive skill that will help build confidence. Too often learners doubt they are up for the task. Even when it is obvious, they can do it. It can be frustrating, can't it?!?

How to Work on this Skill

Knowing What You Know – A learner with strong metacognitive skills knows what they know. They have

access to information they retain, then retrieve, to use and build on. One of my favorite sayings of all time, is John Wooden's saying "It's what you learn after you know it all that counts." When you can know which knowledge and tools in the learner's toolbox to pull out to use on a job you can engage in increasingly more sophisticated and bigger projects and work, and you

know when you are learning. To help learners know what they know, use phrases like, “You know that” and “You taught me something today,” to help your learner assess their knowledge and be more confident in their self-assessment.

Scaffold Skills #1-5 to Achieve this - There’s a reason this skill is number 6 on this list. It is through the scaffolding of the other metacognitive skills that learners can adequately and accurately evaluate their own work.

Growth Mindset for Evaluating Work - Use a growth mindset where evaluations are treated as an opportunity to grow. This is a learner focused approach where students know what they know and are encouraged to investigate new knowledge and skills.

A Final Thought

Metacognition is about creating a culture of thinking and learning that results in thoughtful and reflective learners who are motivated to engage in independent, lifelong learning. Strong metacognitive skills help learners connect to the unique way their brain works. These are the skills of lifelong learners. This school year, in addition to planning for language arts, math, science, and history, why not weave work on metacognitive skills into those.

Find more information about the author of this article *here*

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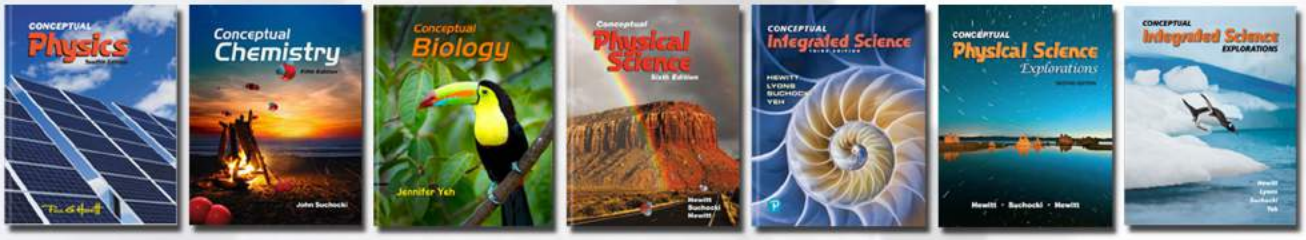

New!

6 Kinds of Books Your Kids (and You) Should Read

By Michelle Parrinello-Cason, PhD

As an English professor who now has lots of friends who homeschool, I often hear people's anxieties around reading. They want to know if their kids are reading enough. They want to know how to keep a love of reading burning or how to spark it if it has fizzled out. They worry about what level their kids are reading at and if they are retaining enough information.

At its core, reading is communication. It's a conversation between the reader and the author, and it can spark projects that reshape the trajectory of humanity or just give us a laugh when we're having a bad day.

Books carry the weight we put on them, and the best advice I can give is to recognize they fill different needs at different times. Here are six kinds of books I think your kids (and you!) should be reading.

1 Books that are deeply your own. You sneak them under your blankets and read them with a flashlight, turning them off when your parents open the door to check that you're asleep. These are books with characters who hear your whispered secrets and turn from the page saying, "I understand. I see you. I know." You can tell them the truths you haven't managed to say aloud to anyone yet. You tell them the things you're too afraid to turn to words, and you tell them with your heart.

These books come in every genre. Adventures where you imagine yourself atop the noble steed or historical fiction where you picture yourself huddling in a different time — hiding from a past that will both never be yours and is also coursing through your veins. A love story about a first crush that makes you realize how those butterflies in your belly will eventually blossom into commitment and passion. A tale of the bully getting bested that makes you realize your friend deserves an apology. The brave boy who stands up to the forces of darkness and gives you a deep appreciation for the lessons your parents gave you.

They don't need an essay or a book report. Maybe no one else even knows you've read them — checked out from the library and returned without anyone else seeing the cover. They're not shameful, but they're *yours*. Private conversations you'll carry along with you and use to look out at the rest of the world — brighter, more informed, better prepared.

2 Books you need to shout about.

Everyone needs to read this *right now* because you need to talk. You need to understand why that character would act in such a way that made your blood boil and your heart ache. You need to understand what that line meant — the one that has been tangling up in your head. The one you re-read 10 times until the letters blurred.

You spent ten pages nodding your head in agreement so hard that you thought the author had stolen the lines straight from your own brain, but then on the eleventh page, you hit a line that same author got so wrong it made it your stomach drop. *How?* How could they think *that* and also *this*?

These are meaty books. Hard to read and impossible to hold quietly in your hands and in your head. You need to talk about them, debate about them, pick them apart and put them back together until you understand where they came from and how they got where they are and what else needs to be built around them.

3 Books that make you think.

You never even knew this career, this line of thinking, these facts existed. This is literally the definition of expanding your world because yesterday, this information wasn't just unknown to you — it was unknowable. You didn't know to ask the questions you're reading the answers to today.

You never would have picked this book up on your own. The title, the cover, the author — nothing about it called your name. Because it didn't know your name yet. You hadn't introduced yourself.

But now. Now you've put yourself out there to learn something new — maybe even to be someone new.

4 Books you don't really want to read.

You know the ones. The must-reads. The list of "20 Classic Books to Read Before You Graduate" "Before You Turn 30" "Before you Die." They've wormed their way onto syllabi and into cheesy movie versions that went straight to TV. They're (mis)quoted on social media pictures and loom large in reputation — and often in page numbers.

When you pick them up, the words sound unfamiliar — written in a stilted cadence that rings off and untrue. *Who talks like this?* It can be hard to look past the flaws, and — oh — there are flaws! The worst impulses of its own time, the missteps of its venerated author protected from his (so often his) own biases all laid out on the page in jaw-dropping black and white.

And yet, there's still *something* there. Even if it is to understand those flaws so that they can be held up to the light, seen for what they are and fully excised from modern thinking. Even if it is just to know how to explain why you reject them and reach for something else. Even if it is just to make your own "Before You" list.

Understanding what came before lets you tread with nimbler steps — confident and full of knowing.

5 Books that give you the knowledge you want.

There is a thing you want to know. Maybe it's how to build the perfect Minecraft house. Maybe it's how to grow tomatoes on the back porch. Maybe it's how to dismantle racist housing policies. Maybe it's how to run a faster mile. Whatever it is, you don't know it yet, and you want to because you have goals.

Someone else knows that thing.

You can't talk to everyone. It takes too long to meet them. They live in far-flung places and have calendars packed too full. They've died before you were born or are painfully shy and don't like speaking in public.

But you have books.

Books take the best knowledge that someone else has — the stuff you need to know — and give it to you. Right here. Right now. On your lap with a highlighter and an open notebook beside you. Watch dreams turn into plans and plans turn into steps and steps turn into to-do lists with half the tasks already marked off.

You are on your way.

6 Junk food books. No, not books about junk food (though, you could read those, too). These are books that serve no purpose that would tick off a box on someone's chart of curricular goals. They're not "smart" or "serious." You're not going to take a quiz or take notes.

They're the equivalent of making a big bowl of popcorn and escaping your worries for a little while. They're fun. They're silly. They make other people around you roll their eyes.

Reading is communication, and not every conversation needs to change the world.

Find more information about the author of this article here

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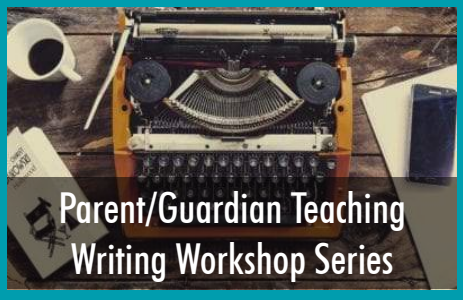

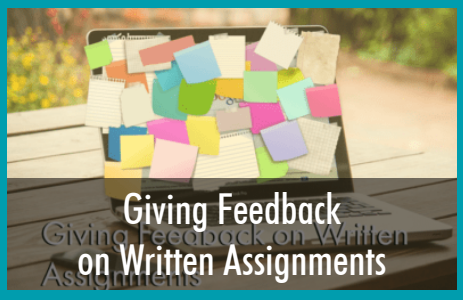

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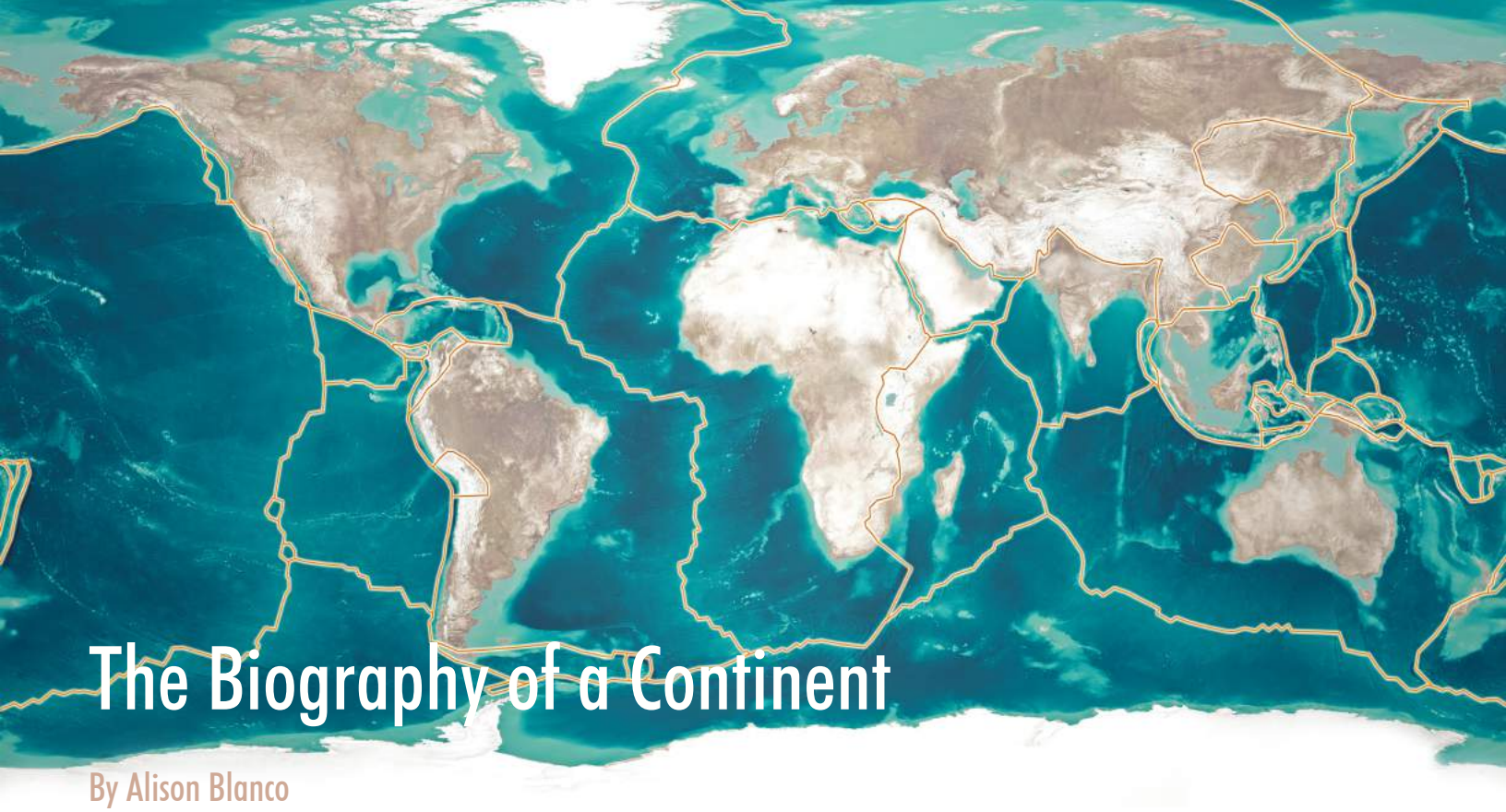

The Biography of a Continent

By Alison Blanco

If continents could tell a story, what would they say? Where have they been? What have they seen?

How Continents Formed

The Earth formed 4.6 billion years ago from a great, swirling cloud of dust and gas. This early Earth was an inhospitable place. It wasn't until almost 700 million years after the Earth was created that rocks formed, which made possible the development of the massive formations we call continents. The continents sit atop large tectonic plates. Heat from inside the earth causes the tectonic plates to slide around on the molten mantle.

The continents, as we know them now, were once joined together in a giant landmass known as the supercontinent Pangaea. About 200 million years ago, Pangaea began to break apart, due to the movement of tectonic plates. Over millions of years, these land masses came to be the seven continents as we know them today. Pangaea was not the first supercontinent on Earth, and it will not be the last. Scientists hypothesize that Earth's continents will again be joined together in about 250 million years.

Biography of a Continent Activity

In this activity, students have an opportunity to compare elements of geologic and human history on different continents. In doing this, they have the opportunity to make comparisons across different temporal and spatial scales.

To begin, give your student(s) a continent (or several) to research. If you are working with a small group, you could divide the seven continents among students. Students will investigate their continent's characteristics and history.

They should look at both its geologic history and its human history, and tell its story by answering the following questions.

- What is the origin and meaning of the continent's name? (Comparing the origin of the English name to the name in other languages is often interesting.)
- What tectonic plates make up the continent? (Is it on one plate, or more? How will this affect the continent as the plates move?)
- When did the continent take the form that it has today? (Remember, the continents are changing every day.)
- When did the continent arrive at the location it is in today?
- What landforms, plant life, and animal life are unique to the continent? (What in this continent's history has caused its mountain ranges, deserts, unique animals, etc?)
- What processes have given rise to the geological, cultural, geographic, and biological features that your continent has today?

After completing their research, students can create a map highlighting the continent's most important features, and share its story, using either a written format or by presentation (Google Slides is ideal for this).

To study history is to study change. Each continent has its own story of change over millions of years, which has shaped its geological and human features. Telling these stories fosters a deeper connection to both the land and its cultures. When we look at history in this way, we develop the tools to analyze and explain the past, which positions us to see patterns that might otherwise be invisible in the present. With this knowledge, we are also provided a unique perspective on the future.

This activity is adapted from the OER Project's Big History Project (www.OERproject.com).

Find more information about the author of this article here

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The History of Pride

By Joshua Jernigan

The LGBTQ+ rights movement didn't start with Stonewall, but if you ask anyone about the first pride march they will happily tell you all about that moment in history. They aren't wrong in their knowledge, however there is so much more that paved the way for the Stonewall movement to make the radical changes they've made. So let's dive into the history of pride!

To understand the impact of pride, we must understand the path that was paved leading up to the riots that gave us modern day pride. This began in 1925 with Henry Gerber. He is the first known homosexual to file and get a charter for a non profit organization. The Society for Human Rights is the first known charter of an LGBT organization in the United States. However, if you notice the name, you notice there is no mention of being a LGBT org. This is very intentional, as there was still a heavy stigma and fierce legal penalties for being gay. Henry learned this first hand as after his wife found out about his homosexuality she reported him to the police, stating he was doing sex rituals with children in his organization. Henry, his boyfriend, and a couple others were arrested and charged, which led to their social lives being ruined. Once his arrest was public, Henry dissolved the Society for Human Rights, stating he could get no one to join.

From 1925 to 1950 there is no other recorded organization for LGBT individuals. In 1948 a man named Harry Hay had an idea for a new organization. In 1950 he founded the Mattachine Society in Los Angeles. This organization helped gay men to find each other and live in peace. In 1955 the Daughters of Bilitis was founded in San Francisco by four lesbian couples wanting a social club for lesbians. Both of these groups created founding organizations that helped to change the landscape of LGBT rights in California, and the entire United States.

On December 31, 1964 there was event in San Francisco that began to draw attention to the way homosexual groups were treated unfairly in society. Despite going through all the proper permitting, a New Year's eve ball thrown by the Council of Religion and Homosexuality, founded by some of the same people who founded the Daughters of Bilitis and the Mattachine society, was raided by police. Even after meeting with special units in order to prove that this

was not anything more than a fundraiser for LGBT rights, the police of San Francisco set up outside of the entrance to the ball, photographing attendees with the intention of publishing their pictures to shame them and have them lose their standing in society. **This event became a huge shift in public perception, because not only were gay and lesbian individuals photographed, but also were white prominent ministers and their wives.**

In the end, police arrested 3 lawyers and a few other people despite not having a warrant or reason. The day after the event, several ministers set up a press conference to discuss the issues of police intimidation and harassment. This was such a shock to many straight individuals, but the LGBT community was well used to this treatment. However, the attention this case got gave a huge boost to LGBT rights in California. In the end, the judge ordered the jury to find the lawyers innocent, and within 20 minutes of going to deliberate everyone was acquitted. One of those lawyers went on to become the first openly gay judge elected in San Francisco, Herb Donaldson.

The 1960s became a huge time for LGBT rights across California, and eventually across the USA. Notably there were two riots that took place before Stonewall that continued to pave the way for the pride movement we know of today. The first being in 1959 at Cooper Donuts in Los Angeles California. Cooper's was a well known hang out spot between two gay clubs that was welcoming to LGBT people of all types. On this particular day police stopped by and began harassing drag queens and trans women, demanding ID. It was illegal to "impersonate a woman" and they ended up arresting drag queens and well known gay escorts.

As they arrested these individuals the patrons of the shop started to riot, throwing food and beverages at the officers. They had finally had enough of this treatment and stood up for their rights. This is often stated as the first modern riot of the LGBT movement.

The second major riot that is of significance before Stonewall is the Compton's Cafeteria riots. This well known cafeteria in San Francisco California was very unwelcoming to the trans community. In August 1968 they began to call the police on many patrons choosing to meet there. When the police arrived and attempted to arrest a trans

woman, she threw coffee in their faces. This caused the cafeteria to erupt as police attempted to arrest as many trans patrons as they could. However, the patrons were not having this and the riot grew. The next day, many community members showed back up to the cafeteria, blocking the entrance. The riots of that second night ended when the newly installed plate glass window of the restaurant was shattered. There are no records of exactly what happened during this time as the police records from that era are lost forever. The cafeteria ended up closing its doors permanently in 1972, after a marked decline in patronage after the riots. This became a huge turning point of trans rights specifically in California.

These two riots gave us a clear pathway for what happened in the early morning hours of June 28, 1969 at Stonewall Inn in New York City.

The Stonewall riots are what legends are made from. There are so many different accounts of what exactly happened that one has a hard time telling fact from legend. Though in the end none of that matters, as the impact of Stonewall continues to vibrate through the LGBT community to this day.

The Stonewall Inn was a place where LGBT individuals could gather safely, as safely as any gay could in the 1960s. The bar was owned by people who paid off the police in order to turn a blind eye to the fact that the Inn has no liquor license nor running water. However, they paid well to be alerted to any raids and to be left alone. However, in the early morning hours of June 28, with no tip offs or warnings, the police raided Stonewall.

They ended up arresting 13 patrons and roughing up a number of others. Instead of everyone quietly lining up to present their IDs, people began to openly defy the police. They refused to show their IDs, they refused to leave. A large group gathered in the streets, right outside the Inn. This group stood, watching people be loaded into the police bus until one lesbian shouted “Why don’t you do something?!” and that

caused the crowd to erupt. This is where it gets hard to separate fact from legends, but what we do know is the people did not go quietly into the night. People began to throw whatever they could get their hands on, from pennies to glasses to bottles. A group of people found bricks at a local construction site and even began throwing them. Police ended up retreating back into Stonewall to get away from the onslaught. At that point people even attempted to set the building on fire. Without running water in the building, it was difficult for the people inside to put out the flames. Full riot police were eventually brought in to disperse the crowd and subdue the crowds that had gathered.

However, people didn't just stop after that night. People continued to gather, fighting against unjust laws and treatment of LGBT people. They weren't intimidated any longer. This is often described as the most pivotal point for LGBT rights in the USA. In 2 years after the riots there were upwards of 2500 different LGBT organizations chartered. This was up from less than 50 before Stonewall.

After Stonewall people didn't stop. One year after the riots the community gathered back on Christopher street to celebrate what they called the Liberation of Christopher Street. This was essentially the first pride event held. The people marched, not only in NYC but also in Los Angeles, CA and Chicago, IL! Each year this march grew to include more cities and more people. By 1972, just 3 years after Stonewall, there were marches in NYC, LA, Chicago, Boston, Dallas, Milwaukee, London, Paris, West Berlin, Stockholm, Atlanta, Buffalo, Detroit, DC, Miami, Minneapolis, Philadelphia, & San Francisco. The growth of the Pride movement made a difference.

From these events we also gathered and gained a rallying symbol, the Rainbow Pride Flag. This symbol was put together by Gilbert Baker. He hired people to hand dye the stripes to create an 8 striped flag. Two were originally made for San Francisco Pride and were thought to be lost until Gilbert passed and they found remnants of one in his belongings. This flag has since undergone many changes. AS the community continues to grow, more attention has been brought to the plight of our more marginalized communities within the LGBT community as a whole.

The most recent flag, the Progressive Pride Flags, bears the original rainbow as well as the trans flag stripes and 2 stripes to represent the intersectionality of our Black and brown community members.

As rights have been granted for the LGBT people across the US, why do we still have pride? What is the significance of the pride movement today? These questions are often asked by people who look at things like Gay marriage and think our fight for equality is over. However, a quick look at the attacks the trans community is facing today will show you our plight is far from ending. Recently we've had bills go up in several states that seek to deny trans children and youth the right to be who they truly are and receive the adequate and much needed medical care they need. At the time of this article, Arkansas has passed the most damaging bill for trans children and youth, stating in law the people under the age of 18 can no longer even speak to their doctors legally

about their trans identity and receive any care related to that. Imagine allowing politicians to dictate medical care for other communities? In relation to that, we also have bills denying trans athletes the ability to play their sports. Currently the focus of politicians and bigots against the Trans community is very terrifying. Any rights lost is a step backwards for the entire community.

Pride continues to be a very important part of our identities. The reminder every year to continue to fight, to continue to riot, until all are equal under the law. Pride is so much more than parades and festivals. It's a living history memorial to our siblings from times past and all they went through and fought for in order for us to dance in the streets. It's also a time for us to continue that fight so that in the future more and more of the community can dance in the streets with us!

Happy Pride everyone.

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Historical Thinking, Research, and Writing for Young Historians in 5 steps

By Samantha Matalone Cook, MAT

Studying history is important. It guides our relationship with our communities, plays a significant role in our identities, and gives the answers to the many questions our young learners have about the world they live in. Studying history is also the catalyst to social change, cultural literacy, and building equity in our society.

At the SEA conference in June 2021, I spoke about the importance of building young historians so that they develop knowledge, skills, and enthusiasm around the subject of history. Once a foundation is laid, young historians will not only be ready for more complex skills as they get older, but they will also engage with history on a deeper level.

Below is a condensed version of five important steps for introducing historical thinking, research, and writing to young historians:

1 Center on narrative history.

Storytelling is a very human act. Humans have been telling stories for as long as we've been capable of doing so. Learners of any age will connect with the narratives of historical people, places, and events, but young learners in particular benefit from stories about the past. Developmentally, kids at the elementary school age still have very strong imaginations, often able to visualize the people and places they are learning about. Language development is key at this stage, so combining images with words supports their ability to identify symbols and articulate thoughts. Picture books, books with vivid descriptions, or books that are read aloud to them that offer a detailed portrayal of history are excellent ways to develop a relationship with the subject. When looking for appropriate books, analyze and vet for credibility, accuracy, and the voice and perspective of the author. Generally, as kids move into late elementary, their ability to think logically and concretely matures and they are more capable of applying what they learn to skills like writing and classification. Use stories to encourage and inspire these burgeoning skills so that they are interesting, useful, and enjoyable, rather than a chore.

2 Include many projects.

Young learners are all about industry, or what they can do. Choosing projects that match narrative history to physical skills connects concepts, builds fine motor skills, and gives a satisfying sense of accomplishment. Kinesthetic learning, or learning by doing, is foundational for many students of all ages, but is especially helpful for young learners who are still very much experiencing the world through their bodies. Projects can be easily tailored to fit the interests of any student. For example, a kid who loves art can explore different mediums and styles through art history, which directly reflects the story of humans and their environments. Learners who love science can explore history through technology and innovation. There is always a direct relationship between what your learner is interested in and the past, since everything has a history, and there is always some way to make that into a project.

3 Build a relationship with history through experiences.

History for young learners can and should be a sensory buffet. Using the concept of strewing, taking field trips, learning about oral history, creating a photography album of historical sites; these are all kinds of experiences that are not only memorable, but create lasting connections between stories, concepts, and skills. Experiences also help learners to see that history is a living, evolving body of work that plays an active role in our communities.

4 WHAT history you study matters less than HOW you are exploring the subject.

In the younger years, you can introduce history or you can follow the historical interests of your learners. I believe that every student should study history in chronological order at least once, but it doesn't need to be in elementary school. In fact, that's an experience better left to the older grades. What matters more than what history you are studying is how you are studying it. Combine narrative history, projects, and experiences, and start weaving in opportunities for historical thinking, research, and writing, so that your learners start building the skills they will need for later work that will demand more complex thought and ability.

5 Define short-term goals and long-term goals.

Your short-term goals should be focused on what your learner needs over the course of this year. What are they interested in? What knowledge would capture their attention? What skills

are needed to do the work you have planned? What skills need extra attention or review? Your short-term goals should support your learner in where they are right now. Long-term goals, however, are the knowledge and skills you are working towards. These are the historical thinking, research, and writing skills you want them to eventually be literate and proficient in. Remember that the basic questions that guide historians: who, what, when, where, how, and why are a great starting point for historical thinking and can be explored at any level. By simplifying and adding in some of these long-term goals alongside your short-term goals you are setting the stage for future.

If you'd like to know more about how to engage young learners with history, you can join me at the next SEA conference in August for the second part of the workshop, where I'll be demonstrating and modeling examples of picture-based, object-based, and dialogic-based strategies to use with young historians. Using real images and objects, we'll discuss how to explore and make meaning of history in a way that empowers students and connects them to the past.

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Own Voices Booklist By Alycia Wright, M.Ed

I could write an essay giving the reasons why I feel this is such an important book for students to read, especially at this moment. However, when I read this interview with Howard Zinn I found that he did such a great job of explaining why students should study history and why such a book and perspective is critical, that I opted to *link to it* instead.

Join me as we explore a Young People's History of the United States. In addition to African American voices, Immigrant voices and Womens' voices, I work to incorporate native voices. A large part of understanding history is to listen to the voices of people as they tell their own stories…. this is especially important in US history and making sure First Nations People's stories and contributions are included. This list is recommended by: **American Indians in Children's Literature and would make an excellent pairing with much of our class discussions.** This list is broken into decades so you can easily weave these books throughout your study of US History.

I hope that your student will join me as we discuss hard history, not from the traditional lens, but from the lens of those most often missing or neglected. This year I will be teaching from *A Young People's History of the United States* By Howard Zinn. I have a class for younger students that also incorporates own voices to teach US History. *This list contains affiliate links.*

1830s	*How I Became A Ghost: A Choctaw Trail of Tears Story* by Tim Tingle (Oklahoma Choctaw). Published in 2013 by Roadrunner Press. *Mary and the Trail of Tears: A Cherokee Removal Survival Story* by Andrea L. Rogers (Citizen of the Cherokee Nation). Published in 2020 by Capstone Press.
1840s	*The Birchbark House* (and subsequent books in the series) by Louise Erdrich (Turtle Mountain Ojibwe). Published in 1999 by Hyperion Books for Children.
1860s	*Danny Blackgoat, Navajo Prisoner* by Tim Tingle (Choctaw). Published in 2013 by 7th Generation.
1920s	*I Am Not a Number* by Jenny Kay Dupuis (Anishinaabe, Nipissing First Nation) and Kathy Kacer. Published in 2016 by Second Story Press.
1940s	*At the Mountain's Base* by Traci Sorell (enrolled citizen of the Cherokee Nation). Illustrations by Weshoyot Alvitre (Tongva, Cahuilla, Chumash, Spanish & Scottish). Published in 2019 by Kokila Press.
1950s	*Indian No More* by Charlene Willing McManis (Umpqua, enrolled in Confederated Tribes of Grand Ronde) with Traci Sorell (enrolled citizen of the Cherokee Nation). Published in 2019 by Lee & Low Books/Tu Books. *My Name Is Seepeetza* by Shirley Sterling (Salish). Published in 1997 by Douglas McIntyre.
1960s	*My Name Is Not Easy* by Debby Dahl Edwardson. Published in 2011 by Marshall Cavendish. *House of Purple Cedar* by Tim Tingle (Choctaw). Published in 2014 by Cinco Puntos Press.
1970s	*If I Ever Get Out of Here* by Eric Gansworth, S·ha weñ na sae?, (enrolled member of the Onondaga Nation, Eel Clan). Published in 2013 by Arthur A. Levine.

Books that Span a Wide Range of Years

Saltypie by Tim Tingle (Choctaw). Published in 2010 by Cinco Puntos Press.
Tales of the Mighty Code Talkers by Weshoyot Alvitre. Published in 2016 by Native Realities.
This Place: 150 Years Retold by Kateri Akiwenzi-Damm. Published in 2019 by Highwater Press.

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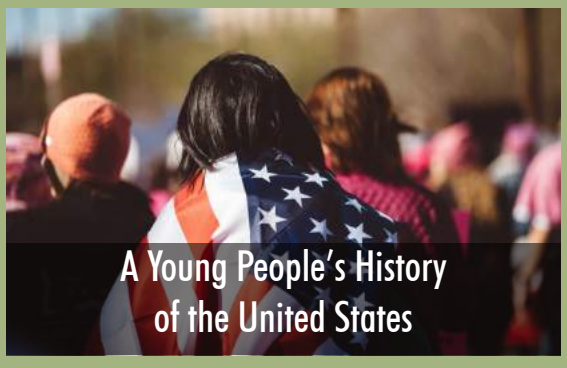

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Easy Engineering at Home

By Kathy Ceceri

I think of engineering as a catch-all for activities that use science, technology and math in practical ways. It involves taking known facts and techniques — and developing new ones — to solve real-life problems.

And as is obvious from my books and workshops, I think some of the most valuable engineering activities for kids are made from everyday stuff. Projects they build from scratch give kids hands-on experience with materials and construction techniques, and allow them to analyze and improve what they're making as they go along – just like real engineers do.

For example, **outdoors they can**:

- dig holes
- build structures from branches and scrap wood
- pile up rocks to dam a creek (or create one with a hose)
- arrange bricks to make walls, archways, and bridges.

Inside, they can:

- use rolled-up strips of paper to make structures from table-top-sized pyramids to club house-sized geodesic domes. (Find instructions here in my book Paper Inventions.)

Anywhere, they can:

- assemble Rube Goldberg machines across the counter, from room to room, or around the backyard. (My book Musical Inventions includes a musical marble run using old keys and metal washers.)

Try it! The DIY waterwheel project below is perfect for a warm summer day (or indoors over the bathtub). Use these suggested instructions as a guide, substituting whatever you have on hand.

A note about "making it count" for homeschooling: There's nothing wrong with letting kids just mess around as they're building and creating. They learn plenty just absorbing the experience of making something from the ground up.

But if you want to take it to the next level, suggest that they document their work. They may feel more official if they have a "lab notebook" for writing down notes and drawing diagrams – that's how real inventors show that they developed a product. Or have them create a document or slideshow on the computer with photos. Older kids may want to record a how-to video that shows them talking about what they made, how they made it, and what they discovered!

Build Your Own Waterwheel

What you'll need:

- 2 disposable plates
- masking tape, 1½ inch wide
- about 9 small disposable cups
- sharp pencil
- (optional) some kind of stand to hold the wheel up, such as supports made of cardboard, or a disposable straw with a string through it that you can tie to two chairs.
- water pitcher or hose

What you'll do:

1. To make the wheel, put the plates back to back. Where they touch, wrap a long strip of tape around both plates to hold them together. (It helps to have a second person do the tape while you hold the plates.)
2. For the "buckets," take a strip of masking tape about 2 feet long and lay it down on your work surface, sticky side up. Starting at one end of the tape, attach a cup facing the other end. Continue laying the cups along the tape, about half an inch apart, making sure they all point in the same direction. Leave a little tape exposed at the end (or add another piece if needed).
3. Pick up the strip of tape and wrap it around the wheel, over the first piece of tape. Fasten the ends.
4. Adjust the cups as necessary. Wrap a short piece of tape around each cup to secure it.
5. To find the center of the wheel, hold a pencil with the eraser end pointing up. Turn the wheel sideways and balance it on the eraser. When you've found the center, mark it by pressing the eraser into the plate. Use the tip of the pencil to poke a hole through the eraser mark, going through both plates.
6. Hold the ends of the pencil loosely, and have someone pour water over your waterwheel to see it turn.
7. Extra activities:
    a. Design a stand to hold the wheel. One method is to replace the pencil with a straw, and run a string through it. Tie the ends to chairs or other supports.
    b. Find a way to get your waterwheel to do work. For example, you can add a second set of plates to the first, and wind string around it so it can lift a weight.

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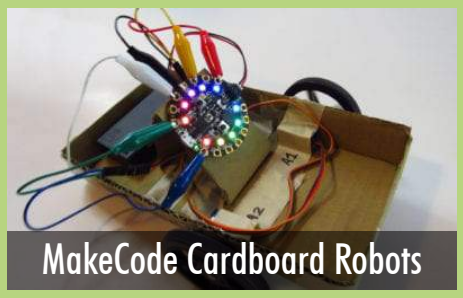

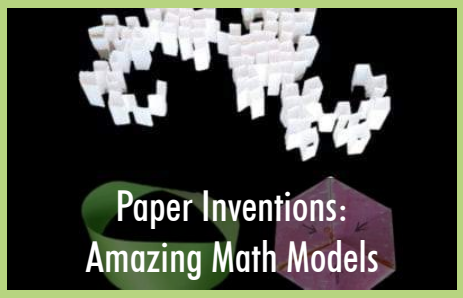

Grilled Vegetables

One of my favorite dishes to make in the summer is grilled vegetables. And adding garlic roasted on the grill to any savory dish is so good! I like the roasted vegetables plain, with pasta, in sandwiches, and as a topping for vegan kraut dogs. I even like some vegetables cooked this way that I do not like any other way. Summer squash for example, I only like it grilled. My husband only likes eggplant when it is grilled. In addition to being YUMMY, the striped grill lines are so pretty across the vegetable slices.

Ingredients

Vegetables Alphabetically

- Asparagus
- Bell pepper
- Carrots – no larger than ¾-inch in diameter
- Eggplant
- Garlic
- Portobello Mushrooms
- Onion
- Tomato
- Summer Squash

Other Ingredients

- Spray on oil
- Salt
- Tajine (Chili Lime Powder, optional)
- Foil & Olive oil (for garlic)

Instructions

1. Heat the grill to 450 or higher.
2. Cut the top off the garlic. Set the head of garlic on foil. Drizzle oil over it. Wrap the foil around it and set it in the grill. The grill does not need to be to temperature for this. If you haver a top rack on your grill, set it on it. Set timer for 20 minutes.
3. While you are waiting for the grill to heat, prepare the vegetables. Cut the tops off those vegetables that have tops. As you slice them put them onto a cookie sheet, 1 layer deep.
   - ☐ Cut the bottoms off the asparagus.
   - ☐ Slice the bell peppers into strips.
   - ☐ Remove carrot tops and peel the carrots.
   - ☐ Slice eggplant to about ½-inch thick.
   - ☐ Slice portobello mushrooms about ½-inch thick.
   - ☐ Slice onions ¼- to ½-inch thick.
   - ☐ Slice tomato about ½-inch thick.
   - ☐ Slice summer squash lengthwise about ¼- to ½-inch thick.
4. Spray vegetables with oil on one side. Lightly salt this side & if you are using tajine, lightly sprinkle the vegetables with it.
5. Turn vegetables over and repeat for this side as described in the previous step.
6. When twenty minutes is up, and the grill is to temperature begin putting the rest of the vegetables on it. While vegetables are cooking pay attention to them. These times depend on your grill.
7. Put the onions and peppers on first.
8. After 2 minutes put the mushrooms and tomatoes on.
9. After 3 minutes put the rest of the vegetables on the grill. If you have a top rack, put the asparagus on it.
10. Close the lid as they cook. Checking on the vegetables regularly. Apart from the garlic, they do not take long to cook.
11. When they are done, take them off the grill.
12. Unwrap the garlic and squeeze the head on the sides so the soft, roasted cloves squeeze out. These are spreadable, and the taste is more mild than it is for raw garlic.

Mindfulness and the Focused Attention Practice

By Mary Martin

I've spoken at the SEA online conferences for a year now, and at no point did I spend the time to go through its core practices. The one that has the broadest appeal for most people is focused attention, as there's very little to remember once you've read about it and done it once. And it's easily accommodated for kids.

Focused attention is the practice most people think of, where you sit upright, focus on your breath, and "stay in the moment." Meanwhile, it's easier to sit in your chosen posture and not do it than it is to do it. It's easy to just sit there and *think*, and when your timer on your phone chimes, go off on your merry way. We all do that sometimes, particularly if we don't have guidance. But sitting quietly and planning your day isn't mindfulness. *What do we do when that happens, though?* We acknowledge it—that's reflection and builds insight. And what do we do the next day? We begin again. No judgement, no ridicule, no talk of failing, not being able to "do it right" or having a brain that "can't meditate." We heap some compassion on ourselves and we begin again.

Mindfulness meditation is a non-doing and can feel strange to those accustomed to doing and who value doing. The strivers, the planners, the achievers . . . frequently are unnerved by the idea of an experience that's not going anywhere. But if you've made it this far, you clearly have an inkling that there might be something to this idea of being.

Heraclitus said something like: The only constant in life is change. I'm sure you've heard that or seen it on some social media quote-maker. But do you know he also said: Nature loves to hide? Let's find your nature.

Having the ability to choose to pay attention is a bit of a superpower, although it shouldn't be. Most people spend most of their days in a trance, going from one habitual thought and behavior to the next, avoiding the reality of maladaptive patterns and instead getting some comfort from their familiarity.

Most of us have a running monologue, and sometimes a dialogue, in our head. All. Day. Long. This is the brain's default mode and it's inversely correlated with executive function. Mind wandering has been associated with unhappiness and unhappiness has been associated with a wandering mind. We're most happy when we're present. This is one of the many benefits of mindfulness.

As wonderful as all of this sounds, being in the moment and experiencing what's actually happening in that moment isn't a day at the beach. It's hard work learning how to pay attention and positioning yourself so that choosing what you attend to is even an option for you.

The Focused Attention Practice

You can do this anywhere, at any time, although I wouldn't begin by doing it while driving or doing anything else that . . . demands your attention. Set yourself up for success by choosing a quiet place where you won't be disturbed for ten minutes. You're building a muscle, and you don't want to demand too much at the beginning, experience disappointment, lose confidence, and ditch the project altogether.

Choose an upright **posture** of dignity and wakefulness. Keep your spine loose spine; not rigid. Your **eyes** can be open, gazing softly at a stationary spot, or closed. For most people, closed eyes remove one level of sensory input (/potential distraction) that aids in their attempt to look inward. There's no special **breath**, and you may or may not focus on your breath, as you'll see . . .

The Guidance

Take a minute to settle into your body and your posture. Feel whatever sense of gravity, heft, or weight is present. Notice contact points, circulation, air, pressure, and moisture. Take a moment to explore inside your body, too. What's here? Any sensations related to digestion? Heartbeat? Other inner body sensations? Be curious! Remember to breathe.

Choose an **anchor point** for this practice (as in, next time feel free to choose a different one). An anchor point is a neutral point in your experience that you put your attention on with the intention of keeping it there. When we talk about cultivating focus and concentration, we're referring to the ability to choose what you're attending to, for the amount of time you choose to attend to it. Your anchor point could be your breath, where you feel it most vividly (the abdomen, the chest, the nostrils); your feet, flat on the floor; your hands; or even the feeling of the solidity of the entire body. We frequently recommend that **kids** use their feet as anchor points, as feet don't have feelings or thoughts, and it's feelings and thoughts that trip us up during practice. Kids can also do this practice lying down, with a stuffy on their bellies and their hands on the stuffy. Their anchor point becomes the stuffy rising and falling with their breath, and if they keep their eyes open they are both seeing and feeling the rising and falling. They can also do it with their eyes closed, and their hands on the stuffy emphasizes the rising and falling.

The neutrality of the anchor is important because, although there are ways to skillfully work with pain or loud sounds, starting with either one of those probably isn't a good idea. Set yourself up for success and learn how to focus with the aid of something that's reliably neutral for you. We tend to want more of experiences we have deemed "good," while we push away those we have deemed "bad." Neutral experiences tend to be ignored because they're not all that interesting. If you can meet something neutral with curious friendliness, and maintain that attitude for minutes at a time, I dare say you can do anything. It might need to be said that your anchor point isn't permanent.

Different days, different locations might call for different anchor points. But I'd also caution about that and wonder if someone is approaching the idea as if they should in some way be entertained by the anchor point. Your anchor point owes you nothing; it's merely a place to put your attention and through which you learn how to focus and concentrate. Be curious about the neutral while not looking for or waiting for something to happen, and not thinking about it.

Congratulations for making it this far! To recap:

- Set a timer for 10 minutes.
- Choose a posture of wakefulness and dignity if your intention is to remain awake (no judgement if you want to go to sleep!).
- Close your eyes if that feels comfortable.
- Choose an anchor point for this practice (for all I know you now want to use a different one).
- And here comes the actual practice . . . Keep your focus on your anchor point, with an attitude of curious friendliness, for 10 minutes.

Your attention will get pulled away to thoughts, sensations, emotions, and sound, many times within the 10 minutes. And that's okay! All that means is you have a human mind. When you notice that your attention isn't on your anchor point—that's mindfulness! That means you know where your attention is! At that point, simply usher your attention back to your anchor point, with compassion and without judgment.

For bonus points, capture what that was like in writing. Was it calming, relaxing, maddening, annoying? What distractions were in your mind? What is here now after your 10 minutes of focused attention? Furthermore, where there any surprises? Obstacles? What did you learn? What did you do about the distractions? What do you think might have contributed to whatever happened during your practice? Have you been sleeping well (or not)? Eating well (or not)? Exercising (or not)? Drinking alcohol (or not)? These and other factors affect our practice . . . affect our lives. Finally, was there a moment that you'd like to plant a flag on—an insight that arose as a result of your experience and reflecting on it?

Try this practice each day, knowing that it will be different each time. Each time teaches you something new if you think you have something to learn. Approaching practice with a shoshin - beginner's mind.

> In the beginner's mind there are many possibilities; in the expert's mind there are few. - Shunryu Suzuki

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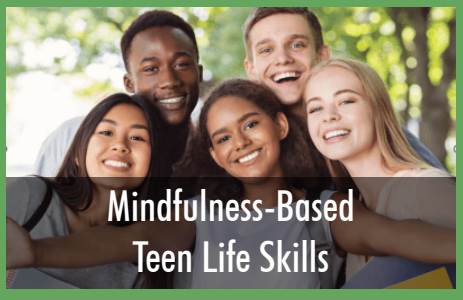

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TAKE ACTION TODAY

Our Homeschool Journey

By Jena Borah

In 1990 I met a homeschooler. In my mind, homeschoolers were wild fringe people, and as someone who went through student teaching and had a bachelor's degree in education, I thought, "I need to check out these crazy people!"

To my surprise, she was very normal, except for the school desks in her kitchen and educational posters on the walls. As a lifelong fan of playing school, holding my first child on my hip, I thought, "I could do this!" And my second thought was, "Is this legal?"

Turns out that yes, Illinois has always been a great state for homeschooling. Then I had to decide if it was a good idea. Should children be homeschooled? My mind went back to education history and philosophy classes. The purpose of public education and compulsory education laws, which took root in the early 1900s, were to train the next generation for factories, to make them cooperative employees, and to instill a homogenous culture. Um, no. Not with my kids.

That was the beginning of my homeschool career. My children would be independent thinkers with the freedom to develop their passions and nurture a love of learning that would carry them for a lifetime. My guiding principle became "maintain the joy of childhood and the joy of learning." If you'd like to know more about how I did this, I've written extensively at yarnsoftheheart.com.

My first child breezed through reading instruction, devouring chapter books in first grade. My second child struggled, but I tried not to panic. My third child started reading as easily as the first, quickly surpassing her older sister. Then I did start to worry. No matter how hard she tried, and no matter how many different teaching techniques I used, my second child was not reading.

By 5th grade, written symbols began to make sense and she quickly made up for lost time. I was glad we were homeschooling because she had the freedom to learn at her own pace without the stigma of "being behind" in school. She went on to get a master's degree and taught college classes. But those years learning to read were very painful.

When my kids graduated from homeschool, I was not ready to retire, but my teaching certificate had lapsed and I needed to take a few graduate classes. That led to a full fledged mas-

ter's degree with a concentration in reading instruction. I wanted to figure out why my daughter struggled so much with reading. Today I'm convinced it is dyslexia and have spent the last ten years investigating, training, and implementing teaching techniques that have helped even the most resistant and struggling readers.

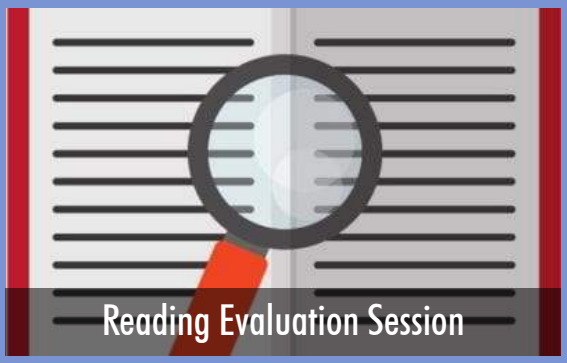
If I had to describe my teaching philosophy in a few points, here they are:

1. Nurture intrinsic motivation. Humans are born curious and want to learn. Feed that natural desire. Practically, keep bribes (like grades and treats) to a minimum. Instead, let them do what they enjoy and make it educational without them realizing. I call this "sneaky teaching." Intrinsic motivation comes from inside the child. They do it because they love it, and the adult tries to stand back and facilitate.
2. Appeal to real-world application. School doesn't have to be an isolated event that feels unconnected to life. Suggest they volunteer at the animal shelter and write a blog about it. Read a book and write a review on Goodreads or Amazon.
3. Avoid power struggles. Let them choose what they want to learn. This taps into intrinsic motivation. Get the books and experts they need. When they are ready, let them move on to something else.
4. Do not kill their natural curiosity and love of learning (see 1-3).
5. For struggling readers,
   a. be systematic. What phonics elements are they missing?
   b. be explicit. Because they struggle, they are not picking up on things intuitively. For example, show them how grammar, composition, and organization contribute to comprehension.
   c. provide audio books to help them continue to grow in vocabulary, author's voice, and concept knowledge.
   d. have a light touch. If they show resistance to reading, don't force them. We don't want them to hate reading. Find library books on their favorite topics and scatter them around the house. Include graphic novels at their age level.
   e. Let them see you reading for pleasure. I am thrilled to have the opportunity to offer reading help here at SEA.

If you want to know more about me and how I do things, I have years of writing at *www.yarnsoftheheart.com*.

Find more information about the author of this article here

SEA Courses by the Author of this Article

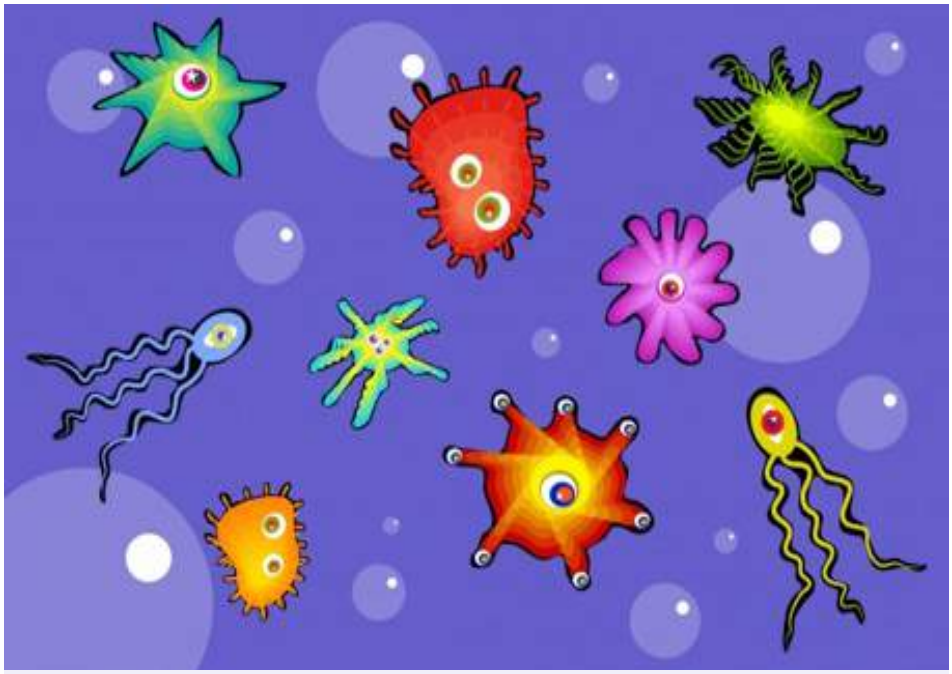


All courses by this teacher

Microbiology Week 1 What Is Micro-Life?

By Blair Lee

What Is Micro-Life is excerpted from a 14-week online course I taught in Spring 2021. The class included 12 chapters of original course material including labs to be done outside of class. The class met once a week to build on the reading materials and labs. These classes included hands-on activities and labs we did together as a class. This is the format I use for my classes. This Summer and Fall I am working on this book to make it interactive with small videos I create.



Click on the image above to go to a YouTube video showing the size of microbial cells.

Think of the smallest thing you have ever seen with your own two eyes, without using a microscope, computer, or television. You are about to start learning about living beings, **organisms**, that are so small you would not have been able to see them. This area of science is called **microbiology**. **Micro** means extremely small. **Biology** is the science that studies life.

Organisms too small to see are called **microorganisms**, or **microbes**, for short. There are many, many, many, many …. more microbes on Earth than there are organisms that you can see. They are everywhere around you. That might make you nervous, but you have been eating, drinking, breathing, and living with microbes your entire life. Before you were even born you were exposed to microbes.

Most of the microbes inside you are bacteria and viruses. (Those are the ones you will be learning about in this course.) However, there are all sorts of organisms that are microbes. In addition to bacteria and viruses, **archaea**, **fungi**, **protozoa**, and **algae** are microorganisms.

There is a debate in science about whether viruses are organisms or not. In class this week we will discuss the characteristics for bacteria and viruses to decide if we agree that bacteria are organisms, but viruses might not be.

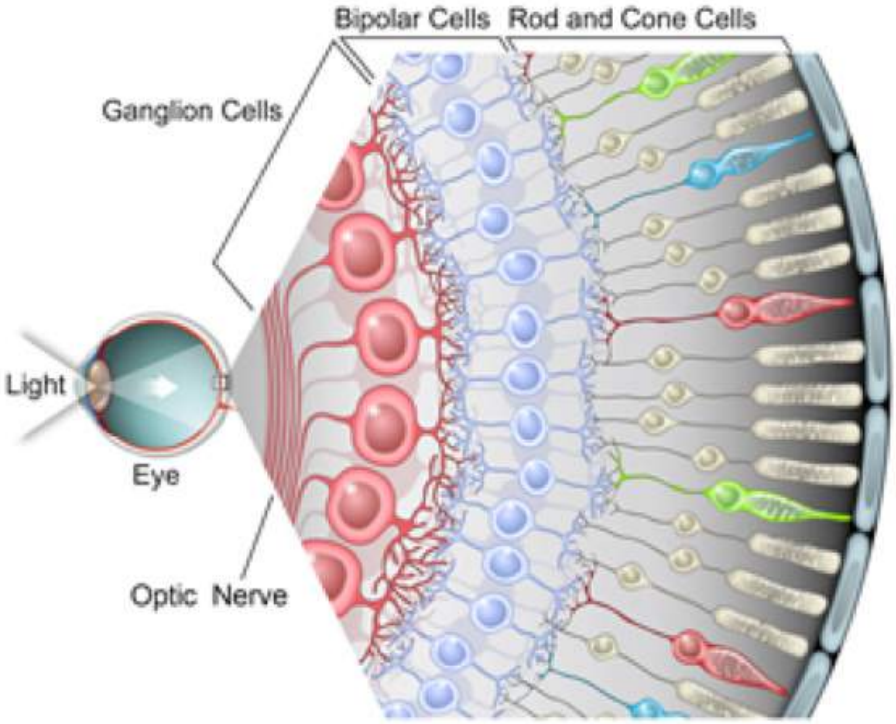
Microbes like the archaea that make this yellow mat might be microscopic, but they can group together to make things that can be seen with the naked eye.

There are some characteristics that all organisms, from the most microscopic to the largest share. As you read through these, think about how you do them. (*We will be discussing these in class.*) All organisms grow, respond to their environment, take in energy, get rid of waste, have some type of circulation (Hint: What travels throughout your body?), have some type of respiration (Hint: This is the process where energy is released from food.) move on their own, although some, like plants, move very slowly, and reproduce.

All Organisms Are Made of One or More Cells

There is a **scientific theory** called the **cell theory**. A scientific theory is a fact-based explanation for why or how something happens in science. The cell theory is one of the basic principles of biology. It explains the relationship between cells and organisms. Scientists develop scientific theories doing many experiments using the steps in the scientific method.

The cell theory states that there is something else all organisms have in common. All organisms are made of one or more **cells**. A cell is the smallest building block of life. They are the basic unit of structure and function of organisms. Some organisms, like you, are multi-cellular. **Multi-cellular** organisms are made from more than one cell. Multi-cellular organisms have many different types of cells. For example, you have eye cells that are structured and function so that you can see. You have nerve cells that are structured and function so that the signals from your eye cells are transported to your brain.



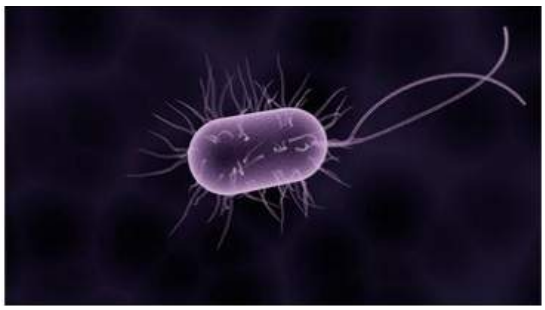
Some of the different kinds of cells that make the human eye.

The microbes you will be learning about are **unicellular**, single-celled. **Unicellular organisms** are living things made of just one cell. All structure and function come from just that one cell, because the organism only has one cell.

The Building Blocks of Organisms = Cells

The Buiding Blocks of Cells = Atoms

1 Bacterium



1 Cell

24,000,000,000 atoms

1 Prokaryotic Cell

1 Person

30,000,000,000,000 Cells

7,000,000,000,000,000,000,000,000,000 atoms

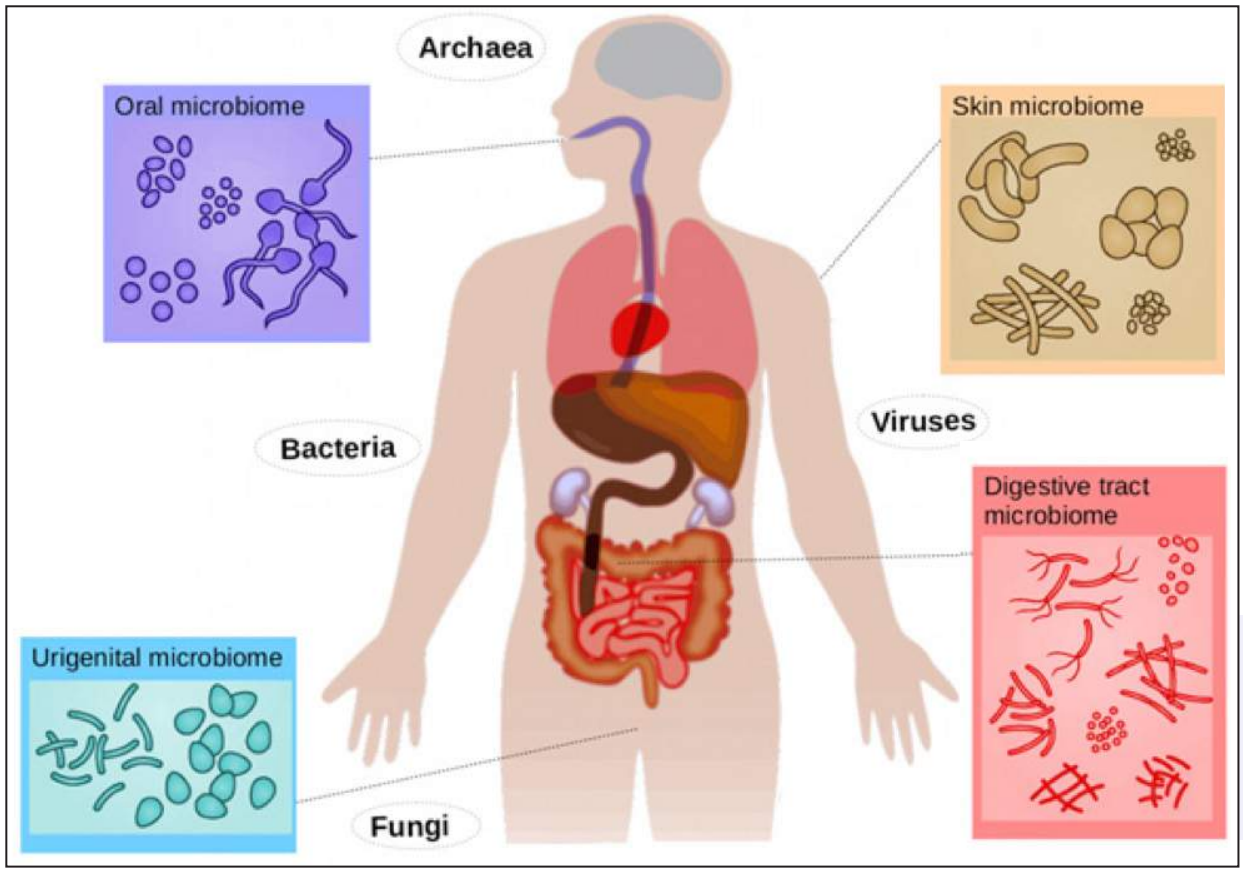
30,000,000,000,000 Eukaryotic Cells

And LOTS and LOTS of Prokaryotic Cells

Bacteria are made of prokaryotic cells with no nucleus to enclose their genetic material.
People are made of eukaryotic cells with a nucleus enclosing their genetic material.

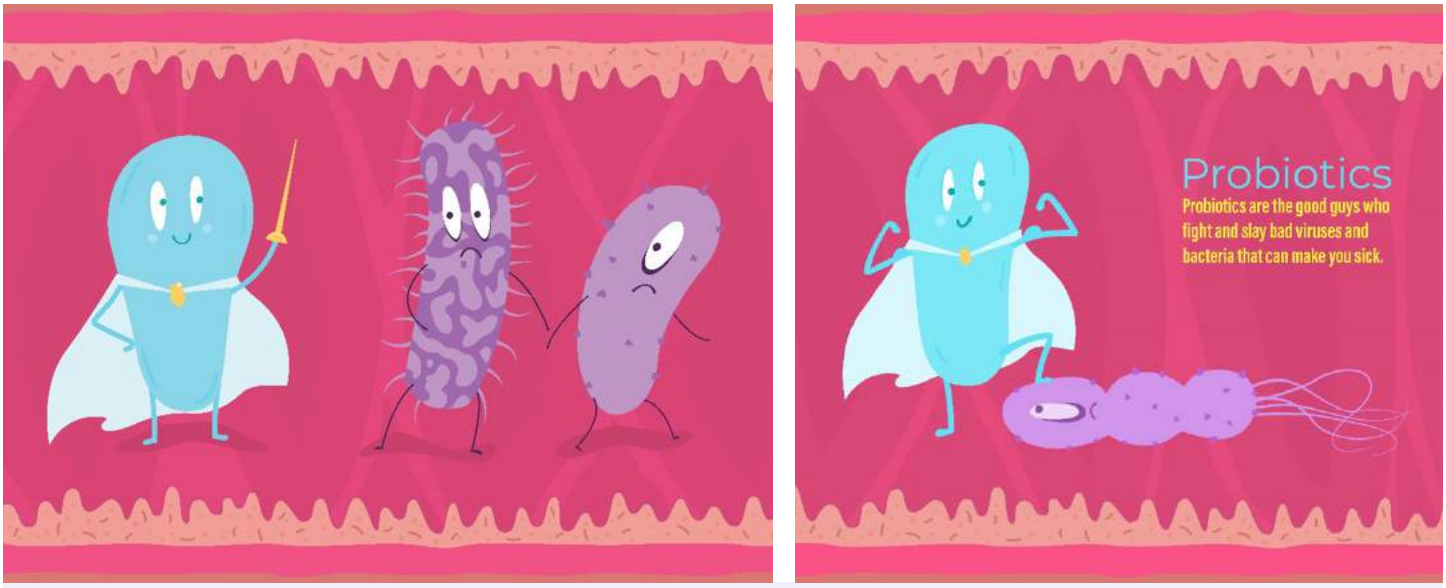
The War of the Microbes

You might be surprised to learn that most of the cells in your body are not human. Unicellular organisms inside of your body outnumber the cells that make you 10 to 1. Inside your body, there are trillions of microbes. Do not be grossed out by that, those microbes are essential to your health.



The unicellular microbes in your body outnumber your cells 10 to 1.

There are also microbes that make you sick. The microorganisms that make humans sick are called **bad**, and those that keep you healthy are called **good**. Good microbes keep you healthy by attacking and destroying bad microbes. A war is being waged on and inside your body every day, and you don't even feel it! In addition to fighting bad bacteria, good bacteria help you digest food and produce vitamins.



Click on this image to go to a YouTube video showing good viruses fighting and winning against bad bacteria.

TRAIT	BACTERIA	VIRUS
Can be pathogen	Y	Y
Microscopic	Y	Y
Size	200 times larger	Much smaller
Reproduction	On Own	Needs Host to Do
Cells	Y	N
Genetic Material	DNA & RNA	DNA or RNA
Good or Just Bad	Both	Both
How Do We Treat	Antibiotics	Vaccines & Antiviral Drugs
Length time for Sickness	Longer	Shorter
How They Make Use Sick	Excrete Toxins	Kill Cells During Lytic Cycle
Cell Structures	Typical Organelles	No Organelles
Make Proteins	Y	Y

This table is from the live portion of the class where we talked about and compared common traits of viruses and bacteria.

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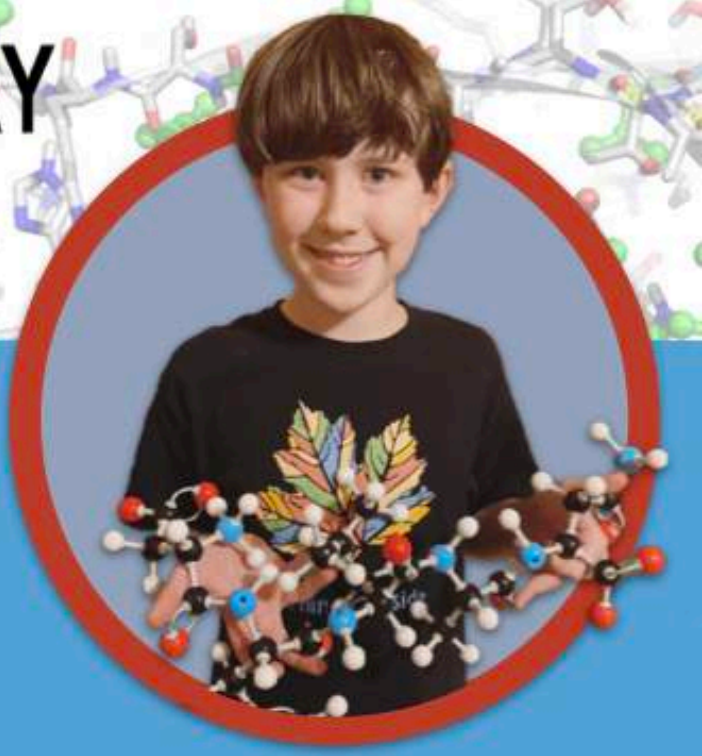

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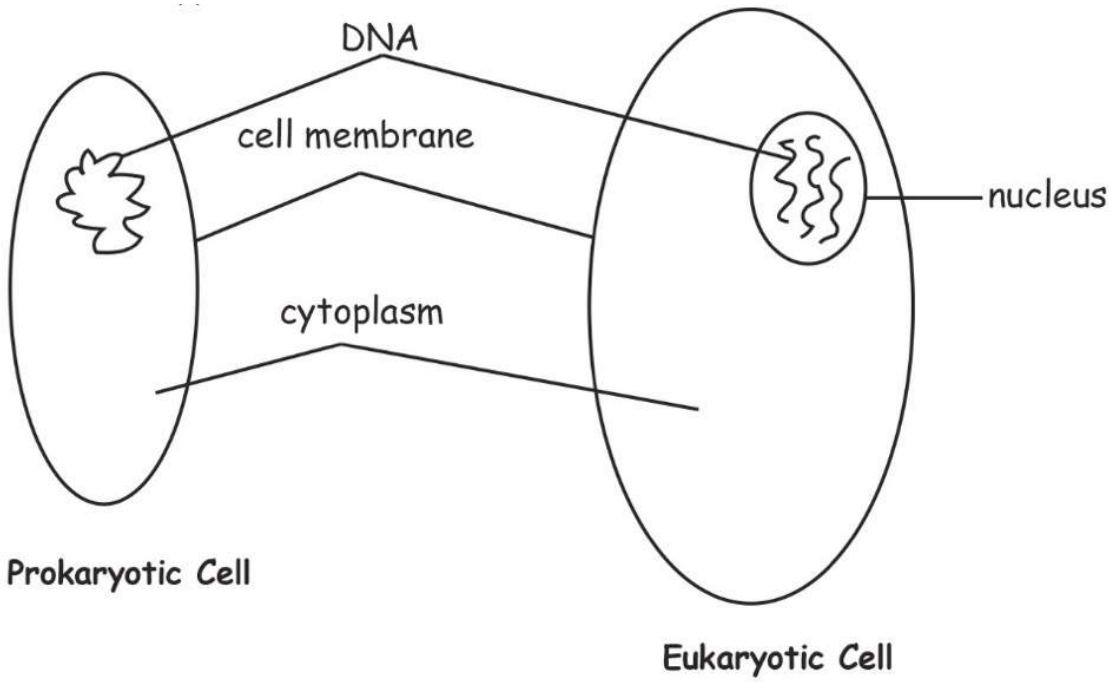
Microbiology Lab Week 1 Building a Prokaryotic Cell

There are three things all cells have in common. They all have a cell membrane, cytoplasm, and genetic material. Cells can have other things in them, too. What those are depends on the organism and the cell type. The **cell membrane** encloses and protects the inside of the cell. It also controls what goes into and out of the cell. Cytoplasm is a jelly-like that fills the inside of the cell. **Deoxyribonucleic acid (DNA)** and **ribonucleic acid (RNA)** are the genetic material inside cells. Many viruses use RNA, not DNA, as their genetic material.

Biologists divide and group organisms based on where their genetic material is in the cytoplasm of their cells. DNA can be free-floating in the cytoplasm, like it is with bacteria, or it can be inside a structure called a **nucleus**, like it is for your cells.

The location of DNA in a cell defines a cell as either **prokaryotic** or **eukaryotic**.

Organisms with prokaryotic cells are called **prokaryotes**. **Bacteria** are prokaryotes. **Prokaryotes** do not have a membrane around their DNA, which means they do not have a nucleus. Most unicellular organisms have **prokaryotic** cells. All multicellular organisms have **eukaryotic** cells.



There are two main classes of cell type, prokaryotic and eukaryotic:
Prokaryotic (example: bacteria) = DNA free-floating in the cytoplasm
Eukaryotic (example: you) = DNA inside a protective structure called a nucleus in the cytoplasm

In this lab, you will make a scientific model of a prokaryotic cell, a bacterium. Bacteria are unicellular organisms, which means your model will be a model of a cell and an organism at the same time! Cells are made from organelles, specialized structures that are inside and cover the outside of cells. If you have ever looked at a plant or an animal cell, you will see that bacteria cells have some organelles that plant and animal cells do not. There are some organelles that they share, too.

Materials

- 1 smallish oval plastic container
- 1 sheet of plastic wrap (it should fit inside the oval container with some overlap)
- Rubber Cement
- White glue that dries clear and shiny
- Modeling clay (I recommend Sculpey) in the following colors blue, red, pink, orange, yellow (You can change colors around, but do not use green. Green is the color of chloroplasts and as there are no chloroplasts in this cell.)
- Ruler
- Oven
- 3 cups Plaster of Paris
- Container for mixing Plaster of Paris
- Something with which to stir Plaster of Paris
- Measuring cup
- 2 cups water
- Super glue
- Organelle Label sheet
- Diagram of the organelle placement
- Scissors
- Toothpick
- Tape
- Cookie sheet
- Small oven proof container
- Skewer

Procedure

- Do not make Plaster of Paris before instructed. It dries VERY quickly.
- There are instructions for putting labels in the cell using toothpicks and labeled strips of paper. However, this makes the cell busy looking. An option is to color code the label sheet to match the color of the organelle, and then keep it near or under the cell for reference.
- You will be learning more about what these organelles do in week 2 and 3 of this course.

1. Make the organelles. Roll the Sculpey into the shapes described in the Organelle Information Table and on Diagram of the Organelle Placement for a Prokaryotic Cell Sheet.
2. When make organelles, use your ruler to get the measurements correct. The measurements do not need to be exact but should be close. As each organelle is molded, set it on the cookie sheet.
3. If using Sculpey or another polymer clay, bake them at 275°F for the following times:
   - 10 minutes for the ribosomes, plasmids, flagella, and DNA
   - 15 minutes for the pilus
4. While the organelles are baking, cut the labels out and tape them onto toothpicks or pins.
5. Once they have baked and have cooled enough to handle, lay out the organelles to get an idea how everything is going to fit.
6. Cut a sheet of plastic wrap that is larger than the inside of the oval plastic container when it lines it with the ends overhanging. You will trim the ends after the Plaster of Paris has dried.

7. Make the Plaster of Paris. Gently stir 1 &1/3 cups of water into 3 cups of Plaster of Paris.
8. Pour it into the oval plastic container about an inch from the top of the bowl. Be careful that the plastic wrap is above the level of the Plaster of Paris. Check the Plaster of Paris every ONE minute to see if it has begun to set. It should only take about five minutes before you can start putting the organelles into the Plaster of Paris. It might be even less than five minutes. You need to work quickly. You want the plaster to be set enough to hold the organelles, but not too stiff.
9. Put the organelles in the cell. DO NOT randomly place the organelles in the cell. Use the diagram. Start on the inside with the DNA. Put the plasmids in next followed by the ribosomes. Use super glue for any of these that do not stick. Let this sit for TWO days while the Plaster of Paris sets and dries.
10. Two days later: Carefully squirt glue on the top of your cell. The glue + Plaster of Paris represents the cytoplasm. Squirt small amounts of glue around the organelles to help keep them in place. Be careful with the glue. You need to coat the top of the cell, but not your work surface. Remember the glue dries clear, so do not worry if you happen to coat a ribosome or two. Let the glue dry overnight.
11. The next day: Cut the edges of the plastic wrap so they are flush with the cut edge of the cell. The plastic wrap represents the cell membrane.
12. The next day:
    - Carefully turn the model over so the organelles are facing down.
    - Use superglue to glue the pilus onto the sides of the container.
    - Use the skewer (turning it repeatedly) to make a hole/tunnel about ¼ - ½ inch into the model- Make this about 1/2 inch from the bottom (opposite side of the one with the organelles) up on one of the short sides of the model. Work carefully on it until you can insert the flagella into the hole.
    - Put superglue into the hole, AND THEN put the flagella into the hole. Hold it there until it dries.
    - Paint the sides but not the bottom with rubber cement. Be careful when painting around the pilus and flagella.
    - Use the top and bottom to carefully turn this over. Place it on something so that you do not get rubber cement on a counter's surface.
    - Use superglue to glue back any organelles if the fall off.
13. Optional: When you are done putting the organelles in their permanent places, use pins or toot picks to secure the labels next to the organelles.

Organelle Information Table

Organelle	Material Used	Color of Clay	Shape of Organelle	Size of Organelle	Number to Make
Capsule	Rubber Cement	N/A	Oval	N/A	N/A
Cell Wall	Plastic Container	N/A	Oval	N/A	N/A
Cell Membrane	Plastic Wrap	N/A	Oval	N/A	N/A
Ribosomes	Sculpey	Blue	Spheres	0.4 cm (0.25 inch)	20
Plasmids	Sculpey	Pink	Circles	2.5 cm (1 inch)	3
DNA	Sculpey	Red	Ropey Strand – folded back-and-forth as is in the image	25 cm (25 inches)	1
Flagella	Sculpey	Yellow	Ropey Strand	14 cm (5.5 inches)	1
Pilus	Sculpey	Orange	Cones	3 cm (1.25 inches)	15

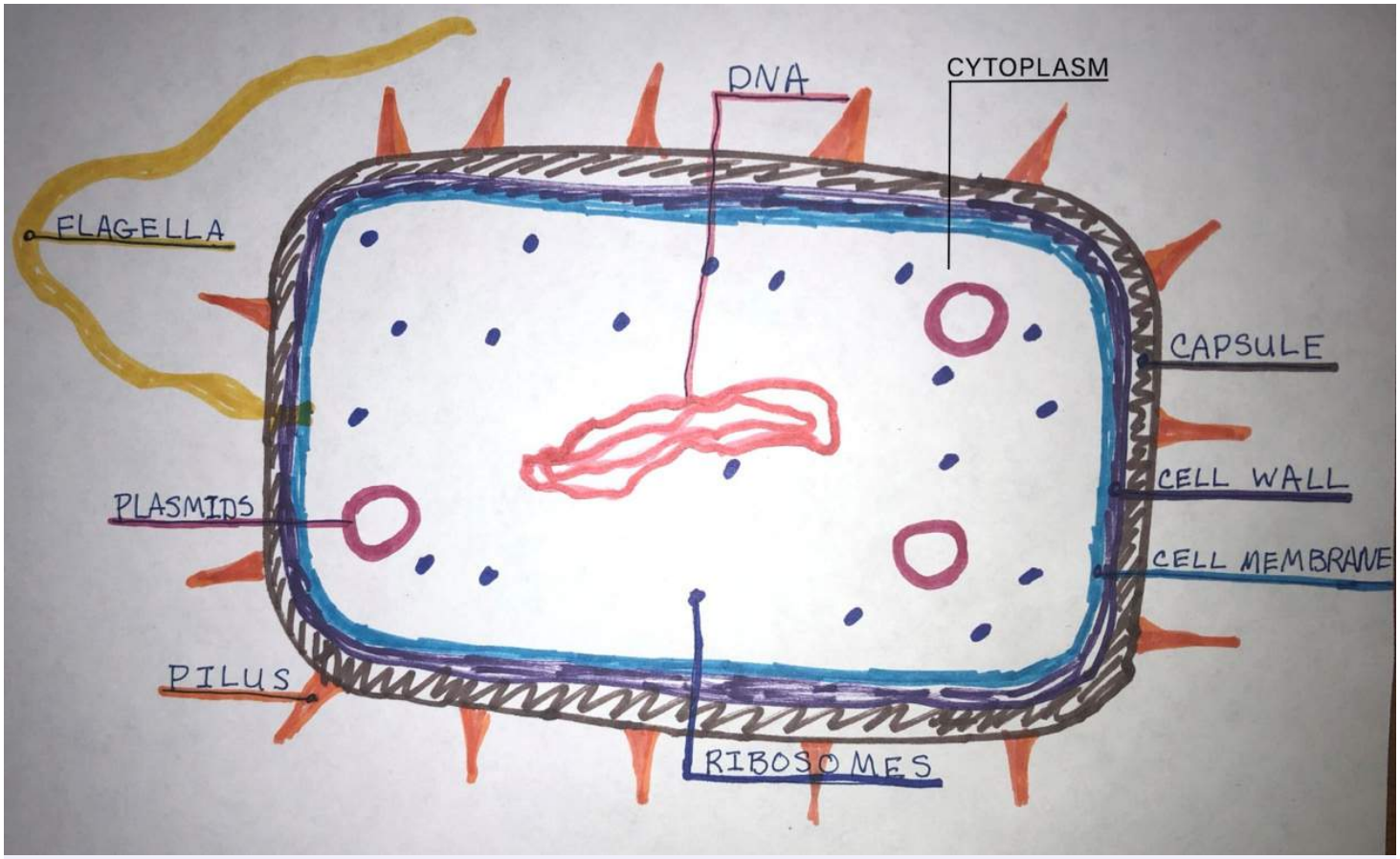


Diagram of the Organelle Placement for a Prokaryotic Cell

LABELS

CAPSULE	CELL WALL
CELL MEMBRANE	CYTOPLASM
DNA (DEOXRIBONUCLEIC ACID)	RIBOSOMES
PLASMIDS	PILUS
FLAGELLA	

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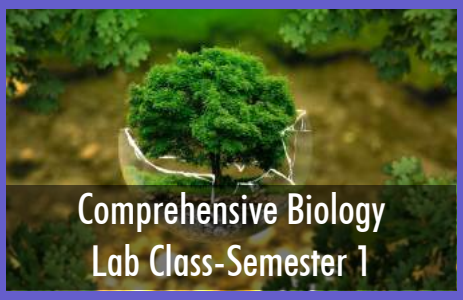

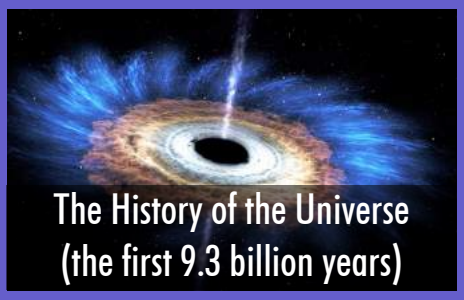

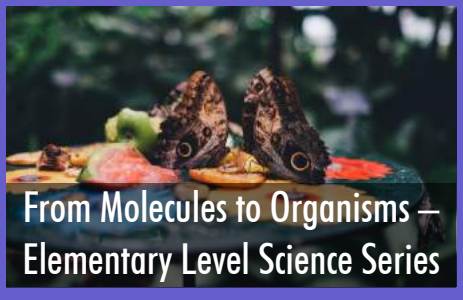

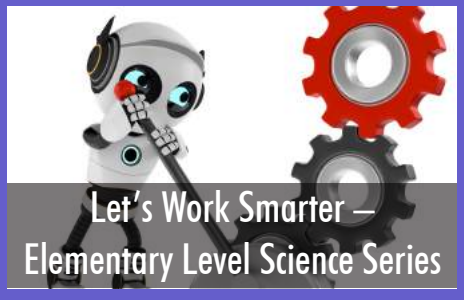

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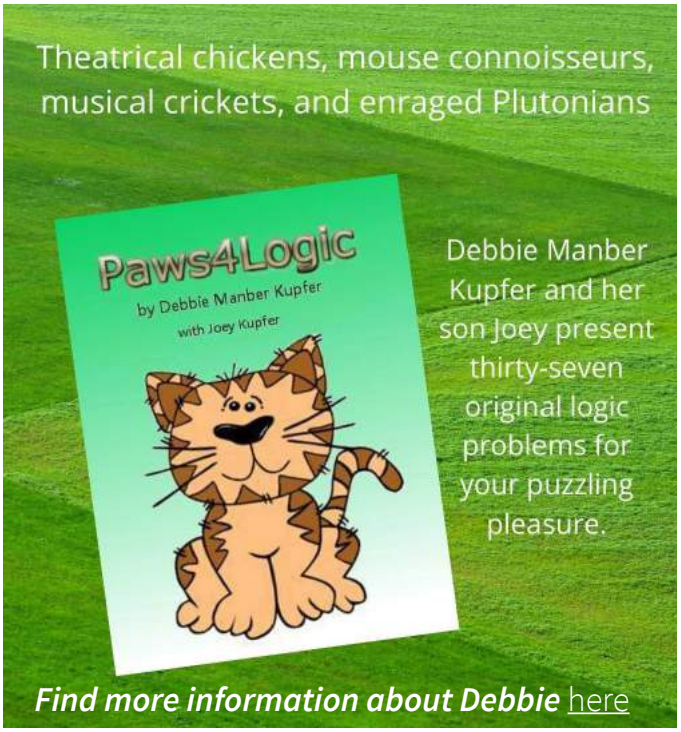
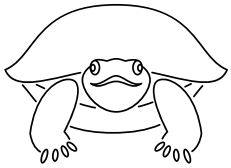


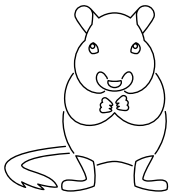
PAWS4LOGIC Show & Tell Logic Puzzle

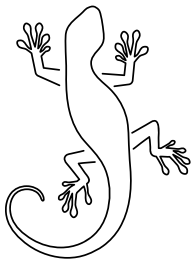
By Debbie Manber Kupfer

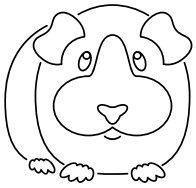
Five students (including Neville and Susie) have brought in their pets to share with their excited schoolmates. One brought in a guinea pig and one brought in a pet called Norbert. Can you work out the name and type of each student's pet?

1. The three mammals are George, Jennifer's pet, and the gerbil.
2. The two boys owned Simone and the hamster.
3. Jackie is a turtle.
4. Gillian brought in Roger (who is a mammal).
5. The lizard was not brought in by Richie.









	Name of Pet					Gerbil	Guinea Pig	Hamster	Lizard	Turtle
	George	Jackie	Norbert	Roger	Simone					
Gillian										
Jennifer										
Neville										
Richie										
Susie										
Gerbil										
Guinea pig										
Hamster										
Lizard										
Turtle										

Student	Name of pet	Type of pet

Contributor Bios

Blair Lee, MS is the author of *The Science of Climate Change: A Hands-On Course*, the primary author for the critically acclaimed *REAL Science Odyssey Series*, and co-author of *Project-Based Learning: Creating a Modern Education of Curiosity, Innovation, and Impact*. Through her speaking and writing, Blair's goal is to empower educators to dare to be innovative and create something unique and academically-rich when handcrafting their students' education. Blair is the founder of Secular, Eclectic, Academic Homeschoolers and SEA Books & More. In 2020, Michelle Parrinello-Cason and Blair started SEA Online Classes. The classes being developed are a different kind of online class that honor learning in a way that scaffolds the specific needs and goals of each student.

Michelle Parrinello-Cason has a Ph.D. in English with an emphasis in rhetoric and composition. Her research interests include pop culture, the history of writing instruction in American colleges and universities, developmental writing, online education, and alt/dis.
Michelle lives in St. Louis, MO where she homeschools her two children. She helped found and now serves as a governance committee member for a secular homeschool cooperative that offers educational experiences to learners across the city. She is the founder of *Dayla Learning*, a source for "homeschooling the humanities with humanity" that provides online classes, teaching materials, and resources. She is also the co-founder of SEA Online Classes, a platform that focuses on engaging, meaningful, hands-on online learning experiences.

Alison Blanco, M.S. is an environmental scientist and a science educator. She has an M.S. in Environmental Science from Florida Gulf Coast University and a B.S. in Zoology from the University of Florida. Alison has a passion for all things related to science and nature. She is currently working on a long-term project with the Florida Fish and Wildlife Conservation Commission involving the endangered Florida panther (Puma concolor coryi) and fire in Florida. Alison has taught in various forms for the past 19 years. She began as a public-school teacher, and now teaches at homeschool co-ops, where she focuses on hands-on learning, and on online platforms, in which she seeks to engage students through active participation. She also has four children of her own, all of whom are homeschooled. To see some of the many science activities that Alison has done with homeschool students, check out her page: *littlepeoplethinkingbig.com*

Alycia Wright, M.Ed. is a former public teacher of ten plus years turned homeschooling mother of the last 7 years. She holds a Master of Education with an emphasis on Special Education and Gifted Education from Virginia Commonwealth University. In the public schools, Alycia taught US History, Civics, and specialty classes such as Wilson Reading for students with reading disabilities, as well a math club for students with Dyscalculia, all at the middle school level. Alycia is the founder and director of Cultural Roots Homeschool Cooperative in Richmond, Virginia. This co-op specifically focuses on history from a decolonized lens and supports families of color. Her passions include providing diverse educational resources and assistance. One of her latest endeavors is the creation of a statewide homeschool conference to address the needs of homeschooling families of color.

Contributor Bios

Joshua Jernigan (he/him/his) is a transgender rights activist and philanthropist living in the greater Charlotte metropolitan area where he and his husband are raising their daughter together. He started the Gender Education Network, an organization helping transgender and gender diverse youth under 12, and is passionate about ensuring every child has a safe and loving home to nurture their growing identities.

Joshua has extensive experience in early childhood education both in traditional classroom settings and remotely. He has previously taught classes on numerous topics ranging from sign language instruction to racial and gender identities.

Joshua is also passionate about accurate and accessible history which has led him down the path of learning all he can about LGBTQ+ history, all things that are not taught in a standard classroom. This passion has led to him giving several speeches about accurate queer history and why it's important that this information be available for all individuals, which now has brought him back to his first love, educating.

When not helping kids or educating in some way, Joshua enjoys hiking, camping, and just hanging out with his family. He has recently authored a children's book, which has been a lifelong goal of his.

Samantha Matalone Cook is an educator, historian, writer, maker, and speaker. She has almost three decades of experience in education and program development, and has worked with both small and large organizations to create educational programming that centers and connects the learner to concepts and skills. She has taught in classrooms and in private workshops, mentored other educators, and worked for and with many museums including the Smithsonian. She also finds new adventures and manages mischief every day with her two teens and one preteen, all home educated; the oldest of whom has fledged to college. Currently, her favorite games are *The Quiet Year, Talisman, Code Names, Azul, Minecraft, Assassin's Creed: Valhalla, The Legend of Zelda: Breath of the Wild, Moss, and Beat Saber*. To see her past and current projects, including her blog, her book on Project-Based Learning, her Harry Potter-themed book studies, Pandia Press History Odyssey curriculum, and her course offerings through SEA Online Classes, please visit *www.samanthamatalonecook.com*

Kathy Ceceri is an award-winning writer and educator, and the author of more than a dozen books of hands-on STEAM activities for kids and teens. Formerly the Homeschooling Expert at About.com (now ThoughtCo), she wrote the Hands-On Learning column for Home Education magazine and taught her own two children at home from kindergarten until college. Kathy's workshops and activities are designed with the non-expert in mind. They introduce basic concepts in science and technology and give students the skills and information they need to troubleshoot their projects and build upon what they've learned. Additional background material and resources look at the diverse people behind the inventions and put them into context in the larger society. Projects generally use only ordinary crafts and household materials and easy-to-find electronic components. Some require inexpensive programmable devices and free online software. Written instructions are provided to help students review what they've learned and encourage further discovery.

Mary Martin, PhD has a BA and an MA English from the City University of New York at Queens College, and a PhD from New York University's School of Teaching and Learning. Mary spent several decades as a professional writer and editor, contributing to over two dozen nonfiction books in the fields of personal science and education. She worked with The Princeton Review for over a decade preparing young people and adults for standardized tests such as the PSAT, SAT, LSAT, and GMAT, and created curricula for several or-

ganizations that train adults for professional licenses. Fifteen years ago, she began the journey that leads her to SEA when she started training to teach mindfulness to children and adults. She is a certified Mindful Schools Instructor and a Brown University-trained teacher of Mindfulness-Based Stress Reduction (MBSR), which is the gold standard for mindfulness. Mary brings her knowledge of how we learn and how we cultivate well-being to SEA with classes in MBSR for adults as well as mindfulness classes for children. Her primary concern is helping people of all ages develop the inner resources they need to face challenging times and ordinary times. She believes healthy, reciprocal relationships begin with self-awareness, and that Emotional Intelligence is an undervalued, yet crucial skill.

Jena Borah, M.S. Ed. (she/her) is a certified teacher with a Bachelor's degree in elementary education and Master's degree in reading instruction. She spent the first 18 years of her career homeschooling her three children with the philosophy "Maintain the joy of childhood and the joy of learning." That meant tapping into their natural curiosity and facilitating their passions, something she called interest-led learning, with a bent toward unschooling. Today, all three have college degrees and are successfully pursuing their careers. In 2011, facing an empty nest and not ready to retire, she started working on a Master's degree to answer the question Why do some children breeze through reading and others struggle? She's been there. She understands how painful this can be for the child as well as the parents. After working a few years as a reading teacher in public schools, she is happy to be "home" again, using her skills and experience to help homeschoolers figure out why their children struggle with reading and offer practical ideas to guide their child in lifelong learning.

Debbie Manber Kupfer grew up in the London, but somehow ended up in St. Louis, Missouri, where she lives with her family including two very opinionated felines. She works as a writer, editor, and puzzle constructor and is the author of the young adult fantasy series, P.A.W.S. Her puzzles have appeared in Penny Press and Dell magazines. She believes that with enough tea and dark chocolate you can achieve anything!

Visit Debbie Manber Kupfer on her website Paws 4 Puzzles or on Facebook.