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Spring 2021

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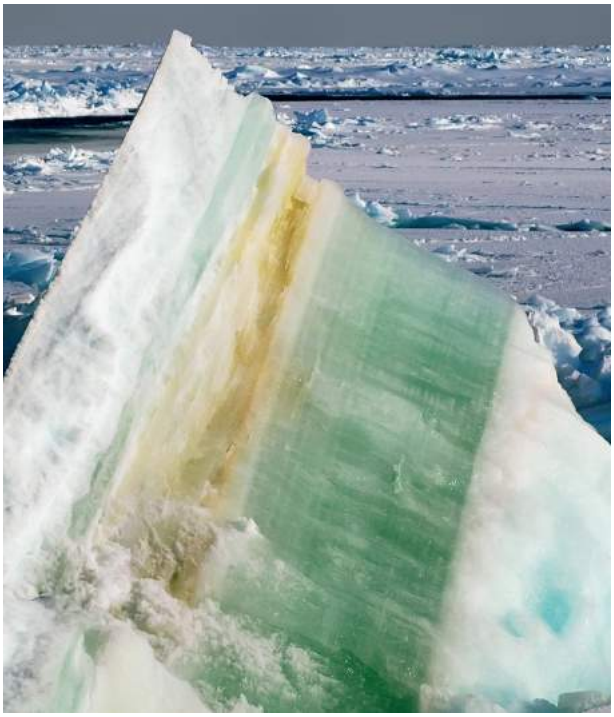

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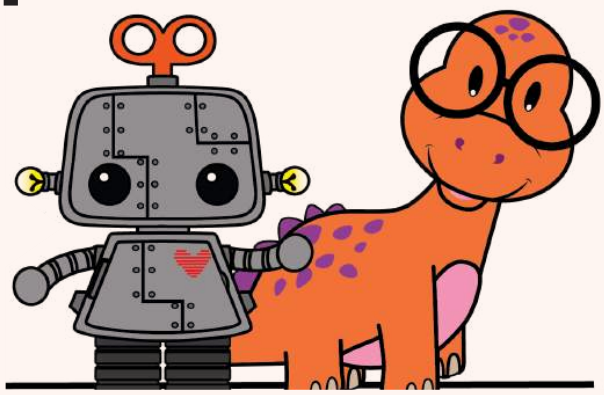
Greetings!
We are Tinker and Sputnik of Tinker the Robot. Get ready to learn some robotics with us!

ROBOT DISSECTION



FROM THE EDITORS

The Spring Equinox has come and gone, and you know what that means? Summer is almost here! Are you ready for Summer 2021? We are!

This is the time of year when most homeschoolers look back as they reflect about the past schoolyear and look forward as they begin to plan for the coming one. Who would have guessed a year ago that all plans made in Spring 2020 were made to be broken? The coming year has to be an easier one to plan for. It just has to!

One thing this past year has done is to shine a light on areas of civics, history, and science that deserve more teaching done from a broader lens. In this diverse world we live in, it is important that we learn about and honor all people. There is an increase in homeschoolers looking for resources to use when planning for this. A year or more ago, no one, including scientists, were discussing the importance of teaching microbiology in school. That has all changed. We can expect more planning and resources to be focused on that area of science.

In addition, it is Earth Day this month. In this issue, we have two resources to celebrate. There is an Earth Day project and an article for young people about the power of youth activism. When the current health crisis began, we were, and still are, in the middle of an environmental crisis. This year we have seen what can be accomplished with a concerted effort from people dedicated to solving a crisis.

SEA will be hosting another incredible weekend conference April 23 through 25, 2021 where experienced speakers will be hosting workshops and vendor sessions focused on “Planning and Resources,” offering a live opportunity to learn and ask questions.

Happy Spring Everyone!

Samantha Matalone Cook & Blair Lee

Handcrafting for a Balanced Learner

By Blair Lee

Have you started planning for the 2021/22 school year yet? If you are like most homeschooling parents, the answer is yes. Have you thought about the subjects you will have your child focus on and possible curriculum or online programs to use? Have you thought about how you are going to help your child learn how to learn? About the specific learning strategies you will weave throughout next year to help your child become a lifelong learner?

Homeschooling parents often say that they want to raise lifelong learners. That is a worthy goal, but how can you as your child's primary teacher and mentor help make that happen? One thing you can do to help your child love learning is to plan so that they become a more balanced learner. Balanced learners can learn from a wide range of materials that are presented in a variety of ways.

Most people access information at a higher level when it is presented in a way that supports one to two of the primary learning modalities (modes): visual, aural (auditory), kinesthetic, or reading and writing learner. For each individual, this is a natural outcome of how their brain works. As a long-term strategy, however, learners are best prepared when they are balanced learners.

What is a Balanced Learner?

Balanced learners are multimodal learners. As the word suggest, multimodal learners learn using all four modalities. Instead of a heavy reliance on one or two modes, there is a balance with the strategies they use. Balanced learners are

strong enough using each of the four modalities to choose the one best suited to the learning task.

This is important for lifelong learners, because it is bound to lead to problems when there is a heavy reliance on one or two learning modes. There is simply no way to always control how information is presented and taught. An important benefit to being a balanced learner is being able to use the strategy that works best based on how the information is presented.

A Metacognitive Approach

Metacognition is the ability of a student to understand how they learn best. With a metacognitive approach, students use prior knowledge to organize, monitor, and adapt the way you approach new learning material and situations. Another benefit of working with students to learn how they learn is that it directly strengthens a student's metacognitive abilities. When there is a focus on learning how to learn in order to become a balanced learner, students come to see that the different learning modalities are tools. Balanced learners can pick and choose the best tool based on the information and how it is presented.

Using Strengths to Handcraft a More Balance Learner

All this theory sounds great, but are you wondering how to handcraft a more balanced learner? The good news is it is easier than you might think (based on the dense theory 😄).

The first step is to identify the learning modalities primarily used by the learner.

Make a list of the academic disciplines the student finds challenging and those that are not challenging.

Pair Strengths with Challenges: Use this information to help you choose materials and programs.

If a student finds a subject challenging, find materials that primarily present the information in a mode that is a strength for them. They are working hard enough to learn the information.

Pair the learning modes that are not as strong with subjects that are a student's academic strengths. You can work on creating a more balanced learner by pairing materials that have a multimodal approach (use all four modalities) with a student's "easy" subjects. You can also use materials that present material using a mode that is not a student's strength.

Learning modes are tools and the ability to use each is a skill. Like any tool and skill, the more practice you get with them, the better you will be using them. By thoughtfully pairing academic strengths with modalities that need work you can handcraft a more balanced learner. This will have long ranging benefits as your multimodal learner is able to pick and choose the optimum learning tool to match the presentation of information.

For more information about handcrafting a balanced learner, check out *Blair's How to Homeschool Masterclass*. In the Masterclass, Blair work with attendees to ensure they have all the tools they need to handcraft learning that is innovative, academically-rich, alternative, and true to who you and your children are.

Find more information about the author of this article here

CLIMATE REALITY LEADERSHIP CORPS

The Power of Youth Activism in Fighting Climate Change

The Youth Environmental Action (YEA) Pod is a youth-led environmental group composed of trained Climate Reality high school leaders from San Diego. This pod is a branch of Climate Reality's San Diego chapter. The YEA Pod is committed to promote youth involvement in climate advocacy through education, community outreach, and other resources. This group reaches towards actionable projects for the youth, highlighting topics ranging from climate education to environmental intersectionality (intersection between social justice and environmentalism).

How We Started

Our pod started with a few passionate youth who just finished climate reality training and wanted a space to create meaningful change. The YEA Pod was formed with the San Diego Climate Reality Chapter leader gathering all the youth who had joined and asked us if we would like to start a pod. We didn't know much about each other yet, soon to come we were working vigorously together and able to create meaningful events. YEA Pod stands for youth environmental action pod, our name was formed from us wanting to emphasize being a youth led pod taking environmental action steps to combat the climate crisis. We have now crafted a comfortable and collaborative space within our pod that has allowed us to achieve great accomplishments. One of the first steps was configuerating the best ways to reach out to youth audiences. We established an instagram platform in order to spread the message of the YEA pod and provide educational resources to the public. Since the start of our pod, we have created a great dynamic and have been able to accomplish great achievement and are striving to be able to continue to create change.

Actions & Events

Since our pod is focused on educational action, we have created a lot of educational events and materials focused towards making climate change topics more digestible towards youth. The first action that we took was creating our digital climate strike week, which was a week of climate action that finished on the Global Day of Climate Action. Our climate strike week consisted of daily infographics via our Instagram, that were each geared towards different aspects of climate change. For example, we had Motorless Modays, which encouraged electric vehicles and other more sustainable forms of transportation. We also included how to take action, including places to volunteer, donate, and to just learn more about if one was interested in the topic. Each day, we hosted fun activities for others to partake in, and even had an elementary class follow each day of the week! That Friday, we hosted a Q and A styled webinar featuring experts in each of the fields we had discussed that week. From youth stories to plastic pollution, we

discussed a wide variety of topics! Another event that we hosted was 24 Hours of Reality, which is part of the Climate Reality Project Global 24 Hours of Reality event. We created a video that included some eye-opening statistics on climate change and the true impact it has on our planet, along with some good news on the actions that are being taken. For the holidays, we hosted a fun get to know you holiday event, where we all participated in holiday crafts and reflected on all the actions of this past year. We are currently working on the YEA, Let's Go! Podcast where we talk about the environment and what others are doing to protect it. We also work to collaborate with other climate groups, such as the Green Schools Campaign. We are currently working to implement the Green Schools Campaign in our region, working with students to help convert schools and districts to 100% renewable energy. We also frequently post educational infographics and other interesting information on our instagram *@yea.pod* so go check us out!

The Power of Youth Activism

Youth leaders aren't the leaders of the future, we are the leaders of today! The YEA Pod believes it is important to spread awareness of climate change to fellow youth because we realize that this current reality is the future that young generations will face. We hope to empower youth as community leaders and activists as we help them learn about climate change. It's important to understand that as a youth activist, you are not alone in this journey. You are supported by millions of fellow activists around the globe who are fighting for climate justice right with you! Ultimately, the path to climate activism is carved out entirely by you and there are endless ways you can take action. You can focus on learning about or fighting for issues you're passionate about, and you can use your own unique talents to spread awareness. Youth activists are today's leaders and every action we take, no matter how big or small, makes an impact. Just by reading this today, you are already joining the YEA pod and taking action.

Become a Climate Reality Leader

Join a free virtual Climate Reality Leadership Corps training with former US Vice President Al Gore and a team of leaders, activists, and scientists. Scan the QR code to find out more information!

Earth Day Projects for Climate Historians and Activists

By Samantha Matalone Cook, MAT

Since Earth Day is towards the end of April, it's time to start thinking about activities and actions that help us understand the environmental issues that we are facing as both local and global communities, as well as take time to appreciate the incredible planet we live on.

I live in the Rocky Mountains, which is an extraordinarily beautiful place, but my family's world was rocked last fall when we had to evacuate due to a wildfire that came within a quarter-mile of our house. We didn't lose our house because of two factors: the awesome firefighting team that was deployed to our area, and the fact that the wind shifted just in time. Other neighbors of ours were not so lucky. While wildfires are a natural part of a forest's ecosystem, the extreme temperatures and rising rates of

fires and flooding seen in our area and throughout the world are not. The science is clear that we have dramatically altered the natural rhythms of climate on this planet with our behavior. It's important to understand this from both a scientific perspective and a historical perspective.

Below you will find an excerpt from a lesson on the Ice Age that was written for my new upcoming history course, History Odyssey: Ancients, published by Pandia Press. I can't give you a release date yet, but I loved these projects and so did my students, so I wanted to share them with you in honor of Earth Day. This curriculum is written for late middle school through high school, but these activities could be easily done as a family or adapted for younger students. I've included one of the research projects, a prompt to debate whether we should bring back the Woolly Mammoth for biodiversity or to aid in the climate crisis, which has been an extremely lively discussion in any class I've assigned this topic. I've also added a hands-on project making Ice Cores that is super fun to make and analyze. Extra resources are at the end of this article. Both projects show the profound connection between history and science, and the impact the past has on the present and future.

Research: Bringing Back the Woolly Mammoth

The Wooly Mammoth lived during the last Ice Age and most went extinct about 10,000 years ago, although a small population lived until about 3,000 years ago. That means there were still Woolly Mammoths in the world when the Ancient Egyptians were building pyramids! Scientists believe a combination of climate and environmental change plus over-hunting by humans contributed to their extinction.

With genetic technology advancing rapidly, it's possible that scientists could replicate Woolly Mammoth DNA and combine it with a related species, such as the Asian elephant. In this assignment, you will research how scientists are extracting Woolly Mammoth DNA, how successful this process might be now and in the future, and then prepare an argument on the science, ethics, environmental, impact, and humanity of bringing back the Woolly Mammoth. What about other extinct prehistoric animals? Does your argument extend to bringing back species that have gone extinct more recently?

Pay close attention to how this research assignment relates to the other research assignment on mapping temperature and climate through the extraction of ice cores and deep-sea sediment. One of the arguments for bringing back the Woolly Mammoth is to combat the effects of the current climate crisis.

You can write an argumentative essay, prepare a presentation, or schedule a debate with a friend, family member, or another student.

Project: ICE CORES

Ice cores help us to study the history of weather, climate, and more through a layered documentation of the past that is, literally, frozen in time.

These ice cores are taken from places where the snow never melts, usually Antarctica or Greenland, so the layers have built up over thousands of years. The oldest ice cores have been dated to around 800,000 years. You can think of them like tree rings; each year adds a layer that contains specific information about the environmental conditions of that time period. For example, the height of the layer can indicate a heavy, average, or slight season of precipitation.

Also, atmospheric particles such as ash, pollen, and dust can get trapped in the snow, and we can analyze their presence to make conclusions about any events that might have happened that year. Bubbles in the snow trap gases we can measure, like carbon dioxide or methane which suggest a warmer climate. Some of these clues are easier to see and interpret, and some need special tools, such as those found in a science lab, in order to understand the evidence.

For this project, you'll be analyzing an ice core to see what information you can find. To make the ice core, you have two choices: you can either create an ice core yourself or have an adult, sibling, or friend make one for you to study.

Note: It will take about 2-4 days to make your ice core, so you should plan accordingly. If you choose to make your own, use the worksheet provided to record the layers (in order!) you chose. Be specific, noting details such as measurements, heavier snowfall or volcanic activity! When your ice core is finished and completely frozen solid, you will take it out of the freezer and compare the layers to your notes. If your ice core was made by someone else, you will be using the worksheet to analyze the ice core and draw conclusions based on what you see. Compare your results to their notes.

Materials

1. Apple
2. Apple Corer (apple core remover)
3. A Pringles can or equivalent
4. Measuring cup
5. Scissors
6. Plastic, metal, or ceramic tray
7. Refrigerated water
8. Additional cup or pitcher of refrigerated water with 1-2 drops of blue food coloring added
9. Refrigerated carbonated water
10. Instant coffee or dirt (represents dust)
11. Ash (from your fireplace or by burning a scrap piece of paper in a fire-proof bowl)
12. Turmeric powder (represents pollen)
13. Dried Basil or Oregano leaf (represents plant matter)
14. Freezer

Optional: Small plastic insects

Procedure

1. • Put your apple on a flat surface and insert the apple corer on top of the stem, pushing down slowly and twisting slightly until you reach the bottom. Slowly pull back up, until you have removed the core of the apple.

   This is a great basic visual example of how ice cores are extracted. Scientists use a hollow drill bit to drill down into a glacier or snowpack and remove ice cores. Larger ice cores are removed in sections and carefully labelled to preserve the timeline.

2. • Now you are ready to make your own ice core.
   • Pour ¼ of a cup of refrigerated water into the bottom of the Pringles can.
   • Put in the freezer until frozen solid. Add a layer (1/8 cup) of the blue refrigerated water.
   • Put in the freezer until frozen solid.

   The regular layer of water represents the winter snow and the blue layer of water represents the summer snow. Winter snow layers can appear lighter and summer snows can appear darker in ice cores because the summer snow tends to melt a bit and then re-freeze, make it denser than the winter snow. A layer of the darker band of snowfall and a layer of the lighter band of snowfall is counted together as one year.

   You can vary the amount of snowfall by adjusting the amount of water you put in. For example, let ¼ cup represent the average amount of winter snowfall and 1/8 cup represent the average amount of summer snowfall. Some years can be average, but some years can have more or less than average snowfall depending on how much water you put in. Make sure you record this information on your worksheet!

Setting up equipment to drill for ice in the Arctic

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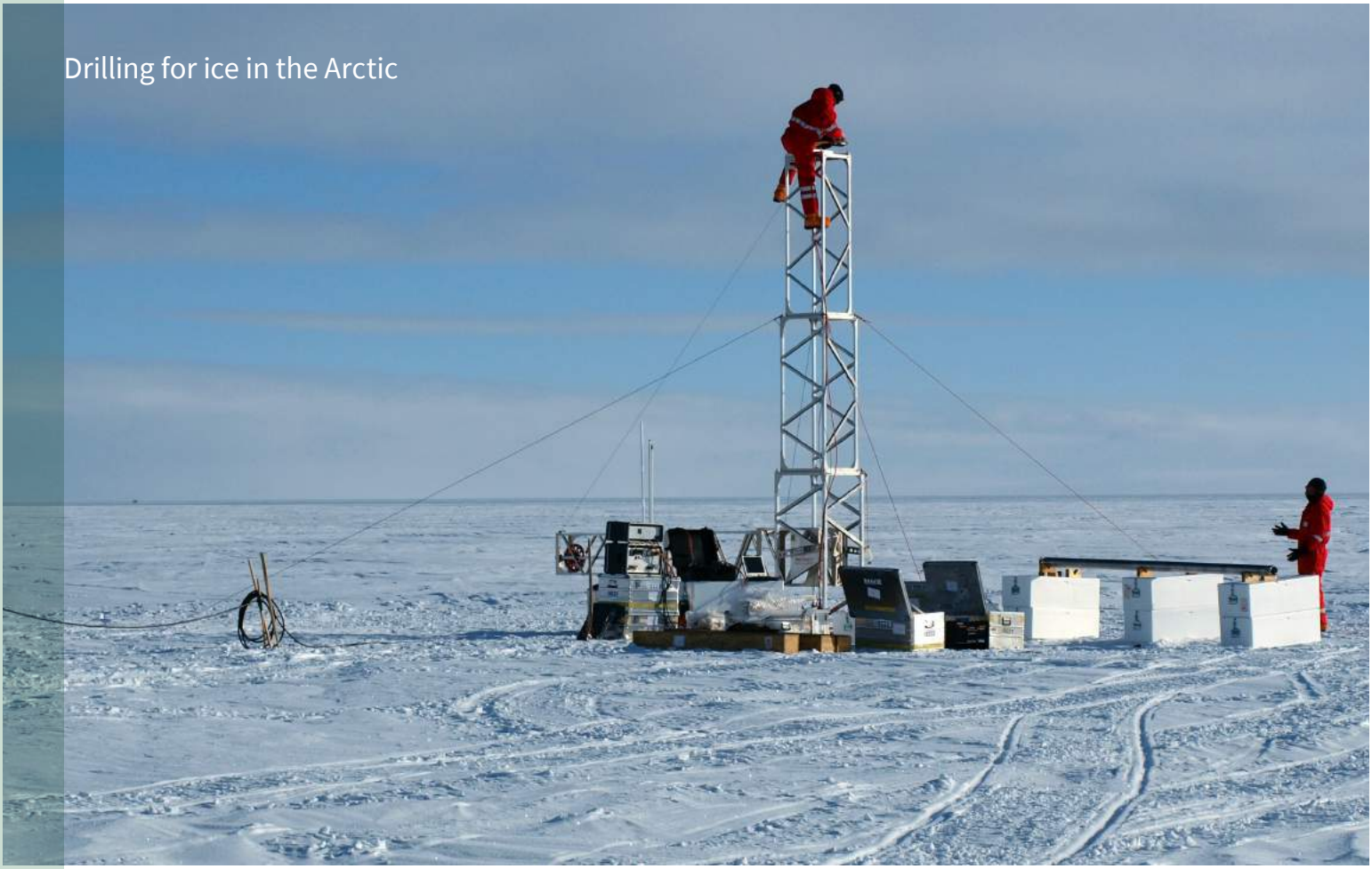
3. You will continue creating layers of alternating summer and winter snows, letting each layer freeze solid before adding a new one. If the previous layer isn't completely frozen, the new layer may mix with it, making it hard to analyze. Add some of the other ingredients to the layers as you work your way up the can:
   - **Refrigerated carbonated water:** represents gases in the atmosphere, particularly carbon dioxide and methane
   - **Instant coffee or dirt:** represents atmospheric dust
   - **Ash** (from your fireplace or by burning a scrap piece of paper in a fire-proof bowl): represents volcanic activity
   - **Turmeric powder:** represents pollen
   - **Dried Basil or Oregano leaf:** represents plant matter
   - **(Optional) Small plastic insects:** have been found in ice core layers!
4. When you have finished all your layers and your ice core is frozen solid, use scissors to cut the edge of the can, and then peel the sides of the can away to retrieve your ice core. Do NOT heat the outside of the can in an attempt to slide the ice core out, as it will damage your layers. Put your ice core in a tray for analysis. If you need to take a break, put your ice core back in the freezer until you are ready to work again.
5. If you made your own ice core, use the worksheet you took notes on to compare your plan with the layers you see. If your ice core was made for you, use the worksheet to record the layers you see and any clues you observe. Make sure you note which side is the "top" and which is the 'bottom" for accurate records. Check your conclusions against the notes made by the creator of the ice core.



Drilling for ice in the Arctic

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Ice Core Project Worksheet

Instructions: Using colored pencils, draw the layers of the ice core you are studying, including any clues you see. On the matching line on the right, record your observations and conclusions.

Layer	Analysis

Mapping Temperature and Climate, Ice Cores

Understanding the last Ice Age helps us to get a clearer picture of environmental patterns and human evolution, this data gives us solid, scientific projections for current and future climate and environmental potential, and that this is a beautiful example of how the intersection of science and history is often necessary for getting a full picture of history and human behavior. Students who are particularly interested in the issue of human behavior and the climate crisis may want to do a unit study or project on the subject outside of this course.

- *Icecores.org* has some great resources, including information on extraction, testing, and the National Science Foundation's Ice Core Facility (NSF-ICF). The site has both articles and videos.
- *Penn State* has a great module on Global Warming, and specifically on the Vostok Ice Core.
- *NASA: An Introduction to Ice Cores*
- This *interview* with the director of the Smithsonian Institution's Human Origins program gives an excellent picture of climate's effect on human evolution.
- *Paleoclimatology: The Ice Core Record*
- *NOAA: What Can We Learn from Ice?*
- *Climate and Ice: Difference between weather and climate, how glaciers form, and the kinds of information that is found in the glacial record.*
- *Recovering Ice Cores: How ice cores help determine past climates, how ice cores are extracted.*
- *Calendar in Ice: Comparison of tree rings and ice core layers, information available in the study of ice cores.*
- *Stories in Ice: How scientists read the clues in ice cores.*
- *Predictions from the Ice: How scientists can use the information from ice cores to predict future climate trends.*
- *Studying Ice Cores in Antarctica with the British Antarctic Survey: Natural History Museum (UK)*
- *National Science Foundation: National Ice Core Lab (Denver, CO) Stores Valuable Ancient Ice*

Woolly Mammoth

One of the arguments for bringing back the Woolly Mammoth is to combat the effects of the current climate crisis. Many students find this subject fascinating and enjoy having a knowledgeable and spirited debate, or presenting their argument in written form, about whether or not they think scientists should try to bring back the Woolly Mammoth.

- Fox, Alex. *"Woolly Mammoth Skeleton with Intact Ligaments Found in Siberian Lake,"* Smithsonian Magazine, 7/29/2020.
- *Yale Environment 360 De-Extinction Debate: Should We Bring Back the Woolly Mammoth?*
- Wrigley, Charlotte. *"Mammoth Task: The Russian Family on a Resurrection Quest to Tackle the Climate Crisis,"* The Conversation, 9/7/2020.
- *Hendrik Poinar: Not All Mammoths Were Woolly (TEDxDeExtinction)*
- *Ted Talk: Bring Back the Wooly Mammoth (how DNA sequencing could be used to bring back extinct animals like the Wooly Mammoth)*
- *Ben Mezrich: Bringing Back the Woolly Mammoth to Save the World (TEDxBeaconStreet)*

A short list of museums with online collections and learning resources relating to Woolly Mammoths:

- *La Brea Tar Pits*
- *American Museum of Natural History*
- *Field Museum*
- *National Museum of Natural History*
- *Natural History Museum, London*

Educator Notes on the Ice Core Project

The Ice Core Project requires extra time to prepare. It can take 2-4 days, depending on how regularly you are adding layers. Decide ahead of time whether you or your student will be creating the ice cores for analyzation and determine when you should start making them based on your predicted schedule.

There are a few ways to approach this project. Your learner(s) can make the ice cores, or you can make them. If your student is making their own ice core, they can follow the directions in the lesson. If you have multiple learners, they can make ice cores for each other to analyze. If you, their sibling, or their friend are making the ice core for your student, you will follow the same directions and make the ice core ahead of their lesson. Make sure you take detailed notes on every layer you add so your student can compare their conclusions to your process. You can use a copy of the worksheet for consistency and ease.

Find more information about the author of this article here

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-D. Idk

My son (9 yrs. old) has just taken part in an Outschool class, brilliant experience, he can't wait to sign up for another class.
-C. Duncan

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- A. Carrizales

Great variety of fun and engaging classes with amazing teachers... all at a reasonable cost!
-L. Shiflett

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Build a Mini Planetarium

Materials

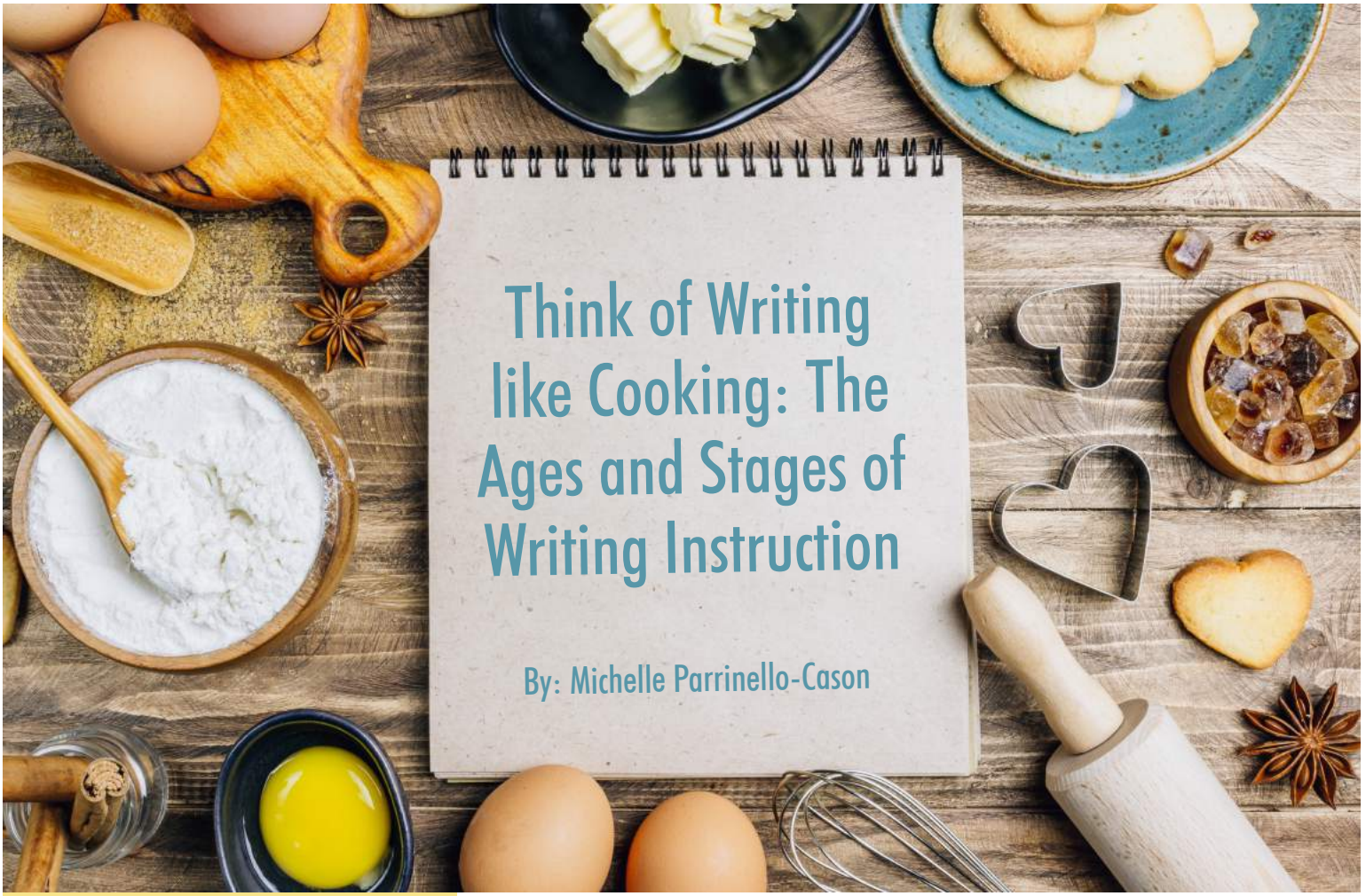
- Shoe box
- Scissors
- Cardstock
- Star chart for your latitude OR OPTIONAL BUT HIGHLY RECOMMENDED a star map you made while stargazing
- Pen or pencil
- Pin
- Tape
- Flashlight
- Books

For those of you ambitious enough to want a larger more detailed planetarium, here are the instructions for something that should fit the bill from *Space.com*

Procedure

1. Remove the lid from shoe box to work on the bottom (lidless) box. On one of the small-sided ends of the bottom box draw a circle the same circumference as the handle end of the flashlight. Cut a hole just big enough for this end of the flashlight to fit into.
2. On the opposite side of the box, cut out a rectangle that is almost that entire section. You just need a small lip to attach the paper to.
3. Using the star chart or your star map, draw dots on the cardstock showing the stars in your night sky.
4. Poke holes through the dots with a pin.
5. Put the cardstock over the rectangular hole of the box, and tape it in place.
6. Slide the flashlight in from the inside of the box, so that the head of it is in the box. Make sure you can turn the flashlight on and off when the lid is on the box. Support the end of the flashlight that is outside of the box with a stack of books. Put the lid on the box.
7. In a darkened room, turn on the flashlight, and project your constellation onto a wall.
8. Quiz your friends or family to see if they can identify the different constellations.

This project is a part of the *Stargazer's Club Month 1 activity package.*



Think of Writing like Cooking: The Ages and Stages of Writing Instruction

By: Michelle Parrinello-Cason

I'm a big fan of using metaphors to take the mystery out of writing instruction, and that's what I'm going to be doing in this article.

One of the things I hear most often from families trying to figure out how to teach writing in their homeschool is concern. Concern that they aren't doing "enough." Concern that they're "late" or "behind." Concern that some particular skill isn't developed adequately.

I hear these concerns — and, as a homeschooling mom, I feel them myself — but I've got an idea that I think will take some of the stress out of writing instruction.

Let's think of writing like cooking.

Setting Our Goal

You don't know where your kid is going to end up. Perhaps they're going to be a world-class author of bestselling books or a researcher who publishes in peer-reviewed journals about their life-changing experiments. They may need mastery of formal, professional, and polished writing to meet their goals. Or they may not.

What you know for sure, though, is that they'll need the foundational skills of communication. Whether they're heading to college or not, whether they're heading into a writing-intensive career or not, whether they like to write for fun or not, they're going to need some basic foundations. Everyone benefits from the clarity, criti-

cal thinking, organization, and depth of exploration that comes with writing practice. It's a universal skill.

Now think about cooking. You don't know if your kid is going to end up a world-class chef. Perhaps they'll go on to compete in cooking competitions or open their own restaurant. Perhaps they'll create new and innovative recipes that change the culinary game. They may need the mastery of formal, precise, and decorative baking skills to meet their goals. Or they may not.

What you know for sure, though, is that the foundational skills learned through cooking are translatable to other areas in life. Being able to read and follow a recipe, converting amounts mathematically, experimenting with flavors, practicing hand-eye coordination, knowing how to feed themselves nutritionally-sound food, developing safety strategies for knives and ovens — these are all skills worth developing for everyone.

We don't want to cut off any options for them, but we also don't want to hyper focus on perfection before they've had the chance to learn the basics. We want to foster an appreciation for exploration and skill building.

Let's get going.

The Early Years: Birth through Preschool

Cooking in the early years is mostly about appreciation for the process. We include our kids in the kitchen as we cook there ourselves. They eat food, and they explore its many textures, flavors, and appearances.

They see you as a model. You cook, you eat, and you prepare food and provide it to them. You describe food when they see it and teach them that the mashed potato and the French fry have the same origin. Your behavior and direct instruction provide a foundation in understanding.

When we do include kids in the actual cooking, it's usually messy and requires either a lot of support or low expectations. But we include them anyway because we know that the skills and interests they're building are worthwhile. That's what we should do for writing, too.

To set the stage for strong writers, these early years should include cultivating an appreciation for and joy in words and language.

The absolute best thing you can do to help with future writing and reading habits at this stage is read books — lots of them. Picture books, board books, audiobooks, chapter books — explore it all. Read that favorite story over and over again. Have a spot in the house

Our goal then — whether we're talking about cooking or writing — is to provide our learners with the foundational skills they need to follow the paths that interest them most.

where piling together with a book to read aloud just feels right and necessary. Get library cards and use them often. Have bookshelves that are accessible to little hands.

One thing that adults don't always think of as part of their child's education is their own modeled behavior, but it really matters for developing a love of language. Let them see you read, and them see you love it. That means read what you love and in a format that works for you. Graphic novels, page-turning thrillers, magazines, gardening books, cookbooks — explore it all. Let your kids see you as a reader.

Of course, this is also the age where you introduce letters and letter sounds and basic handwriting practice. There are tons of great tips available for these practices in the many, many preschool curricula out there. Find some that work and use them, but remember that creating wonder and joy around reading is just as much a foundational skill for writing as these more technical aspects.

AT A GLANCE:

- Read, read, and read some more
- Model a love for reading
- Make books accessible and enjoyable

Early Elementary: Kindergarten-Second Grade

As kids develop more physical skills and longer attention spans, cooking can be a lot more meaningful. We'll teach them how to safely use the knife and follow simple recipes. We don't, however, expect that a dish come out perfect.

If a kid at this age makes cupcakes, for instance, we're likely not expecting them to be iced evenly. They wouldn't likely make their way into a display case of a bakery. But that doesn't mean they aren't delicious!

Continue building a great foundation for writing through that practice and appreciation for reading.

Great books, mediocre books, silly books, serious books — read it all. Keep the read aloud traditions, and — as your learner develops their own reading abilities during these years — provide them with access to choose their own independent reading selections. Don't worry about keeping them "on level." Reading under their level builds confidence. Reading above their level stretches their skills. Listening to audiobooks is reading. Reading graphic novels is reading. Reading is worthwhile in all its forms.

Introduce writing as a low-pressure experience. Write paragraphs describing personal experiences. Write letters to people you love. Make lists and take notes. Tell stories.

Remember that writing doesn't just mean pen to paper. It also includes playing with puppets and creating stories with Legos. Making a speech and recording it on video is writing. Drawing pictures is writing. Typing is writing.

Incorporate writing into other subjects. Have your learner write about how they would feel to be in a particular moment in history. Write down the results of the science experiment. Make writing a regular, meaningful part of day-to-day life.

As your writer's interests and attention span allow, you can focus on some specific writing skills as they arise. Talk about capitalization conventions and how writers put periods at the end of sentences. Model these practices in your own writing and when you scribe for your writers. Do not make a big deal out of it when they don't immediately translate these skills into their own writing. Do not make every piece of writing require perfect polish. Let most of their writing exist in its rough draft form. It teaches them that, first and foremost, writing is about ideas.

We understand that getting in the kitchen and making a mess is a great way to build the interest and early skills for a lifelong cooking practice. Writing skills happen the same way.

AT A GLANCE:

- Read, read, and read some more
- Make writing a low-pressure activity
- Remember writing takes many forms
- Make a mess

Late Elementary: Third-Fifth Grade

At this point in cooking, you might start adding in some more refined requirements and expectations. Your young chefs will probably start to master specific recipes they can complete without your assistance. They may start mixing together their own concoctions — some will be delicious, and some will be . . . well, not delicious. Experimentation is important, and this stage adds the consideration of external expectations. What kind of food will other people like, too?

In writing, now is the time to start introducing some basic academic writing conventions. These should remain low stakes and occasional. Not every piece of writing requires rigorous standards around mechanics and grammar. Much — perhaps even most — of your learner's writing should remain informal, not evaluated on its lower order concerns like spelling and punctuation.

Occasionally, though, introduce a formal assignment that does need to be polished and perfected for an audience. Use


Get Them Ready to Launch
Simplify
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these assignments to identify the areas that need the most attention. Help writers start to develop their own revision process. Teach them to read aloud and listen for errors and missing words.

The biggest goal of this age and stage is to get them comfortable with the idea that sometimes — but not always — writing comes with higher expectations. It's like baking cupcakes at home vs. baking them for a professional shop display. At home, it doesn't matter if the icing is uneven and the wrapper pulled off a big chunk of the cupcake. It's still delicious. If you were putting them in a shop display, though, you'd be more careful and deliberate with what you put forward. You might even have to make cupcakes you wouldn't normally make — specific flavors and themes that meet your customers' demands.

This is the time to start exploring that concept with an occasional assignment. Just make sure that it always has an authentic context. Tie it to a lesson in another subject. Write about a character from that history chapter. Summarize that documentary. Write a letter about the social justice lesson. Writing needs to be meaningful.

AT A GLANCE:

- Introduce occasional higher-stakes requirements
- Start to consider audience more formally
- Write in multiple subjects
- Make writing meaningful and connected to ideas

Middle School: Sixth-Eighth Grade

At this point, those home chefs probably have some pretty sophisticated skill sets, but they may have developed unevenly. They might be very skilled at particular kinds of cooking but not have much practice in others. They may still need supervision during tricky or risky practices, but they're likely getting comfortable with creating their own plans and following more complex recipes.

This is the time to really start to understand academic writing conventions and their requirements. Helping a learner nail down these concepts now means that their high school years can be spent exploring the effectiveness and finding their personal voice rather than being overwhelmed by the demands.

Build on the work from the Late Elementary section by incorporating more and more formal writing assignments with specific expectations in terms of form, format, and goals. Support the development of an individual and rigorous revision process by requiring multiple drafts with feedback at each stage. Break writing assignments down into steps that help learners choose topics, research, outline, brainstorm, draft, revise, and polish with purpose and intention.

Continue to do a mix of formal and informal writing assignments that don't always require such careful attention to grammar and mechanics. It's important to remember that writing is always about ideas first. The polishing is important for some circumstances, but the ideas are important all the time.

Most importantly, if you can get all the basic skills introduced in these stages, writing at the high school level can really be about exploration, developing critical thinking skills, and discovering ideas.

Think of it as sending your chefs off with a familiarity of a range of cooking styles and techniques even if they have their favorites that are more heavily leaned upon.

AT A GLANCE:

- Mix informal and formal writing assignments
- Focus on developing a flexible and personal writing process
- Experiment with different formats and goals
- Introduce assignments that create new expectations

High School: Ninth-Twelfth Grade

Ideally, this would be the stage where a chef could start to explore their own recipes and explore unique flavor combinations with confidence and bravery. Sure, sometimes things are going to fail, but someone who has experience in the kitchen and strong foundational skills won't feel deterred by an experiment that doesn't work out.

That's how we want our high school writers to approach their craft: unafraid to think outside the box and prepared to improvise when a new idea strikes.

In order to get there, high school writing should be about pushing the boundaries of the comfort zone and continuously asking writers to consider different audiences and purposes. The more complex, engaging, and authentic the writing experiences can be, the better.

Continue to explore the connection between reading and writing by making writing a component of different subjects. Remember that writing takes many forms, and creating infographics, video reports, and speeches all count.

Build authentic writing experiences where a real audience sees the finished product. Send letters to elected officials and post flyers in the park. Make street art and publish podcasts. Teach your writer that their voice matters and find an audience who wants to hear it.

Research becomes a key focus of writing at this stage, and knowing how to find credible sources and incorporate them meaningfully into their own writing is one of the most important skills a high school writer can develop.

Teach them that writing sometimes has to follow academic writing conventions to perfection. Cover letters and resumes can't afford to have a typo or a punctuation error. Help them learn when it matters most.

AT A GLANCE:

- Make research a major component
- Write across different subjects
- Create real-life audiences
- Write in various forms and formats

Final Thoughts

It's never too late to learn writing skills. We're all communicators by our very nature, and these are skills that we'll develop more when we have situations that call upon them in a meaningful way.

The most important advice I can give for families working on writing is to meet your learner where they are and don't worry about any official timeline. We all develop skills in their own time and place. The more we practice, the better we become, and the absolute most important thing you can do is provide your writer support to practice often.

Just like cooking, writing is a lifelong skill. Some of us use it daily and with joy — we're constantly looking at new ways to practice the skill and make it a key part of our lives. Others may do it begrudgingly and only when necessary, but it's still easier to do when we have a strong foundation behind us.

Start wherever you are and build skills with the confidence that they'll serve your learner well today and for the rest of their lives.

Find more information about the author of this article here

How Tough Math Challenges Build a 21st-Century Skill Set

The Value and Versatility of Advanced Math

By: Katlin Chadwick, Art of Problem Solving

How do you know your child is getting a good math education?

Many parents' first reaction is to look at their child's test scores. But this can be tricky. Since not all tests (or curricula for that matter) are built the same, using test scores as a value indicator can be inconsistent. For example, getting a perfect score on a basic skills test is far less meaningful than scoring a 70% on an advanced math exam at MIT.

Exams at top-tier universities are tough tests. Instead of checking your ability to execute basic concepts, they're built to measure your ability to apply those concepts to novel problems. And that involves a different skill set altogether.

That type of thinking involves problem solving. And one of the best ways to evaluate if a math education promotes problem solving is by its level of challenge.

Whether your student is MIT-bound or on a different trajectory altogether, it's critical to figure out what type of learning works for them. Then, you can tailor that learning to the right challenge level to keep them engaged and excited.

At Art of Problem Solving (AoPS) we recognize individual student journeys and provide the resources to support them. Because every child is different, we offer various instructional models and online resources to help families meet students where they are — in level, intensity, and delivery method.

Raising Problem Solvers Through Challenging Math

So many parents we talk to just want to know their kids are going to be OK. Will they thrive in school and life? Find a career they love? Be ready to tackle any obstacle that comes their way?

Challenging math can help your child en route to all of those things. Working with advanced math builds a foundational problem-solving skill set they'll use the rest of their lives.

What do we mean by a problem-solving skill set? We mean complex, real-life, human skills, such as perseverance, creativity, and communication. Students gain these skills by solving problems — tough problems — over and over again.

And this is not just for those to whom math comes easy. The most challenging moments are oftentimes when the most critical skills take root.

The Power of Novelty in Math

What happens when a student is faced with a math problem? More often than not, they simply plug in a formula they've memorized. But what if that problem is completely new or unconventional? They can no longer lean on memory.

At that moment, we don't want a student to freeze or doubt themselves. We want them to consider all they've learned so far and creatively think through a new approach. We want them to understand the why and how a problem works — not just memorize the answers.

By trying multiple approaches on the same problem, students develop creativity and outside-the-box thinking skills. By spending a lot of time (sometimes hours!) on a single problem, students build up perseverance. By writing out their solutions and thinking through real-life scenarios, students hone their communication skills.

And finally, once they've worked their way through the productive struggle to reach a solution, they gain confidence. From there, they begin to take ownership of their learning.

The versatile skills gained from a challenging math curriculum prepares students for success academically and professionally. Not to mention this skill set is also completely automation-proof, safeguarding your child's prospects for those 21st-century innovations yet to come.

The Case for Math, Earlier

We started offering an advanced math curriculum at AoPS in 1993. By 2011, we'd built out an online curriculum for middle and high school students. What we realized pretty quickly, however, was that most students exiting fifth grade were not yet prepared for our entry-level prealgebra course.

So in 2011, we launched our elementary math curriculum, Beast Academy. We believed there'd be many more students ready to take on the types of challenges AoPS offered if students started advanced math earlier.

We were thrilled to be right. We saw that the earlier we introduced students to an advanced, thought-provoking curriculum, the easier it was for them to learn and retain. Just like when learning a second language, students developed a greater capacity for learning year over year, compounding their growth.

DID YOU KNOW?

Art of Problem Solving (AoPS) trains today's brightest minds to tackle tomorrow's toughest challenges. Through Beast Academy, AoPS Academy, and AoPS Online we offer the most comprehensive honors K—12 math pathway in the world.

DID YOU KNOW?
Beast Academy is a comprehensive, challenging math curriculum that can be used as a full-time or part-time program for your elementary student. Through robust dashboards, parents can track their student's progress and customize their learning experiences based on what they see.

Throughout our curriculum, students build real-life problem solving skills that go far beyond math mastery. As elementary students work their way through secondary school and college, they can use the same general strategies to work through physics, philosophy, economics, and other subjects they encounter.

Math is the means here, not the end. Challenging math is one of the absolute best ways to teach kids how to think through hard things.

The Struggle to Engage

We believe students can (and should) do hard things. And that ability comes from, well, doing hard things.

Advanced math is tough. Students will struggle when it comes to new math challenges. But that's what we want. The productive struggle is where the magic happens. It's where students test their limits and discover something new. Once doing hard things becomes commonplace, the future is truly limitless.

And here's the kicker: Challenges engage. With the right amount of challenge, math is not only motivating and creative — it's extremely fun.

So how do you maintain the right level of challenge for your student to stay engaged? It can be helpful to use tools that track engagement and activity metrics (not just test scores). We've built those tools into Beast Academy and AoPS Online.

Finding a Math Community

The world of advanced math can often seem out of reach. Accessing it can feel intimidating, exclusive, expensive, and more. From curriculum options to math clubs and online communities to the contest space, a STEM student's journey is multi-faceted, non-linear, and wholly individual.

With so many pathways, offshoots, and tangents, it can be hard to know 1) what options exist out there for your child, based on their interests, and 2) how to best access those options.

Maybe your student is inspired by math, but hasn't met other kids who share that passion. We hear this story a lot

from students who find a home in our AoPS Online community. In class and out, these students meet like-minded peers and mentors — connections that often deepen into life-long friendships.

Maybe your child has been pursuing math for a while, but is ready to step it up a level. There's an entire mathematical universe out there to discover — from discrete math to contest math and beyond. One of our favorite things to see is students' eyes catching fire when we open that door.

At AoPS, we try to provide a greater awareness and understanding of these STEM communities, as well as the various onramps to get there.

I invite you to check out our advanced math communities and resources at aops.com, our elementary program at beastacademy.com, and beastmath.org — a free program that helps underserved students access advanced mathematics.

Find more information about the author of this article here

Gluten Free Cream Puffs

From the kitchen of Samantha Matalone Cook

Since it's my birthday month, I'd love to share with you one of my favorite dessert recipes: gluten free cream puffs. They are so fancy, yet so easy to make!

I have some very strong, wonderful memories associated with these delicious little treats, so when I thought I couldn't have them anymore, I set out to try all the recipes I could find and figure out how to include them in my rotation of desserts again. I'm celiac, so I've adapted a combination of regular cream puff recipes until I found just the right combination that worked for me. You could use regular flour instead and they turn out fine.

For those of you who are interested in history, here's the short story pieced together: Experimentation with puff pastries was already popular in the Middle Ages and on into the Renaissance. Food history mythology claims that the distinctive cream puff, or profiterole, appears to have emerged in Europe around 1540 or so, created by Catherine de Medici's pastry chef for her and her husband, Henry II of France. Regardless, various types of pastries, including choux pastry, continued to evolve through the 17th and 18th centuries. By the 19th century, each variety of pastries had their own fan following, including the cream puff, or profiterole. Cream puffs made their way to the United States around 1880.

Cream puffs are made from two parts: the Pâte á Choux shell and the filling. The recipe below calls for a sweet filling, but I've also use savory fillings (such as sautéed mushrooms in gravy). Cream puffs are worth every effort- I hope you enjoy them as much as my family and I do!

PÂTE Á CHOUX:

Ingredients

- 1 cup Gluten Free Flour (I get amazing results with Manhattan Blend GF Pastry Flour by Orly- you can find it on Amazon.)
- Add ½ teaspoon Xantham Gum if you choose a flour blend that doesn't include it.
- Pinch of salt
- 1 tsp baking powder
- 1 cup water
- ½ cup unsalted butter, cut up into small cubes
- 4 large eggs (5 eggs if you live at high altitude like me!)

Instructions

1. Preheat the oven to 400 degrees F.
2. Mix together dry ingredients (flour, salt, baking powder). Set aside.
3. In a sauce pan, bring the water and butter to a boil, until the butter is melted. Add dry ingredients all at once and stir with a wooden spoon until the ingredients are completely mixed into a ball of dough.
4. Place the dough into a stand mixer with a paddle attachment, or if you don't have one, use a mixing bowl and a spatula. Turn the mixer on medium and beat the dough for a few minutes until it cools down. (You don't want the hot dough to cook the eggs you are about to add!)
5. Leave the mixer on medium speed and add one egg at a time. Let the egg completely mix in before you add another. It will look like the dough is slimy and coming apart each time you add an egg, but let it mix until it the dough comes back together again. Repeat until all the eggs have been added and the dough is smooth.
6. Use a cookie scoop or a spoon to place a drop of dough (2-3 Tablespoons worth) on a baking sheet lined with parchment paper. Leave 2-3 inches between each Pâte á Choux puff. Smooth out the tops of your puffs, using your finger and a little bit of water if needed.
7. Bake in the 400-degree F preheated oven for about 30 minutes, until golden brown. Turn off the oven, open the door a few inches, and leave the puffs in the oven until it has cooled completely.

FILLING

Ingredients:

- 1 pint heavy whipping cream
- 2-4 Tablespoons of sugar (depending on preference of sweetness)
- 1 teaspoon vanilla extract
- 1 cup of powdered sugar
- Optional: strawberries, mini chocolate chips

Instructions:

Pour the heavy whipping cream, sugar, and vanilla into a mixing bowl and blend with a hand mixer until whipped cream is formed. You want thick, stiff peaks! Mix in mini chocolate chips or strawberries if desired.

Putting it all together:

1. Take the completely cooled Pâte á Choux puffs and cut them evenly in half. Drop a spoonful of filling in between each half- you can put more or less filling depending on your preference.
2. Put the halves back together with the filling in between and sprinkle powdered sugar on top.
3. Serve and enjoy!

Find more information about the author of this article here

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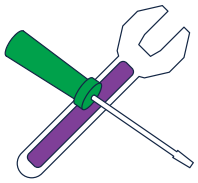
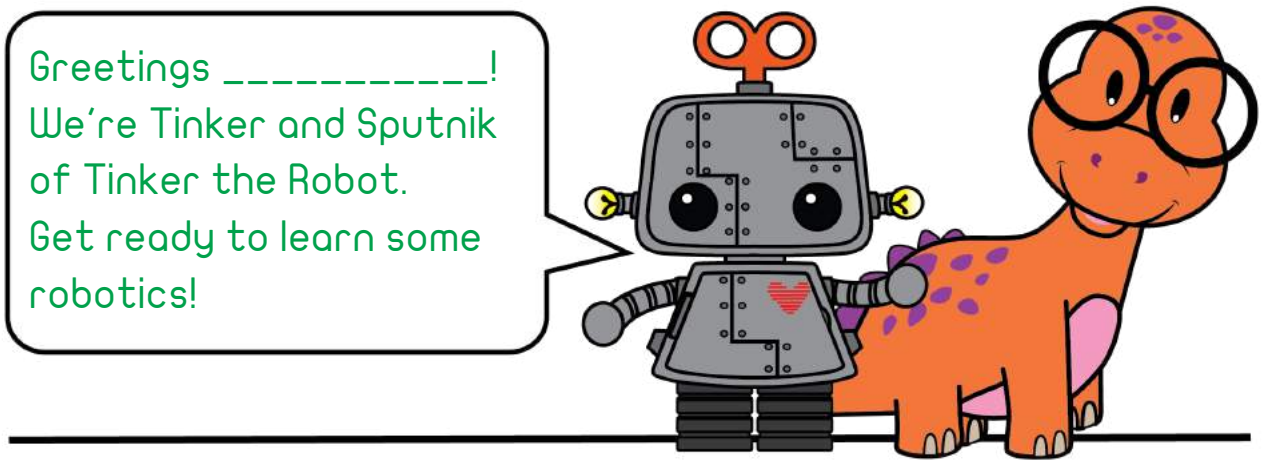


ROBOT DISSECTION



WHAT IS A ROBOT?

A robot combines mechanical components, electronics, and programming to help us perform a task.

Robotics uses

- ☐ Mechanical Engineering
- ☐ Electrical Engineering
- ☐ Computer Programming

SUPPLIES

Supply suggestions. We welcome you to substitute or add supplies. :)

- ☐ Something fun to take apart
- ☐ Screwdriver
- ☐ Empty Table or floor

WHAT IS A ROBOT DISSECTION?

A Robot Dissection is when a robot or an electromechanical item is taken apart. It is a fantastic way to explore mechanical and electrical engineering.

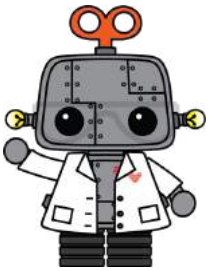
HOW TO USE

1. Download and print the lesson plan
2. Find an item you feel comfortable taking apart (we recommend getting an item from a second hand store)
3. Pick a level on the lesson plan page
4. Review the Robot Fundamentals page
5. Turn off, unplug, and remove batteries from your item
6. Carefully take apart your item
7. Have fun!

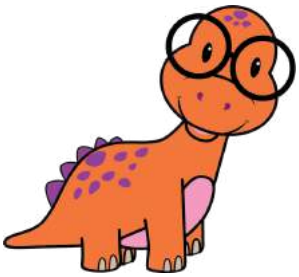
Have some questions?
email - kay@tinkertherobot.com
Want to build your own robot?
Check out our Robot Build Series at
tinkertherobot.com

TINKER THE ROBOT

Name | Date



ROBOT DISSECTION LESSON PLAN



There are several ways to turn a dissection into a learning opportunity. This is a rough guide.
**SAFETY ** Please make sure all electronics are unplugged, batteries removed, and turned off before beginning any dissections. All dissections need to be supervised by an adult.

Level 1 - Robot Dissection - Ideal for all Ages

- [ ] Remove components
- [ ] Lay out all components an a table or the floor for a picture
- [ ] Put your robot back together (extra points if your items still works!)

Level 2 - Identify Components - Ideal for Ages 12 +

- [ ] Identify the type of component it is - Mechanical or Electrical
- [ ] Identify the component
- [ ] Write a blurb about what you think the component does

Level 3 - Hack & Improve - Ideal for Ages 15 +

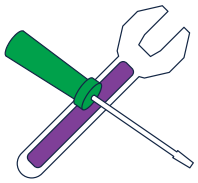
- [ ] Brainstorm ways to modify and improve the product
- [ ] Research how to implement your modification - Check out Instructables for help

Need some help getting started?
ficitv has an amazing resource page where they have done several robot dissections
Everything from a Nintendo Wii to a Sphero
fictiv Teardown - https://www.fictiv.com/teardowns

TINKER THE ROBOT

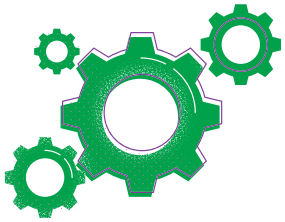
- [ ] Take a picture of this sheet to submit as a work sample

Name | Date



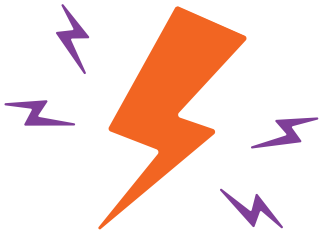
ROBOT FUNDAMENTALS

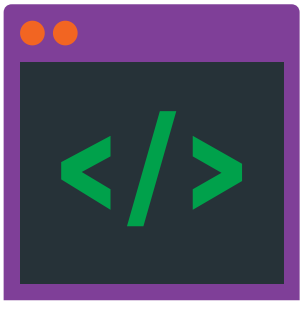
Robotics combines mechanical components, electronics, and programming to help us perform a task. Robotics uses mechanical, electrical and computer programming to create an integrated robot.



The Mechanical Components are your plastic parts like your outer shells, buttons, keyboard, or mouse. They also include electromechanical components like motors.
Mechanical Engineers specialize in designing 3D parts in CAD (computer-aided design) and prototype using a 3D Printer.
To learn more try TinkerCAD - 3D Designs

The Electrical Components consist of your sensors, computer components, lights or displays.
Electrical Engineers design and prototype electrical circuits that are used in all types of industries ranging from toys, to cars, to spacecraft.
To learn more try TinkerCAD - Circuits





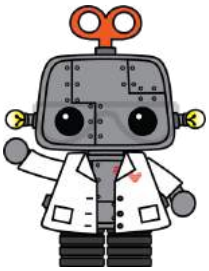
The Programming (not covered in a dissection) or code tells your robot how to react to the environment. This is the code that you write or the directions you send your robot and is stored in its computer.
Programmers write code behind robots, apps, websites, and more!
To learn more try code.org

TINKER THE ROBOT

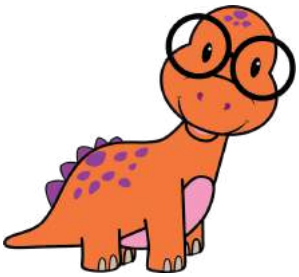
Have some questions?
email - kay@tinkertherobot.com

Name

Date



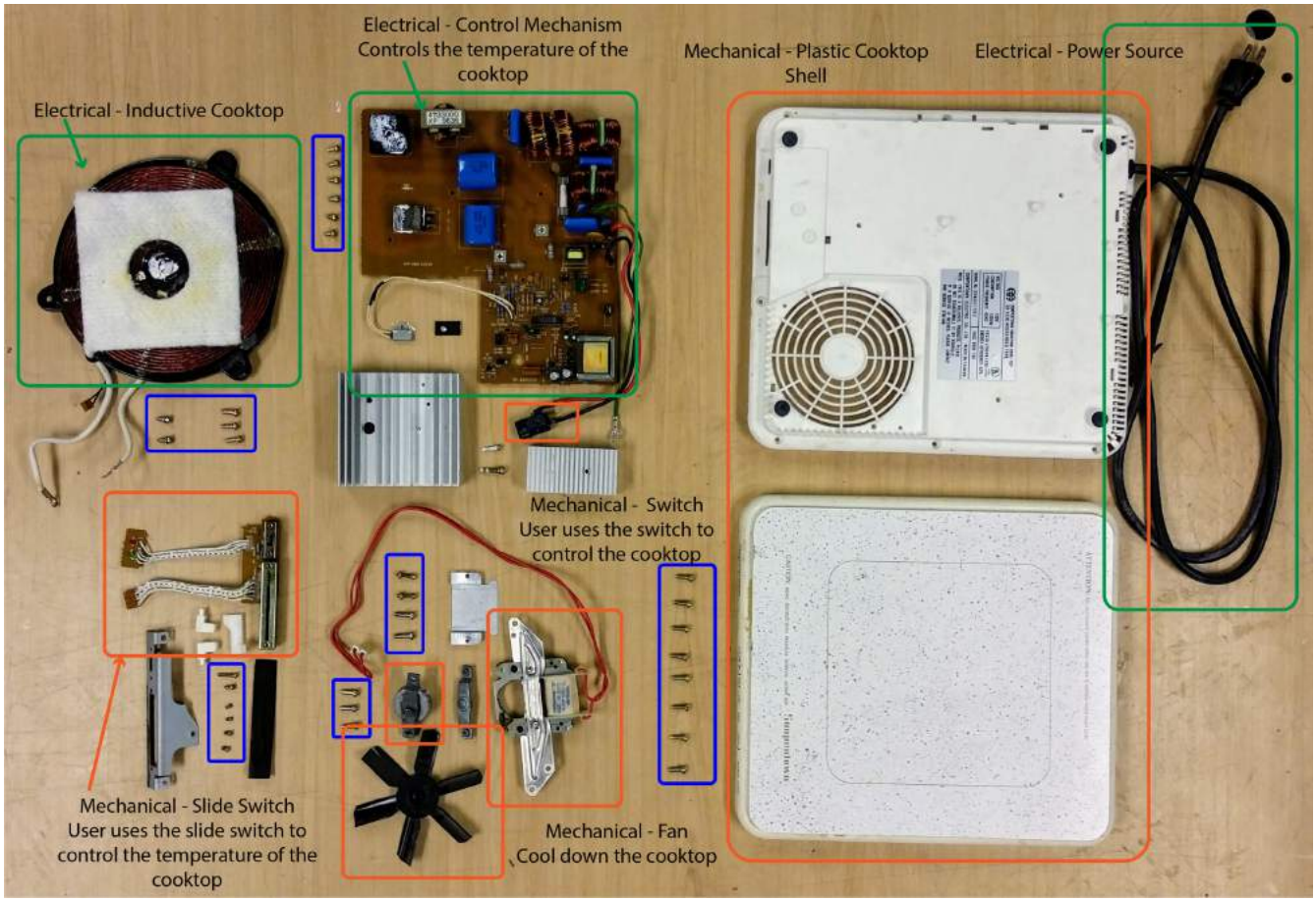
SAMPLE ROBOT DISSECTION



As an example, an induction cooktop dissected.

Part 1 - Remove all components, Lay items on a table & Take a Picture

Part 2 - Identify the type of component (Mechanical or Electrical or fasteners), Identify the Component



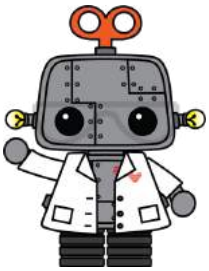
Part 3 - Hack & Improve

TINKER THE ROBOT

Have some questions?
email - kay@tinkertherobot.com

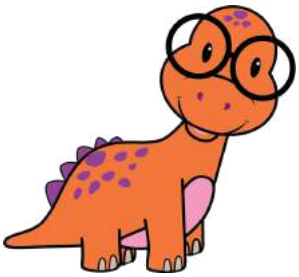
Name

Date



ROBOT DISSECTION

Use this sheet to submit a work sample to your teacher



WHAT DID YOU DISSECT?

What did you dissect?

Why did you pick this item?

PROJECT DETAILS

What did you do in the project?

What did you learn?

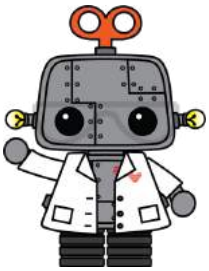
NOTES

PICTURE OF BUILD

Take a picture of this sheet to submit as a work sample

Name

Date



ROBOT DISSECTION

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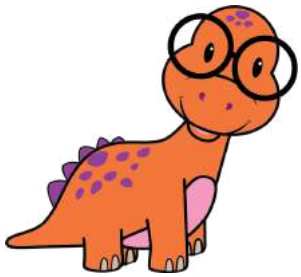

WHAT DID YOU DISSECT?

What did you dissect? _____

Why did you pick this item? _____

PROJECT DETAILS

PICTURE OF BUILD

Take a picture of this sheet to submit as a work sample

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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.

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*

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.