



# The Seven Biggest Mistakes Made in Teaching Science... *and What to Do About Them*

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Did you have a teacher that really had an impact on you? Remember the excitement? Or the thrill you felt when you taught something to someone else and they really *got* it?

First, let me *thank you* for your commitment to education – a value that is high enough for you that you are stretching for resources to help you reach your goals.

In this article, I am going to share with you some of the common mistakes that educators often make. If you've fallen prey to one or more of these, it simply means that no one told you about them yet. Once you know, you can then focus on solutions. Or, perhaps you'll find that you are already on track, and this may reaffirm that you are headed in the right direction. Are you ready? Let's begin.

## Mistake #1. Failure to make an impact.

In today's world, we're so inundated with information that in order to really teach something new, you need to get someone's attention. Think about food commercials. Advertisers first focus on getting you hooked, catching your eye – before they ever deliver their real message. And that's what you need to do when teaching science.

You've got stack the deck with things that inspire natural curiosity. Hand them a bucket and ask them to tilt it completely sideways without a single drop of water coming out. (When you hand them the bucket, don't touch the handle. Just hand it over from the bottom. Let them make that jump themselves.)

How do you know when you're doing this right? You know you've made an impact when your kid's entire body says, "WOW!", complete with the eye bulge, slack-jaw, blank stare that accompany this universal state of brain-pretzel. So how do you do *that*?

Easy. Just do the opposite of what they currently expect from you. If you're as neat as a pin, slosh a bit of water on the floor while slinging a bucketful around your head, asking them what they know about g-force and physics. If you're shy about electricity, poke a paperclip and a penny into a juicy lemon and ask them to stick their tongue on both contacts, because you're not sure what will happen.

Get and do things that are different enough to get their brain pumping and to put the fun back into it for you, too.

If you're planning to demonstrate the reaction of baking soda and vinegar (which produces carbon dioxide gas, the same stuff you exhale), first ask your kid, "Have you ever burped before?"

## Mistake #2. Give away the ending.

How often in textbooks or classrooms have you seen this one? Every detail in the project is outlined step-by-step, leaving no room for questions, speculation, or new ideas. No scientist in their right mind will design, set up, and execute a scientific experiment if they already know the ending!

This mistake often has the undertone of being in a rush. Learning takes time, and it needs to go through different stages to make a lasting impression. Just as a farmer can't plant crops too late in the season, then try to rush them to grow, certain aspects of learning takes time.

For real learning that lasts, your child needs to focus on activities that allow the natural process of discovery, wonder, and exploration. During this process, questions formulate, ideas flow, and true learning takes place from the inside out. Short-cutting this process (by outlining exactly what to do and how to do it) will kill your child's passion for *science*, which is defined as "the effort to discover and understand how the physical world works".

When a kid asks, "Do you think this will work?" remember that it's just a test. What they're really asking is, "Can I try it?" To which you can confidently answer, "I don't know. Try it!"

To continue our example of the baking-soda-and-vinegar reaction: After you've asked your child about burping, show them the chemical reaction and ask them about the bubbles they see rising out of the cup. (Solid, liquid, or gas?) Then casually ask, "What if we do this again, but this time put the lid on?"

## Mistake #3. No space for the job.

Once your child excited enough about something that they want to take it and run, your next task is to give them what they need!

Now, kids need their own space. However, parents worldwide go crazy with the pack-rat syndrome kids seems to have. Here's a solution to make both parties happy.

In a corner, set up a table that's all theirs. No touching. This is for two important reasons: first, it's a lesson in organization waiting to happen. When they whine to you that they can't find something, you can honestly shrug and say with empathy, "Gosh, I haven't seen it – it's not my space. What are you going to do?" The second reason is more subtle, but even more important. How safe will your kid feel discovering and exploring, creating and building if you whirlwind through there every so often and *clean it up*?

Make sure this kid-zone has boundaries, or it will take over your house. For instance, throw down a rug under the table. Now, anything that floats off the rug is yours to keep. And when company comes over, the flowery tablecloth goes over the whole shebang.

To continue with our chemistry lesson example, tell your kid to explore this idea *outside*.

#### Mistake #4. Withholding the tools.

So often, we believe that by reading lots of books filled packed with knowledge, we will instantly understand everything and get a *real* education.

While this may work for other subjects, science is one that needs tools, equipment, and space. This is the one subject where books are not only a source of inspiration, but can also be used as stepstools, ramps, inclined planes, tunnels, weights, and platforms.

Remember the table you're setting up? Great families stash three baskets underneath. Let's peek inside:

- Basket 1. *Materials*. paper, rubber bands, straws, string, paper clips, brass fasteners, balloons, popsicle sticks (two different sizes), index cards, skewers, and clothespins.
- Basket 2. *Tools*. Clear, masking, duct, electrical, and packing tape. Stapler, hole punch, (low-temp) hot glue gun, and scissors.
- Basket 3. *Clean Junk*. Water bottles, berry baskets, soda bottles, six-pack ring holders, packing foam (big pieces are great), film canisters, egg cartons, soup cans, milk jug tops, yogurt lids, butter tubs, and coffee tins.

Arm your table with these and stand back... *way back*. Your child will race in with excitement now that you've set up an environment what supports their freedom to create and build.

#### Mistake #5. Fear of making mistakes.

Honestly, now... when do you *learn* more? When you make mistakes, or when you get it right? And how many of us have a hard time letting our kids make mistakes?

Edison made thousands of mistakes before he invented the light bulb. Or did he? His "failures" resulted in the basis for the internal combustion engine, electrical wiring for your house, and hundreds of other things we use every day. Remember that you always get to choose what something means to you. You can choose to forget about it, or to learn from it.



When your young chemist is outside and accidentally spills the entire jug of vinegar into your full box of baking soda, just take a breath and say, "Gosh – I'll bet you didn't expect that to happen. Now what are you going to do?" Make sure you really feel empathy and interest for them, or they'll feel that, too.

#### Mistake #6. Having no acuity.

Have you ever had the experience of someone talking to you about something that you had absolutely no interest in whatsoever, but because you were so polite about it, they thought you *did*?

Or worse, you've been on the other side of that conversation, thinking someone was interested in what you had to say when they really *weren't*?

Kids feel the same way.

As a teacher, educator, coach, and guide, your job is not only to hook them, you need to be aware that kids are different, and not every one of them fits into your method of teaching. You need to be aware of how your child learns as well as what motivates them. Once you accomplish that, you've got the keys to getting them open and ready for your message.

Kids can be visual, auditory, kinesthetic, or digital learners. You can easily tell by asking them to describe something. If they use words like 'see', 'picture this, or 'look', then they're predominately visual. Words like 'hear' and 'listen' are most found in auditory learners (you'll also notice more tone inflections and temp changes in their actual voice).

Kinesthetic learners often describe what something *feels* like. Digital kids base their decisions entirely on logic.

What motivates your child? “Fire behind” kids need to know what would happen if they didn’t do something. “Fire in front” kids are motivated into action by painting a picture of how great things can be if they *do* take action. You probably know already which your kid fits into best.

Kids can also be predominately mis-matchers or matchers. Throw three quarters down and ask your kids what they see. Mis-matchers will find the one quarter that is different and tell you about it. Matchers will find everything they have in common, like the year, shininess, or all ‘tails’.

Knowing how your child processes how they see the world will give you the awareness on how to best set up their educational experience to fulfill their needs. Awareness is always the first step.

If you know your mis-matcher chemist is a fire-in-front kinesthetic learner, and just walked away from the mess he left on the back deck, then simply say, “Feel free to join us for ice cream after you’ve cleaned up what you’ve got going on out here.”



There’s nothing for them to mis-match (you’ve taken the power-struggle out by stating a fact, not a question), you painted a picture of the future (ice cream), and tapped into their kinesthetic senses (‘feel free’ and the image of the ice cream).

#### Mistake #7. Don’t link up new with old.

If you’ve ever tried to cram for a test, you know what happens the week afterwards... you can’t recall most of it! You spent all that time, effort, and energy memorizing, only to forget it shortly afterwards. Now why is that?

The only way the human brain ever learns anything is by relating something new with something you already know. It’s basic psychology. So how do you do that?

Your chemist decided to clean up the mess after all, and now he’s washing his hands before the ice cream is served. As he scrubs, he notices something interesting... dirty water goes down the drain, but clean water comes out of the faucet. What gives?

A lot of parents feel uncomfortable on this hot seat, only because they are still under the impression that they have to know all the answers.

Nothing could be further from the truth.

Your job is to ask questions, to get curious, and to model this for your child. Here’s how one parent handled this:

“Mom! Where does clean water come from?” he stamps out of the bathroom, eyes wide.

“Hmmm... tell me more.” Mom stalls for time as she racks her brain on how to explain activated carbon and water filtration to a six year old.

“Well, dirty water goes down the drain, and clean water comes out. How come?”

“Well, have you ever seen me make pasta?”

“Yeah.”

“How do I get the pasta out of the water when it’s done?” Mom smiles.

Kid is thinking, what *is* that thing called? “A strainer!” he shouts with triumph.

“Yep. Now, can you imagine the holes being small enough to catch the dirt in the water? Good...” and off they go in a discussion of bugs, mud, and germs.

Mom related this new idea with something the young kid already had experience with. And you can, too.

#### **There you have it – the seven most common mistakes made when teaching science.**

In fact, these apply to many other subjects in their own way. Few of us ever had a class or mentor to teach us *how* to teach, or how to make the biggest impact on a child’s education.

Do whatever you have to in order to do it right. Read books, get online courses, find a mentor, get a good educational coach, and model a successful teacher.

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