

**The Pop Ups.** Stay seated. Three, two, one, ignition. Get ready for an adventure of magnificent proportion.

**The Pop Ups.** (Singing.) I don't know what you've been told, but we're in a golden age - so many discoveries that are jumping off the page. Wow in the world. Wow in the world. Wow in the world. Wow in the world. Wow in the world. Wow in the world. Wow in the world. Wow in the world.

**The Pop Ups.** With Guy and Mindy. We're on our way, Houston.

**Announcer.** You're listening to "Bongo And The Toot..."

(Soundbite of fart.)

**Announcer.** ...In the morning on WOBBLE FM! Wobbling your way through the work week.

(Soundbite of fart.)

**Bongo.** Whoa-oh. I'll tell you what, folks, it's a hot one out here today.

**Toot.** Yeah, totally. I saw a kid trying to cool off his Hot Pocket by sticking it in lava.

**Bongo.** Ow. I just saw a chicken lay an omelet.

(Soundbite of chicken clucking.)

**Toot.** Oh, but seriously, folks, stay safe out there. Find some shade. Drink plenty of water.

**Bongo.** Yeah, because hydration is cool! (Laughter.)

(Soundbite of fart.)

**Toot.** Yeah. OK, don't go anywhere, folks. All your favorite summer tunes coming up right after these messages.

(Soundbite of music.)

**Advertisement.** Summer heat got you down? Well, then head on over to the Spit-Take Restaurant - moist, bitter and...

**Guy Raz.** Whoa, Mindy, you really picked a hot day to go to the beach. I'm sweating through my elbow patches.

**Mindy Thomas.** Ugh. I still can't believe you were able to get a full-body tweed swimsuit tailor-made.

**Guy.** Man, does this ice-cream truck of yours have air conditioning? I'm going to need to turn it on.

**Mindy.** It is on.

**Guy.** It is?

**Mindy.** Uh-huh. See? Check out the dial on the dashboard.

**Guy.** Mindy, this is set to ninety degrees Fahrenheit!

**Mindy.** And?

**Guy.** Mindy, why in the wow do you have the heater on?

**Mindy.** Because I wanted to set it to a temperature that would help us to get in the mood for the beach.

**Guy.** Well, I'm going to have to bring this down to a comfortable and climate-friendly seventy-seven degrees Fahrenheit, or twenty-five degrees Celsius.

**Mindy.** But careful! The button's only held on by gum.

**Guy.** Ah, so much better.

(Soundbite of brakes squealing.)

**Mindy.** We're here. Come on, let's get out before everyone else eats all the sand.

**Guy.** Whoo. Mindy, it must be a hundred degrees out here. I'm going to need my parasol. Hold on one sec.

**Mindy.** Now, come on, let's kick it. It must be, like, a billion degrees out here. Walk, walk, walk, walk, walk, walk.

**Guy.** Man, this beach is packed, Mindy.

**Mindy.** Tell me about it. Looks like the whole neighborhood is here. Hey, look - there's Thomas Fingerling.

**Thomas Fingerling.** Cowabunga! Scope out that epic surf, bro. Toss me my board. I'm going to hit the lip and then just hang ten.

**Guy.** And look! There's Grandma G-Force.

**Grandma G-Force.** Hang ten? Fingerling, you'd be lucky if you could still hang five!

**Thomas Fingerling.** No way, dude! I could never hang five.

**Mindy.** And is that...Dennis?

**Dennis.** Hey, Mindy. Hi, Guy. Check it out! I got a new full-body, nylon blend, Swim Master bathing suit.

**Mindy.** Yep, that's Dennis all right. Whoa.

**Dennis.** I'm fully protected from the sun's harmful rays. The hydrophobic material is as slippery as a dolphin's nose.

**Mindy.** What is he talking about?

**Guy.** Boy, all we're missing is...

(Soundbite of bird cooing).

**Mindy.** Reggie.

(Soundbite of bird cooing).

**Guy.** Reggie! What are you doing here? I thought you were meeting your friends in the park.

(Soundbite of bird cooing).

**Mindy.** He says that the birdbath was too crowded.

(Soundbite of bird cooing).

**Mindy.** OK Reg! See you later.

(Soundbite of bird cooing).

**Mindy.** All right, let's see here. Oh, this looks like a good place to set up.

**Guy.** OK. Well, let me just set up the parasol here.

**Mindy.** Okey-doke.

**Guy.** Stand back, Mindy. Three, two, one.

(Soundbite of parasol opening.)

**Mindy.** Whoa.

**Guy.** There we go. OK, let me just get out my beach bag. OK, let's see, what do we have here? I got some beach towels, some sunscreen.

**Mindy.** SPF three fifty?

**Guy.** UV-protective sombrero, microscope.

**Mindy.** Microscope?

**Guy.** Kale chips, some caviar for you, Mindy.

**Mindy.** Aw, you remembered!

**Guy.** Yep.

**Mindy.** Did you bring the buns so I can make a caviar sandwich?

**Guy.** Here you go.

**Mindy.** Thank you very much.

**Guy.** Sunglasses, sun gloves, zinc cream, sun neck-protector.

**Mindy.** Guy Raz, do you think that maybe you're just taking this whole sun-safe thing just a teensy bit too far?

**Guy.** Well, I'm afraid not, Mindy. And with the changing climate, these heat waves are just going to become much more common.

**Mindy.** You mean because of global warming?

**Guy.** Well, technically, Mindy, many scientists prefer the term climate change nowadays because, although the global temperature is rising overall, this increase in temperature is messing with the planet's climate.

**Mindy.** And just to be clear - climate is not the same thing as weather, right?

**Guy.** That's right. Weather is what happens in our atmosphere week to week; the climate, on the other hand, specifically refers to larger patterns in our atmosphere that occur over several decades.

**Mindy.** Ah, so when we say climate change, we mean that, long term, the atmosphere is changing because of the higher temperatures.

**Guy.** Exactly. And a changing climate means more extreme weather, like this heat wave.

**Thomas Fingerling.** Gang way! Ooh-ah. Ooh. Gnarly.

(Soundbite of crash.)

**Guy.** Thomas Fingerling?

**Thomas Fingerling.** What's up?

**Guy.** Well, actually, Mindy and I were just discussing how this heat wave may, in fact, be the result of climate change.

**Thomas Fingerling.** The heat wave is from climate change? Well, if it means more beach days, sign me up for climate change.

**Mindy.** Sorry, Thomas Fingerling, but that is not how climate change works.

**Thomas Fingerling.** It isn't?

**Guy.** No. Just because it's warmer here doesn't mean it's a perfect beach day everywhere on the planet.

**Thomas Fingerling.** Oh, but I thought it was global warming?

**Mindy.** Well, technically, yes. But now some scientists are preferring the term climate change because the increasing temperature of the planet is actually changing our climate.

**Guy.** Which may mean more heat waves, like this one here.

**Mindy.** Or it could mean more hurricanes or more extreme snowstorms.

**Guy.** And if we let the temperature of the planet increase by even one and a half degrees, it could throw our whole weather system out of whack.

**Thomas Fingerling.** Mind if I set up my bean bag here in your shade? I can feel the top of my head frying.

(Soundbite of frying.)

**Guy.** Uh, of course, Thomas Fingerling. Come, take a seat.

**Mindy.** Yeah, there's plenty of room.

**Thomas Fingerling.** Ah, thank goodness. Say, this is a cool little umbrella you got here, Mr. Raz-y.

**Guy.** Well, actually, it's not an umbrella; it's a parasol. It's super handy on hot days like this. Here, look - hot-

(Soundbite of pop up.)

**Guy.** Cool.

(Soundbite of pop down.)

**Guy.** If only it was this easy to cool down the planet.

**Mindy.** Uh, say that again.

**Guy.** Oh. If only it was this easy to cool down the planet?

**Mindy.** Yes.

**Guy.** Well, what about it, Mindy?

**Mindy.** Well, maybe it is.

**Guy.** What are you talking about?

**Mindy.** I'm talking about throwing shade.

**Guy.** Throwing shade? You mean that new TV show where two people sit down and insult each other in front of a live studio audience?

(Soundbite of music.)

**Mindy.** No. I'm talking about a brand-new research project from Harvard University where these scientists plan to basically create a great big parasol for the earth.

**Guy.** Wow. For real?

**Mindy.** Yeah. But instead of using fabric, like your parasol here, these scientists are going to be using antacid to help control the temperatures down here on Earth.

**Guy.** Antacid? You mean, like, the kind of medicine you might take if you have an upset tummy?

**Mindy.** Yep, same stuff.

**Thomas Fingerling.** Oh, yeah. That's what I use to control my toots.

(Soundbite of fart.)

**Guy.** Ugh.

**Mindy.** Gesundheit.

**Thomas Fingerling.** Pardon.

**Guy.** So Mindy, how in the world are these scientists going to use stomach medication to help cool down the planet?

**Mindy.** Well, Guy Raz, the technical name for this stomach medication is calcium carbonate, and it's the same stuff found in snail shells and limestone.

**Guy.** Huh.

**Mindy.** And what these scientists are hoping to do is to release particles of this shiny and reflective chemical into our atmosphere to reflect some of the sunlight back out into space and bring temperatures under control here on Earth.

**Guy.** Kind of like how this parasol is blocking out some of the sunlight on us and keeping us cool.

**Mindy.** Exact-oritos. It's a process called geo-solar engineering, which is basically just a fancy way of saying, 'altering the atmosphere.'

**Guy.** Geo-solar engineering, huh? I think I've heard about this before, Mindy.

**Mindy.** Oh, yeah?

**Guy.** Yeah. What you're talking about is humans purposely altering the atmosphere to try and lower the global temperature.

**Mindy.** Uh-huh.

**Guy.** But, you know, this kind of geo-solar engineering happens from time to time in the natural world.

**Mindy.** It does?

**Guy.** Yeah, especially after volcanic eruptions.

(Soundbite of volcanic eruption.)

**Mindy.** Volcanic eruptions?



**Guy.** Yeah. After a volcano erupts, it spews tons and tons of dirt and sulfur way up into our atmosphere, and it blocks out the sunlight and creates a sort of giant parasol around the planet.

**Mindy.** Just like what these scientists are trying to do.

**Guy.** Exactly. In fact, there was a famous case of this in 1963 - a volcano in Indonesia erupted, and it lowered the Earth's average temperature by zero point seven degrees Fahrenheit that year.

**Mindy.** Wow. Was it because the ash from the volcano threw shade over that part of the planet?

**Guy.** Well, that's what the scientists concluded.

**Mindy.** Whoa. That's so wow.

**Balloon Salesman.** Balloons here. Get your balloons here.

**Grandma G-Force.** I'm going to get me some raccoons. Where's my pocketbook?

**Guy.** Yagh!

**Mindy.** Grandma G-Force, where'd you come from?

**Grandma G-Force.** I've been here this whole time. You didn't recognize me on account of Fingerling made me into a sand mermaid. I got flippers.

**Mindy.** Huh?

**Grandma G-Force.** They don't work.

**Mindy.** Oh.

**Balloon Salesman.** Balloons here. Get your balloons.

**Mindy.** Oh, I want one. Excuse me, sir? Sir?

**Balloon Salesman.** Yes. Hello, ma'am.

**Mindy.** Hi. Yes. I would like one of your finest balloons, please.

**Balloon Salesman.** Well, these are all the finest. I've got gas, copper, cluster, water, solar, fire, observation, decoy, weather and, if you're looking to spend the big bucks, I've got a hot air balloon back in my van.

**Mindy.** Hm. I will take one weather balloon, please and thank you.

**Guy.** Uh.

**Mindy.** That's the type of balloon that they're planning to use to spread the calcium carbonate into our atmosphere to make that giant chemical parasol.

**Balloon Salesman.** Okey-dokey, here you go. One eight-foot diameter weather balloon. It's filled with helium, so if you let it go, you're probably not going to see it again...

**Mindy.** Whoops, I let it go. Sorry.

**Balloon Salesman.** Oh. OK, here's another one. Make sure to hold tight this time. (Laughter.) Will that be all?

**Mindy.** No, actually, that's not all. You wouldn't happen to have a couple of pounds of calcium carbonate on you, would you?

**Balloon Salesman.** Nope, sorry. I just sold my last bucketful to that lady down there.

**Grandma G-Force.** Ugh, this ain't no sherbet. Here, you lick it, Fingerling.

**Thomas Fingerling.** No way, dude.

**Mindy.** Oh, is she eating the calcium carbonate?

**Guy.** Grandma G-Force, don't eat the calcium carbonate.

**Mindy.** Yeah, don't eat it.

**Grandma G-Force.** I do what I want.

**Thomas Fingerling.** That's true; she does.

**Mindy.** OK, so what does this balloon have to do with climate change, Mindy?

**Mindy.** What? Oh, right. Yeah. So those scientists from Harvard University are going to get that calcium carbonate up into the atmosphere...

**Guy.** With a weather balloon?

**Mindy.** Well, with a custom-made weather balloon. So it might look a little different from this one.

**Guy.** Right. Right. So how would it work?

**Mindy.** OK. So later this year, these scientists plan to send this specialized weather balloon twelve miles up into our atmosphere, where it would then use a propeller to stir the calcium carbonate into clouds.

**Guy.** Which hopefully will then reflect some sunlight back out into space.

**Mindy.** And cool the planet.

**Guy.** Right. So why calcium carbonate, Mindy? I mean, I know it's super-reflective, but why not something else?

**Mindy.** Well, I mean, you can't just go around putting anything you want into the atmosphere.

**Guy.** That is true. I mean, putting too much carbon dioxide into the atmosphere is what got us into this climate change conundrum in the first place.

**Mindy.** Right. So these scientists did a bunch of testing with a bunch of different chemicals and found that heavy metals like chlorine, for example, would be bad and toxic for the environment.

**Guy.** And what about sulfur? Because that's the primary chemical that's found in all of those volcanic eruptions.

(Soundbite of volcanic eruption.)

**Mindy.** Well, they tested that too and found that calcium carbonate is even less harmful than that. And it could even help heal some of the damage that has already been done.

**Guy.** That's amazing.

**Mindy.** But - and this is a big but...

**Thomas Fingerling.** I get it.

**Mindy.** ...This is not a solution to climate change.

**Guy.** But, Mindy, I thought you said this was going to reduce temperatures here on Earth.

**Mindy.** Well, that's the idea, but it won't last forever.

**Guy.** So this is just a temporary plan?

**Mindy.** Exactly. Think of it like putting tape over your leaky nose. It's going to hold your snot in for a while, but eventually you're going to have to get a new nose.

**Guy.** Uhhhh...

**Mindy.** But if this works, it will dolphintely buy us more time.

**Guy.** And boy, do we need all the time we can get. But by the way, did you ever read that IPCC report I sent you?

**Mindy.** The I-See-You-Pee-Pee report?

**Guy.** No, Mindy, the IPCC - the Intergovernmental Panel on Climate Change.

**Mindy.** Oh, right, the I-See-Me-Pee-Pee report. Oh, yes. No, I did not see that. What did it say?

**Guy.** The IPCC, or Intergovernmental Panel on Climate Change, is a group of scientists from all over the world who've gotten together to try and figure out how we can stop and hopefully reverse climate change.

**Mindy.** And what did they figure out?

**Guy.** Well, in a report they released in 2018, they said that we have just twelve years to turn the ship around and start reducing our impact on the climate.

**Mindy.** Oh, man. So even though solar geoengineering might not be a permanent solution to climate change, it could help buy us some more time to figure out how to do that.

**Guy.** Well, that's the idea.

**Dennis.** Incoming.

**Thomas Fingerling.** It's raining volleyballs. Climate change is here. Run!