

## **Egg Drop: The Science Behind Cracking Eggs**

**By Mindy Thomas**

<<scene opens at G-Force's diaper house as they await the arrival of Gramma G-Force coming home from gentleness training class – we hear meditation music playing and soft wind chimes tinkling in the living room>>

Guy Raz: Alright, just gonna turn these lamps on here.

<<click>>

Dennis: Ooo.

Mindy: Yeah, that looks good.

Guy Raz: And that should do it! Okay, Mindy, I think we've got the mood all set to welcome Gramma G-Force back home from her week of gentleness training.

Mindy: Wow, her diaper house has never felt this calm!

Cat: <<loud meow>>

Dennis: Yeahm even her cat landlord, Colonel Toots Thunderpaw, agrees! Don't you Colonel Toots?

Cat: <<loud hiss>>

Mindy: Okay, so let's see. Now what all did we do to make it feel so nice and calm in here? It's usually pretty chaotic!

Guy Raz: Well, for one, we replaced all of her flashing strobe lights with warm, soft, energy saving lightbulbs.

Dennis: Awe, I like the strobe lights.

Guy Raz: And then we painted the diaper walls a relaxing neutral color.

Mindy: Oooh, is that beige or gray?

Dennis: Actually, it's called greige. I picked it.

Guy Raz: And we also added some nature. You know, green plants and flowers.

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Mindy: Wow, they smell good.

Guy Raz: And speaking of smells, we also cleaned out Colonel Toots's litter box and put out a couple of essential oil diffusers.

Mindy: <<sniff>> Oooh, lavender!

Guy Raz: We also hung some chimes <<chimes sfx>> And we created this comfy little zen corner with a cozy floor cushion, perfect for her to sit in when she needs a place to calm down!

Mindy: So we made her a time-out corner?

Guy Raz: Yeah, I guess you could call it that.

Mindy: Well, I'd say we thought of everything, guy raz! It's gonna be impossible for Gramma G-Force to be anything but gentle when she comes home to her relaxing diaper house!

Dennis: Um, can anyone tell me why Gramma G-Force had to go to gentleness training in the first place?

Mindy: Oh yeah.

Guy Raz: Well, if I'm not mistaken, I think it had something to do with getting in trouble for taking a zamboni out of the ice arena

Mindy: And driving it through a construction site!

Dennis: Uh huh.

Guy Raz: She said the construction was in her way.

Dennis: Uh huh.

Mindy: Yeah, and she also drove the zamboni over a bunch of road signs while yelling, "Don't tell me what to do."

Dennis: Uh huh.

Guy Raz: So a judge ordered her to go to gentleness training to help her handle problems a little more, uh, gently.

Mindy: So in order to set her up for success, we decided to make her home a place where it's easier for her to feel calm and gentle!

Dennis: Alright! Well, I hope it works! I can see Gramma G-Force and Thomas Fingerling through the window right now!

G-Force: [outside/distant] Careful, now Fingerling. Easy does it.

Fingerling: [outside/distant] I know, I know. I got it.

Mindy: Woah, look how calm she looks? So light on her feet. She's barely even stomping on the pavement!

Guy Raz: It's almost like she doesn't want to hurt it or something.

Mindy: So gentle. So graceful. Like an old wrestling, hot pepper smacking, ballerina.

G-Force: <<outside>> NAow Fingerling, when we get to my diaper house, you're gonna give him a bath and i'm gonna sing him a song.

Fingerling: <<from outside>> Oh, I wanna sing him the song!

G-Force: <<from outside>> No!

Fingerling: <<from outside>> Okay, fine.

Guy Raz: Wait, it looks like she's holding something.

Mindy: What is that? Something wrapped in a tiny blanket?

Dennis: And tucked away in a tiny basket?

G-Force: [outside] Yer jostlin' him, Fingerling!

Fingerling: [outside] No, I ain't!

Guy Raz: Ooh, it looks like they're walking up to the house now!

<<knocking at the door>>

Guy Raz: Wait, why is Gramma G-Force knocking at her own door?

Mindy: I'll get it! Walk, walk, walk. Opening the door.

Dennis: Surprise!

Fingerling: Blagh! What in the world wide web?

Guy Raz: Dennis, no, this is not a surprise party!

Dennis: Oh.

Mindy: Gramma G-Force! Welcome home from gentleness training!

G-Force: Line!

Guy Raz: Uh, what?

Guy Raz, Gramma G-Force: I said, "Line," Fingerling!

Fingerling: Line, right! Let me check the gentleness training manual here. Uh, the line is, "Thank you. It is so lovely to see you."

G-Force: I do not want to say that.

Mindy: So, how was gentleness training, Gramma G-Force? Tell us everything!

Dennis: Yeah, did you learn how to not lay the smack down on innocent Dennis's by running them over with your shopping cart when you're mad at the sun for shining?

Guy Raz: Or how to not stomp on people's flower gardens when the tulips look too cheerful?

Mindy: Or how to not splash people walking through the mall when you're diving for coins in the fountain and stuffing them into your wrestling unitard even though security keeps asking you to please stop doing that because you're stealing people's wishes?

G-Force: No, no, and nooo!

Guy Raz/Mindy/Dennis: Oh!

G-Force: But what I did learn at gentleness school was how to not break a baby.

Guy Raz: Okay.

Fingerling: Gently show em' the baby, G-Force!

Mindy: Baby? What baby!?

Dennis: Is there a baby in the basket you're holding?

Mindy: Awe! I love babies! Lemme see! Lemme see! Lemme see!

G-Force: Gentle! He's sleeping even though his little googly eyes won't shut.

Guy Raz: What?

Fingerling: Here, let's just gently remove the little baby blanket a bit, so that you can take a look.

Guy Raz: Wait, the baby blanket is a pancake?

G-Force: Hush boy! You're gonna wake him up.

<<music box music starts playing>>

Fingerling: There he is. Awe, look at him.

Mindy: Awe! He is so cute, I could just scramble, I mean, snuggle him up!

G-Force: Do not do that.

Dennis: Awe, he's got your shell, Granny G!

G-Force: Why, yes, he does.

Mindy/Dennis/Reggie: <<cooing in unison>>

<<music box music cuts>>

Guy Raz: Uh, I'm sorry. Is that an egg?

G-Force: Not just any old egg, Guy Raz. This is Eggbert Benedict Cumberhatch the Third!

Fingerling: He's a wealthy baby.

Mindy: Ah, a prosperous family.

Dennis: Yeah, that sounds rich.

Mindy: Old money.

Dennis: Regal.

Guy Raz: Huh?

G-Force: He was born weighing one point seven five ounces and exactly five and a half centimeters long. I adopted him at gentleness school.

Dennis: Why?

Mindy: Awe! But also, why?

G-Force: I dunno. I was forced to do it.

Guy Raz: Wait a minute. I think I know the answer to this.

Mindy/Dennis/Fingerling/Reggie: You do?

Guy Raz: I do! This egg baby must have been given to Gramma G-Force as a test to see how gentle she can be.

Dennis: I don't get it.

Mindy: Yeah, me neither.

Guy Raz: Well, eggs are very fragile, right? And the only thing protecting what's inside from the rest of the world is a thin shell.

Mindy/Dennis/Fingerling: Wow!

Guy Raz: And to know if Gramma G-Force's gentleness training actually worked, or not, she was probably given this egg baby as a test. A test to see how long she could go without breaking it!

G-Force: And that judge down at the court says I gotta keep this egg alive for a whole week or else I gotta go back and learn how to be gentle all over again.

Mindy: Well, I would just like to say that little Eggbert here is the cutest little egg I have ever seen! Can he do any tricks??

G-Force: Here, let me pick him up and then drop him on the table there so you can watch him roll over.

Mindy/Guy Raz: No, no!

G-Force: Why not? You don't wanna see him roll over?

Fingerling: G-Force, you can't drop sweet baby eggbert on the table! You gotta hold him upright and support the neck!

Mindy/Guy Raz/Dennis/Reggie: Huh?

G-Force: No, you not know nothin about egg babies, Fingerling? You gotta put it to sleep on its side when you drop it. Else or it'll open up and all it's guts'll are gonna spill out all over the place.

Mindy/Guy Raz/Dennis/Reggie: Ew!

Fingerling: No, everyone knows that an egg baby is strongest on the top of it's head and it's little bottom there. So, if you're gonna drop it on the table, that's the only way you wanna do it! Straight, up and down- a vertical drop of the baby!

G-Force: False! You do not know nothin' about droppin' egg babies, Fingerling. How about is I drop you on your head like... <<gets cut off>>

Mindy: <<interrupting>> Okay, okay! No one in this diaper house is dropping anyone or anything on it's head. We're keeping our hands to ourselves, and focusing on not breaking Gramma G-Force's egg baby.

G-Force: <<yelling>> Mindy! Quit yellin! Yer gonna wake up the baby!

Fingerling: <<yelling>> Yeah! Keep the volume down!

Guy Raz: <<to Mindy>> It seems to me like the gentleness training is beginning to wear off.

Mindy: Yes.

Dennis: Mindy! I have a question!

Fingerling: Quiet! What did I say about volume?

Dennis: [whispering] Oh, sorry. Mindy, I have a question.

Mindy: <<exasperated>> Yes, Dennis.

Dennis: When I was a young school boy, teacher had us drop eggs out of the window, and whoever's egg survived got rewarded by getting to take the egg home and hide it under their bed pillow until eight months later when mother finds it because it's rotting and smells like a dead rat.

Mindy: Okay, uh, that is not a question, Dennis.

Guy Raz: But that does actually remind me of something.

Mindy: Yeah?

Guy Raz: Yeah, when I was in school, we used to experiment with dropping eggs, by wrapping them in all sorts of things. Like cotton balls and wads of tape and bubble wrap. Even a banana peel.

Dennis: Why?

Guy Raz: Well, because, it was an experiment to help us learn about physics. You know, things like gravity and force and impact and how things fall.

Mindy: Ah!

Guy Raz: And also engineering. By designing ways to protect the eggs from breaking when they fell. And experimenting like this helped us to learn.

Fingerling: Or we could learn by just dropping eggbert here on his little egg head.

G-Force: What?! And watch his little guts spill out all over the everywhere? The rules are, you always drop a baby on its side. Everybody already know'd that. Come here eggbert.

Mindy: Wait!!

G-Force: what.

Mindy: this just reminded me of a new study i just read in The Scientific Journal, Physics Communications!

G-Force: You should not be readin' people's journals, Mindy. That is private.

Mindy: No, no! Hear me out! You see, these researchers from the Massachusetts Institute of Technology, or MIT, had a big wonder: they wondered whether an egg is less likely to break if it lands standing up on its head or lying down on its side, when it falls!

Fingerling: Really. What were the results?

Mindy: Well, I could tell you....

Everyone but Mindy: Yesssss?

Mindy: But I'd rather show you!

Guy Raz: Mindy, you're not going to....

Mindy: Now, where's little Eggbert?

Everyone: <<looking for egg in confusion>>

Dennis: Let's see. Uh.

Guy Raz: Where'd he go?

Dennis: Oh no! He's missing!

Mindy: Huh, that's strange, he was just here!

Fingerling: G-Force? Where's the egg?

G-Force: He's under my butt.

Everyone: What?!?

Guy Raz: You're sitting on the egg?

Dennis: Oh, I get it. Like a baby sitter! Ha, ha, ha

Fingerling: G-Force! Get off the egg! You're not a chicken!

G-Force: I do not know why chickens is the only ones that gets to sit on the eggs.

Mindy: Okay, Gramma G-Force, please pass me the egg baby.

G-Force: Fine. But don't break it. Or else's I gotta go back to gentleness school. Here ya go, little eggbert.

Mindy: Thank you.

Guy Raz: <<groan>>

Mindy: So, as I was saying, the researchers at MIT wanted to find out if a falling egg is less likely to break when it lands on its top or bottom, or on its side.

Guy Raz: Wait a minute, Mindy! I think I read this too! Is this the one where the researchers gathered 200 eggs and then crushed some of them in a device that allowed them to see the exact amount of force they needed to crack their shells?

Mindy: Yes, that's the one! And to study this, when they put some eggs in the device they put some on their sides and some standing straight up.

Fingerling: What a tragic loss of so many innocent egg babies.

Mindy: Oh, it's okay, after the experiment the researchers fed the broken egg babies to their dogs.

Guy Raz: True story.

G-Force: Okay, let's redo the experiment. Give me little eggbert here. I'll put him in a headlock.

Everyone: What?!

G-Force: For science!

Mindy: Well, we don't need to perform that part of the experiment, Gramma G-Force.

G-Force: We don't?

Mindy: No, the researchers discovered that it didn't matter whether the eggs were laying down on their sides or sitting straight up. The amount of force needed to crack their shells was all the same.

Fingerling: So, me and G-Force were both right?

Guy Raz: Well, I guess you could say you were both right and you were also both wrong.

G-Force: I do not know how to feel about that.

Mindy: So, the next step of this experiment was to drop the eggs.

Guy Raz: And they dropped some of the eggs from teeny tiny heights. Like only eight millimeters or so.

Mindy: Okay, are you ready eggbert? I'm just gonna drop you from a teeny tiny height.

Fingerling: Careful now, Mindy.

Mindy: Ready... One, two, three... aaaaaand drop!

<<eggbert drops to the table and survives>>

Everyone: Yay!

G-Force: Okay, now give him here, Fingerling! Where's little pancake blankie!

Fingerling: Here you are eggbert. Let's get you all wrapped up like a little breakfast baby.

Dennis: So Mindy, did all the eggs that were dropped from the teeny tiny height survive? Is the trick just to not drop them too far?

Mindy: Actually, Dennis, some of the eggs dropped from the teeny tiny heights did break.

G-Force: What?! You coulda broke my baby Eggbert?! Why I oughta...

Fingerling: Now G-Force, be gentle.

G-Force: Well, okay. Line!

Fingerling: <<pages turning>> Uh, the line is, "Please don't break my egg. Thank you."

G-Force: Please do not break my baby Eggbert. Else or I'll throw your tv into a river.

Guy Raz: Actually, Gramma G-Force, Mindy knew exactly what she was doing. She wasn't going to break baby Eggbert.

G-Force: Whatever.

Dennis: How did Mindy know she wasn't gonna break baby eggbert?! What happened next in the science experiment?

Mindy: Well next, the researchers dropped more eggs. But this time, from much higher heights.

Dennis: <<gasp>> Huh, and some survived?

Guy Raz: Well, not exactly.

Dennis: Oh. How many broke?

Mindy: Well.. all of them.

Fingerling: Oh, heavens!

Dennis: They all broke?! No matter which way they landed!?

Mindy: Exactly. It didn't matter whether the eggs landed on their sides or on their pointy tops or bottoms. From too high of a height, all the eggs broke.

Dennis: Well that's not fair! How come some of eggs dropped from the teeny tiny height survived!?

Mindy: Well, that's a great question, Dennis.

Dennis: Thank you.

Guy Raz: The researchers wondered the same thing. So they went back and looked at video footage of all the eggs that survived the teeny tiny drop.

Mindy: And when they played back the video in slow motion, they discovered that the surviving eggs mostly shared one very important thing in common.

Dennis: <<gasp>> They all liked the same movies?

Mindy: What? No! What they discovered was that almost all of the surviving eggs...

Everyone: yesssss?

Mindy: Were eggs that had fallen...

G-Force: yessssss??

Mindy: Were eggs that had fallen on their sides!!!!

G-Force: Boo-yea! I was right. iIm the best at droppin' eggs and takin' names.

Fingerling: Well Mandy and Mr Razy, you better have yourselves a good explanation for this!

Guy Raz: Actually, we do, or the researchers who studied this do at least. See, what they found when they took a slow, close up look at the eggs as they fell, was that when the falling eggs hit the hard surface, the ones that landed on their sides, would bend a little bit. Even squish a bit in order to absorb or soften the impact.

Mindy: But when the eggs landed sitting up on their pointy or round ends, the shell at those points was much more stiff- less likely to bend and squish- and more likely to crack.

Everyone but Guy Raz and Mindy: <<murmurs in amazement>>

G-Force: You know, that reminds me of that time Fingerling and me fell out the window.

Mindy and Guy Raz: You did!?

Fingerling: It was a low window.

G-Force: At a drive thru restaurant.

Mindy and Guy Raz: Oh.

G-Force: Fingerling here landed stiff as a board.

Fingerling: And G-Force went all floppy.

G-Force: That's right I did. All floppy. Just skin and guts.

Guy Raz: Uh.

Mindy: And what happened? Did one of you handle the fall better than the other?

Fingerling: Well, it wasn't so bad. 'Cept when all my bones crunched up and popped outta my body.

Guy Raz: What?

G-Force: But not me! Not ol' floppy, boneless, g-force! I just bounced a little and went right back to fall outta that window, again!

Fingerling: Well, that's right, you did.

Guy Raz: Well, what you describe with your bodies, is the same thing that these scientists discovered with their egg drop experiment!

Mindy: When something, or someone falls, the more stiff and rigid it is, the more likely it is to break.

Guy Raz: Whereas the more flexible something is, the less likely it is to break.

Mindy: In other words, for us humans, if we find ourselves falling, it's best to let our knees and elbows and bendy parts bend to better absorb the impact of the fall.

Guy Raz: Because being too stiff and rigid could cause some serious bone breakage.

Fingerling: Or poppage.

G-Force: Well, okay, that settles it. The best way to keep an egg baby from crackin' it's guts out is to land it on its side.

Mindy: Well, more often than not, anyway.

Guy Raz: And only from very short distances.

G-Force: Well, that's wonderful. Who's ready to throw baby Eggbert off the roof?

Everyone but G-Force: No!!!

G-Force: Okay, fine. We'll just throw Fingerling off the roof.

Fingerling: Only if you put me back together again.

Guy Raz: Okay, Mindy. better go start your ice cream truck.

Mindy: Somebody's going back to gentleness training.

Dennis: Who??

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