

COUNT~~≠~~D OUT

WE ARE MATHEMATICIANS

Kitchen Table (or Car Ride) Math for Families

Reimagin=Math

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In COUNTED OUT, we learn that many of us have a very limited idea of what math is. We learn that math isn't just arithmetic and numbers: it actually comprises a wide variety of complex, rich mental tasks, including reasoning, risk assessment, modeling, pattern recognition, mapping and finding ways to prove that what we *think;' is true is actually true.

Use the below prompts at the breakfast or dinner table, or in other down-time moments with your children, such as when you're in the car or taking public transit. Not only are these conversations fun and challenging; they're also ways to gain insight into your child's thought processes, observations and ways of seeing the world.

1. Make a family plan.

This activity can be applied to all kinds of family plans, but let's start with a universal one: discussing what chores need to be done in your household and how best to get them done.

This exercise, and others like it, helps your kids develop skills in optimization, spatial relations, **and geometry**.

First, ask your child to draw a map or floor plan of your home or property, with labels indicating the tasks that need to get done in each part. Now discuss: how much time do each of these tasks take? At what frequency should they be done? Who in your household should do each chore, considering each person's strength, height, skill, safety and preferences? Do chores need to be divided equally, or will some people do more?

There are countless ways to divide up the work, but challenge your child to come up with 3 or 4 non-negotiable criteria that must be met to reach the goal of keeping a tidy and clean home. Then ask your child(ren) to present the best plan. Does it meet the criteria? Is it actionable and realistic given constraints of time and physical ability? What makes it the optimal chore plan--and how can they prove it?

When you're done with your chore plan, you can introduce other optimization problems, like the best way to mow the lawn, best times to feed or walk the dog, or best way to manage bathroom traffic before school.

2. Fix a parent mistake.

There are virtually unlimited variations on this discussion, which builds **error analysis** skills and helps kids practice the **growth mindset**. And kids will love finding out where their parents went wrong!

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Start by picking an everyday household problem you tried to solve--and messed up. Maybe you didn't make enough spaghetti for dinner, and no one got seconds. Or maybe you were late to pick up a child from school. Did you miss your bus to work? Or run out of cat food or toilet paper?

Ask your kids to help you figure out what happened. How did you try to solve the problem? Were your assumptions incorrect? Did you make a computation error? Or did you make a correct calculation based on static or irrelevant data, rather than by taking into account dynamic conditions? Ask your children to find where you erred, and how they'd fix your mistake.

The idea is not to belabor faults, but to normalize them, making your kids comfortable with talking about errors, and seeing that making mistakes and fixing them is actually **part** of doing--and getting better at--math.

3. Talk about a looming choice.

This conversation, and others like it, introduces skills of risk analysis, probabilistic thinking, and confidence intervals.

Start by prompting a discussion about a choice or decision that your child is facing. Maybe it's whether or not he will get a radically new haircut, whether she will play soccer next season, or whether or not she'll spend \$5 on a new toy right now, or save the money for a more expensive item later.

Once you've settled on a looming decision, ask your child to consider the possible risks of deciding "yes." Are they big or small? Are they possible (they could happen) or probable (they are likely to happen)? How confident is your child that the risk will manifest? Now ask them to think about the rewards of making that decision. Are those rewards possible or probable?

Next, challenge your child to think of multiple other pathways, aside from a simple "yes" or "no" decision. Do some of these pathways minimize risk while maximizing reward?

Now complicate the decision further. Are the risks of making a specific choice 1) in your child's control, 2) totally up to chance or 3) both. Would your child rather make a decision with an outcome they can control? Or an outcome that is more vulnerable to chance? Why?