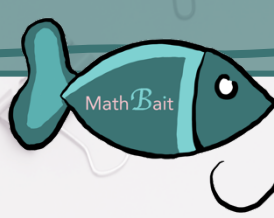


MATHBAIT® HOOKED



UPSIDE UP LOGIC

INTRODUCTION TO SYMBOLIC LOGIC

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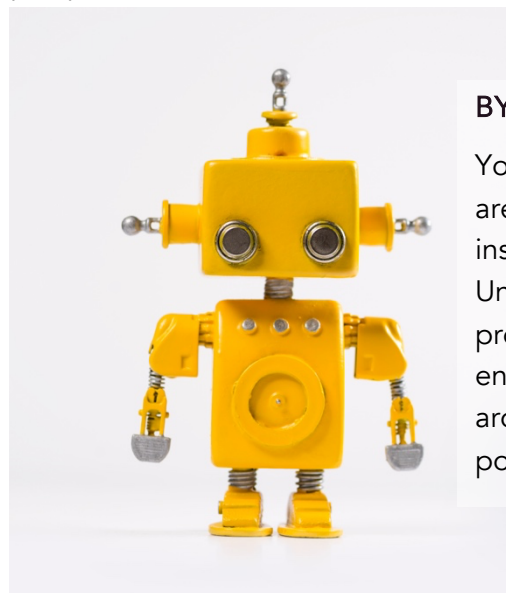
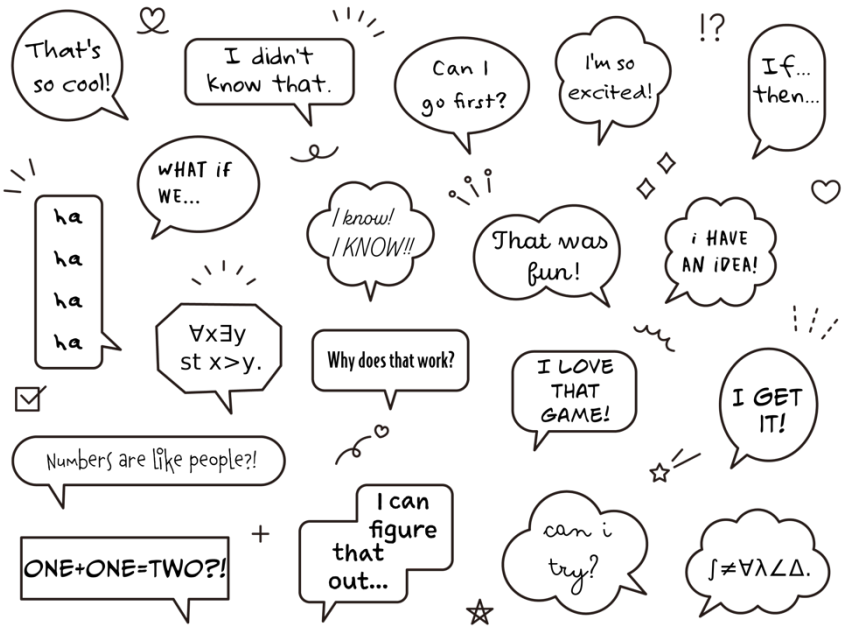
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METHODOLOGIES

At MathBait®, we believe math should make sense! Our courses are designed to help your student find the beauty in numbers, sharpen their logic skills, and explore new and interesting topics through storytelling, games, and lots and lots of laughter.

Math is everywhere, from the petals on a flower to the architecture of a building to the intricacies of space. Understanding numbers allows us to strengthen the connections in our brains to solve tomorrow's toughest problems.

Our unique courses do not use traditional methods. Instead, we used research-backed methodology, rooted in cognitive science (how the brain works and how humans best learn) to help students relate mathematical concepts and structures to their everyday lives. We'll find number besties based on what two numbers have in common. We'll command our armies to points on the battlefield. We'll see how math is simply a tool to describe things we already know and understand and, in the process, improve enjoyment, retention, and comprehension. We will provide your student with the key to unlock the universe allowing them to soar in both traditional problems as well as novel and interesting situations and empowering students to find joy, beauty, and utility in mathematics all through a simple change in perspective.

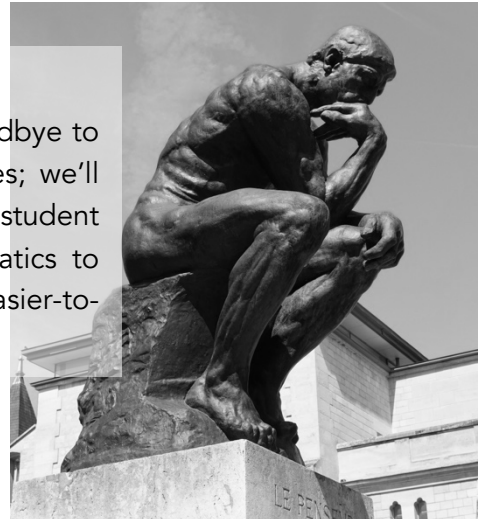


BYE-BYE ROBOT!

Your child won't be memorizing formulas or algorithms. We aren't interested in creating human-robots! Our goal is to inspire the next generation of thinkers and problem-solvers. Unlike other programs that encourage following steps and procedures, with MathBait® your child will enter an enchanted door enabling them to see mathematics all around. They'll use their own experiences to uncover the power of numbers and make sense of complex ideas.

[INSERT YOUR NAME]'S THEOREM

That's not Pythagoras' theorem – it's mine! Say goodbye to blindly accepting mathematical properties and rules; we'll use relationships, patterns, and play to help your student discover their own theorems as they use mathematics to describe our complex universe in simpler and easier-to-understand terms.

**STUDENT LEADERS**

Never the “sage on stage”, our instructor will provide prompts, leading questions, activities, and thought experiments to help guide your child to their own discoveries. We consider a class most successful when students have more talk time than the instructor. Come ready to participate and share your ideas! We strive to create a safe and welcoming environment where mistakes are encouraged (how else are we supposed to learn?), every idea is a good idea, and students drive our exploration down untraveled paths.

SMALL GROUP PHILOSOPHY

Small groups are optimal for learning. While larger classes are the most profitable, we place learning at the forefront as we strive to create the ideal learning experience. Our classes are limited to 8 students* allowing each child space to grow and share their thoughts, while also providing the opportunity for peer-to-peer interaction and multiple perspectives.

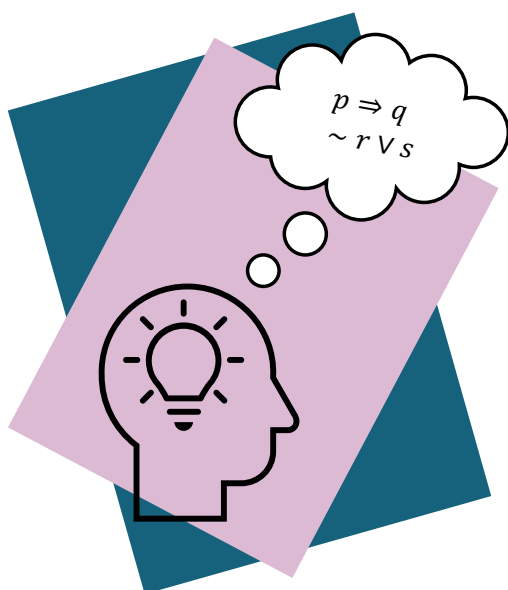
However, this means space is limited! Make sure to secure your spot early.

* Some exceptions may be made for homeschool co-ops and siblings.

Logic is a crucial skill, important for not only a variety of careers, but also everyday life; doctors use differential diagnoses to determine what steps they will take, lawyers rely on logic to build a case, mechanics apply logical skills to find the cause of the problem. In *Upside Up Logic*, we'll explore challenging university-level logic in a fun and lighthearted way through games, mysteries, and challenges. Warning! You might be surprised when your student provides an excellent argument next time you say "no".

UPSIDE UP LOGIC

SYMBOLIC LOGIC

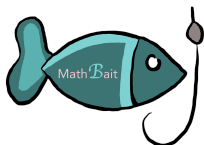


	Prerequisites	Fluency in four operations
	Reading Age	N/A
	Length	5/10/12 weeks
	Weekly Class Time	1.5 hours
	Weekly Dedication	3 Hours
	Books	Symbolic Logic by Lewis Carroll (optional)
	Maximum Class Size	8
	Skills	Truth Tables Quantifiers Conjunctions Disjunctions Conditionals Set Theory

Upside Up Logic covers topics traditionally not introduced until a college level math or philosophy course. We focus on building an intuitive understanding of conditional statements, disjunctions, and conjunctions before moving on to using these concepts to solve mysteries or make valid and sound arguments with techniques such as Modus Ponens. We then extend our understanding to quantifiers and set theory to explore union, intersection, difference, and complements of sets.

Upon completion of the course, students will have developed a strong familiarity with basic propositions, translating English to symbolic logic, and the ability to manipulate statements into new forms. They will be able to identify and utilize argument types and extend their understanding to other areas of mathematics.

This course is excellent for students who are interested in logic, enjoy playing games, preparing for a proof-based geometry course, or preparing for standardized testing.



Upside Up Logic focuses on the following course objectives:

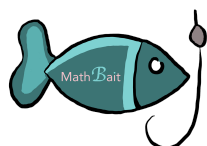
- Determine the truth values of propositions
- Generate a truth table for conditional statements
- Explain when a conditional statement is true or false
- Understand negations and their impact on the truth value of a statement
- Generate truth tables for converse, inverse, and contrapositive statements
- Determine if two statements are logically equivalent
- Prove the equivalence of statements
- Generate a truth table for conjunctions and disjunctions
- Apply logic to solve mysteries or determine truth in a list of statements
- Prove the validity of argument types and rules of inference
- Utilize common argument types (Modus Ponens, Modus Tollens, Hypothetical Syllogism etc.) to prove a statement
- Examine statements involving quantifiers (e.g., all men are mortal) and determine validity
- Complete proofs using quantified statements (Specifically Lewis Carroll puzzles)
- Connect logical operations to Set Theory
- Identify the Union, Intersection, Difference, and Complement of Sets
- Create and analyze sets

Although we will be tackling challenging concepts, the course will focus on the use of games to develop an intuitive understanding. We will examine the logic used in *Alice in Wonderland* and play games such as SET to build understanding and fluency in a relatable way.



5 WEEK SUMMER	10 WEEK WINTER	12 WEEK FALL	TOPICS
WEEK 1	WEEK 1	WEEK 1	Two Truths and a Lie Get to each other, the course, and what logic is.
	WEEK 2	WEEK 2	Propositions and Truth Values Determining the truth value of a statement
WEEK 2		WEEK 3	If I eat my dinner, then I can have dessert Conditional Statements
	WEEK 3	WEEK 4	That's Not, Not true... Negations & Truth Tables
WEEK 3	WEEK 4	WEEK 5	Soup or Salad, I want both Conjunctions and Disjunctions
	WEEK 5	WEEK 6	Solving a Mystery Using logic to make conclusions
	WEEK 6	WEEK 7	I'll apologize only if you do first! Equivalent Statements
WEEK 4		WEEK 8	Who's a Liar? Knight and Knave Puzzles
	WEEK 7	WEEK 9	Lewis Carroll Puzzles Logical conclusions using quantifiers
WEEK 4	WEEK 8	WEEK 10	Let's Argue Rules of Inference
	WEEK 9	WEEK 11	No Bullies! Affine Geometry
WEEK 5	WEEK 10	WEEK 12	Ultimate Victory A Game of Wits and Skills

Please note, the 5-week course is accelerated. This is ideal for students with previous exposure to logic or self-directed learners willing to spend time in the online platform outside of live class time.



Our courses are designed in a three-tiered structure:

- I. The Preview
- II. The Exploration
- III. The Expansion

THE PREVIEW

Students begin through self-exploration and discovery. They will be provided with a mission for the week (available in our online platform). Missions are a mix of text, images, and digital activities and exploration.

The Preview is akin to watching a movie trailer. Students are not expected to know the entire plot, have an intimate understanding of the characters, or know how the movie will end. The goal is to provide a sneak peek and prime their brains for our exploration.

THE EXPLORATION

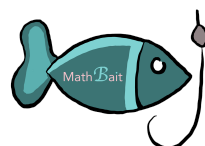
After completing their mission, students log in to our weekly live class. During this time, we explore the concepts introduced through activities and games. The goal of this time is to allow students to work together, to gain additional insight from the instructor, and to practice applications of the topics in new and novel ways.

THE EXPANSION

The final leg of the journey is the expansion. This is when students expand their understanding. Students will have additional games, challenges, and debriefs in the platform to continue practicing their skill and ultimately showing mastery.



Bonus! Your instructor will arrive 10 minutes early and stay 10 minutes after our formal class time! This time is optional and can be used to answer any additional questions, explore more deeply, or just chat and get to know each other! Our online platform also includes a discussion forum, to easily contact your instructor when you're stuck!



MathBait® courses are a mix of guided discovery, independent learning, and self-paced exploration which include a wealth of resources for your student.



GUIDED DISCOVERY

~8 to 18 hours of live instruction with an award-winning teacher facilitating student ideas and engagement



SELF-PACED EXPLORATION

Courses include access to our Learning Management System where students will engage in text-based missions, games and activities, knowledge checks, and debriefs.



INDEPENDENT LEARNING

Our secure server houses video recordings of each live class for student review or make up if a course is missed.



ONLINE FORUM

Within the online course, students have access to a discussion board, allowing them an additional platform to ask questions and work with their classmates.

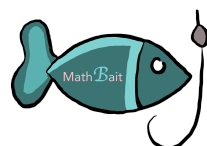


CERTIFICATE OF COMPLETION

All students will receive a certificate of completion indicating their participation along with documentation of course topics. Students who also complete all course challenges will win an award for their impressive accomplishment.

EARNING CREDIT

Any class (MathBait® or otherwise) cannot promise credit to a student regardless of accreditation or institution. Families must work with their school to negotiate whether the school will award credit for their MathBait® course. Parents may request a full transcript and/or a letter of recommendation to help facilitate this process. Certain states are more rigid than others. In the past, parents have received credit for their students as well as state resources (homeschooling and other educational funds) for MathBait® courses. However, this will vary widely based on location and institution.





Shayla Heavner is an award-winning teacher and author dedicated to improving mathematics education and fostering a love of mathematics in every student she interacts with.

EDUCATION

- ∞ Bachelor of Science in Mathematics – Indiana University
- ∞ Graduate Certificate in Mathematics – Indiana University
- ∞ Master of Science in Education – Johns Hopkins University

EXPERIENCE

Shayla has been a mathematics instructor and curriculum designer of mathematics courses for over 15 years. After working for the New York City School system, she became an upper-level mathematics professor at Indiana University teaching and designing some of the most notoriously difficult classes including Differential Equations, Abstract Algebra, and Computational Methods, among others. Wanting to inspire younger students, she moved to the Johns Hopkins Center for Talented Youth where she was awarded the prestigious Sarah D. Barder fellowship for excellence in teaching. Advancing to Mathematics Supervisor, Shayla designed and taught what would come to be the most popular programs for the institution including her Algebra II and Introduction to Logic and Proof courses. After being hired to lead the development of a brand new high-engagement curriculum, she realized full-time instructional design left out the best part of her job – the students! With the desire to get back into the classroom she began teaching for The Art of Problem Solving's virtual campus.

Inspired by her colleagues' reviews of her work, Shayla decided to take a leap and design her own unique mathematics program focusing on conceptual understanding, problem-solving, and enjoyment of learning. Her books have been sold all over the world, helping students to find the joy and power in math. She continues to teach for Indiana University, The Art of Problem Solving, and MathBait and loves the smiles, laughter, and aha moments each class brings.

Shayla is a certified online instructor.

I just love the
math class!

-AS, Age 11

She makes it
so much fun!

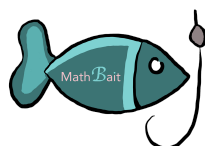
-Leela

10 out of 10!
Favorite class ever!

-Jameson

I love your class and the
way you teach! The classes
are interactive and fun,
and I feel like everything
sticks in my brain so well.

-N&S Kaur



My kid just loves the math class and looks forward to it. He especially enjoys the overall fun way of approaching math which doesn't make it boring. It's so fun that at times my younger kid also wants to sit in.

Krishna S.

We're very happy with the classes and the growth we've seen in our kids! They always get excited about class and look forward to it all week. I'm so happy they no longer see math as boring and even enjoy doing homework. Visually understanding graphs and equations through games in class has been so enlightening – as a parent, I also learned a lot from it!

Vinit K.

As a pediatrician of 20 years and a homeschool parent of 5 years, I've observed countless educational methodologies and curriculums, but Ms. Shayla's math program stands as a singular achievement in pedagogical innovation. Her unique fusion of logic, critical thinking, and joy has completely reshaped my children's relationship with math. Shayla has transformed math from a dreaded subject to an eagerly anticipated adventure in our household, proving that deep conceptual understanding and genuine enthusiasm aren't mutually exclusive in childhood education.

Archana C.

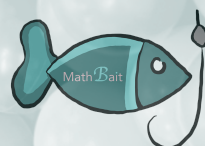
I can't recommend Shayla enough! My kids absolutely love her math classes – they look forward to them every week and always come out smiling, laughing, and having a great time. They even beg me to sign them up for more! But the best part is that they're actually learning so much.

Adriana R.

Thank you all so much!
It is such an honor to
work with such amazing
kiddos!

Absolutely amazing learning experience making math so much more interesting and fun, reinforcing, and expanding fundamentals and abstract thinking in very accessible ways.

Parent of upper elementary child



A MathBait® course is highly unique. Not only for our engaging strategies, but also our methodologies. Here are the answers to a few commonly asked questions.

WHY DO YOU USE STRANGE WORDS?

We'll admit, words like "besties", "Numberfolk", and even using DNA to describe prime numbers is highly unusual. While this is a part of MathBait® many students love, some students may find the transition more than a little strange.

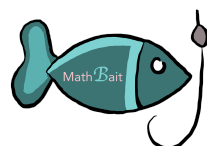
Our non-standard terminology is at the heart of our methodology. We do not approach mathematics through algorithms and processes, but rather through understanding the world around us. By using words students already have some familiarity with, they can quickly and more easily grasp the associated mathematical topic. For example, we ask students "if you meet someone new, what do you think will determine if they will be a fast friend?" While the answers differ, every student settles on the idea of commonality. Our lesson next extends this idea to help students see numbers can too have "besties" – friends in which they share a lot in common. This transforms a strange and foreign idea with varying jumbles of letters to represent it (sometimes it might be called GCD other times GCF) to something approachable and even intuitive.

WHY ARE SOME TOPICS MISSING?

While our courses as a whole cover the vast majority of topics included in traditional curricular material, our sequence often differs. For instance, a grade 6 standard is to solve equations in the form $x + p = q$ and $px = q$, while in grade 7 students are expected to solve equations in the form $px + q = r$ and $p(x + q) = r$. In grade 8, students are then introduced to functions in these forms.

This disjoint sequence fails to allow students to see the connection between all forms of linear equations, or to develop a clear foundational understanding, as there is often a year or more between the two standards. Our Prealgebra curriculum instead introduces students to all forms of linear equations, allowing them to recognize the patterns and understand the impact of multiplication and addition more easily and more intuitively.

Similarly, rather than provide students with handfuls of geometry and graphing, we introduce these ideas where they make the most sense. Our algebra curriculum begins with an introduction to Cartesian coordinates and functions, building an understanding of how to move objects on the plane. Rather than teaching each type of function in a silo (linear, quadratic, polynomial, rational, radical, sinusoidal etc.), we help students to build an intuitive understanding of all functions, which they can then apply to any and all functional graphs. Where a traditional



curriculum builds floor by floor, we build the “bones” of the entire structure to ensure a solid foundation.

Finally, our geometry curriculum is notably different as we do not simply teach Euclidean (or flat plane) geometry. Although traditional to introduce concepts like the Pythagorean Theorem in early grades, we have found this actually severely limits student understanding. These common theorems only apply to an area with no curvature. As we live on a sphere, we believe it is important to help students see the “big picture”. MathBait® geometry heavily focuses on the standard Euclidean view, but also provides insight into geometry on a sphere as well as hyperbolic geometry. For students continuing to courses like calculus, this view is greatly helpful as they will tackle concepts like hyperbolic sine and cosine.

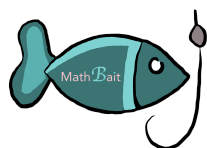
Thus, while our sequence may differ from other curricular material, our scope is akin to standard courses and in many instances much wider as we also include spherical and hyperbolic geometry, abstract algebra, number theory, and college-level logic throughout our content. Currently, the only topic not covered in the MathBait® progression is Statistics.

WHY DON'T YOU INCLUDE DUE DATES?

While due dates are helpful in keeping students on track and building executive functioning skills, our goal is to help students master mathematical concepts and build their frontal lobe connections through creative problem solving.

A due date forces a student to complete a task at a specific time regardless of their readiness. We want all students to be successful. Some students will work quickly through topic A and need more time to truly master topic B, while others will be the exact opposite. Our recommendation is for students to complete their knowledge checks and debriefs when they feel ready and prepared.

However, we do ask students complete their preparation work before our live classes and ask students and parents to work together on a schedule that makes sense for them. Students may use the calendar in our online platform to add their own “due dates”, reminders, and goals.



MODALITY

Our sessions will occur in Zoom. Once registered, parents will receive a welcome packet with information on how to join.

USE OF IMAGES

Each class will be recorded and posted to our Learning Management System. Only students in your child's class will have access to this platform. The purpose of this is to provide students with an additional resource to review classes or to catch up on missed classes as well as for MathBait® to evaluate and improve our live courses.

CANCELLATIONS

Due to the group nature of our summer programs, rescheduling is not possible. Parents may cancel or drop a class with more than 14 days' notice for a partial refund (full refund – fees incurred through payment and refund processing). If a student must miss a session, they can review the video recording as well as the additional information posted on our class page.

In the event of an emergency or sickness of the instructor, parents will be notified as soon as possible. We will attempt to schedule a substitute instructor. If our substitutes are unavailable, a video lesson will be provided for students to complete the week asynchronously with access to their instructor for help and questions.

LEARNING MANAGEMENT SYSTEM

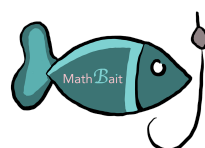
Upon enrollment, students will be added to our Learning Management System. This is a private class, only available to registered students. Here they will find additional information, games, and activities, as well as class recordings. As part of their welcome packet, parents will receive instructions on setting up this account.

DIRECT NOTICE

We value the privacy of our users and adhere to the Children's Online Privacy and Protection Act (COPPA). This notice describes our practices of collecting, using, and disclosing personal information for children under the age of 13. In using our platform, we must collect certain information from your child in order for us to provide high-quality services.

PROVIDING CONSENT

We need your consent before we create your student an account for a child under the age of 13. By enrolling your student and providing payment for class, parents are providing consent to allowing MathBait® to collect, use, and/or disclose relevant information about your child for



the purpose of fulfillment of your child's registration for the relevant course your child is enrolled. As part of the registration process, you will be prompted to accept our site terms and policies on behalf of your child.

WHAT INFORMATION DO WE COLLECT?

By enrolling in a MathBait® course we require:

Parent Full Name and Email Address

Student Name

As your student interacts in the online classroom and our live sessions we will collect:

IP Address

Cookies

Audio and video of your child's participation in live sessions

Areas of our Learning Management System include space for your child to express themselves such as the "Description" and "Notes" in their profile. This information is for the child's personal reference only and is never shared with third-parties or other users

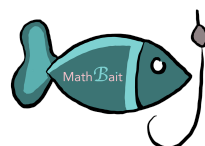
In live events, students will have access to chat with an educator and other students. Our live events are organized over Zoom which provide the host with the ability to monitor communications. Your child may provide information about themselves to the educator.

If your child contacts us through email, or by telephone, we may collect your child's name, username, email address, phone number, physical address, and any other content your child chooses to provide to us. We will only use this data to provide the customer service as requested.

HOW DO WE USE THIS INFORMATION?

The information we collect is used solely to provide your student with an outstanding learning experience. Student username is used to login and access the educational content, IP information and Cookies are used to generate student and parent reports and to track student accomplishments, and Zoom recordings are used to provide students with reference material for their review.

Parent information is collected to contact you regarding any important information or updates to our platform or services as well as provide you with information that we believe would be of interest or benefit to you or your child.



Please note that your child's progress will be linked to Parent email address through our learning management system.

DISCLOSURE OF INFORMATION TO THIRD PARTIES

Except as stated in this Notice and our Privacy Policy, we do not share or sell your or your child's information. Parent emails are shared with a third-party (Mailer-Lite) in which we contract with in order to deliver our email communications. They are required to keep your parent information in strict confidence. ***We do not sell your information for any purpose, and we do not exchange mailing lists with other organizations.***

