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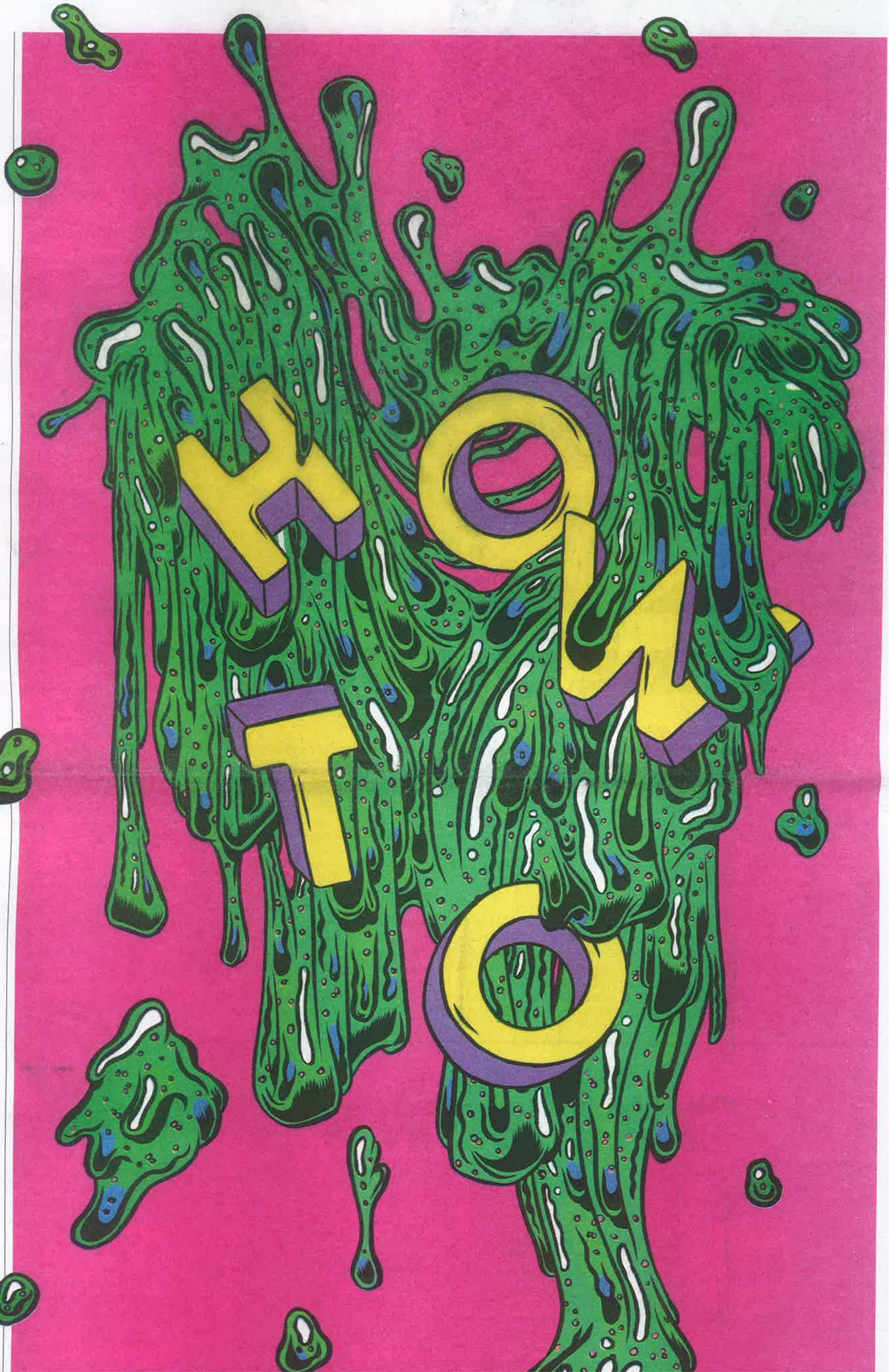
The New York Times For Kids

EDITORS' NOTE: THIS SECTION SHOULD NOT BE READ BY GROWN-UPS

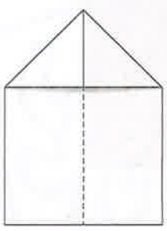


MAKING THE BEST PAPER AIRPLANE,

THANKS TO NASA

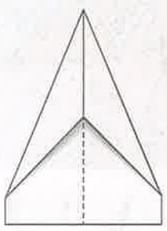
BY CHELSEA LEU · PHOTOGRAPH BY SARAH ANNE WARD

AS A NASA aircraft designer, Andrew Hahn spent decades figuring out how to make airplanes zip through the sky. "All designs are compromises," he says. "In order to do one thing better, it needs to do something else worse." Take, for instance, two world-record-holding paper airplanes. One managed to fly almost 227 feet, while the other stayed aloft for a whopping 29.2 seconds — and the two look completely different. This design falls somewhere in between: It flies well, it isn't too difficult to construct and it can be tweaked to soar just the way you want it to.



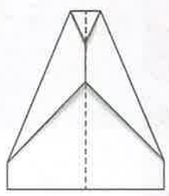
1

START by folding a sheet of lined paper in half lengthwise. Unfold it, then fold down the two uppermost corners of your sheet so they align with the centerline.



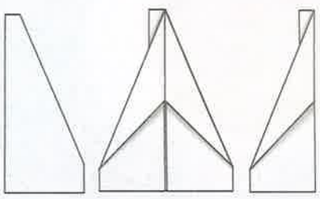
2

FOLD the upper edges down toward the centerline, and crease. This step starts forming the sharp slant of the wings. In aerodynamics, how angled-back the wings are is called wing sweep, and bigger wing sweep helps prevent the plane from rolling in flight. Folding the wings this way, Hahn says, also shifts back a point called the aerodynamic center, which is where the combined forces of lift, drag and others act on the plane.



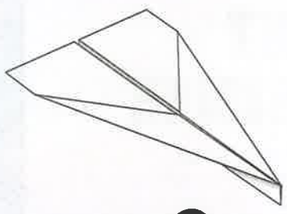
3

FOLD the tip of your model back, forming the nose of the plane. The farther you fold it in, the bigger the plane's fuselage — the part you hold to throw it. A bigger fuselage means your plane will have smaller wings, which means it will need to fly faster to stay up. For a slower-flying glider, leave less room for the fuselage and more for the wings. A flat nose also helps keep the plane from being bent out of shape when it runs into a wall or tree.



4

FOLD your model in half, then open the top flap and crease it so the fold begins at the top corner and runs parallel to the folded edge underneath. Then flip the model over and fold over the other flap to match the first. These form your plane's wings. "Make sure they're symmetrical — that's the most important part," Hahn says. Symmetry helps keep the plane level and prevents it from spinning like a corkscrew through the air.



5

NOW try throwing it and see how well it flies. If it works, great! If it flops, here are two tweaks to make your plane a better glider.

- If the plane spins as it flies, check the angle the wings make when you look at the plane from behind. The wings should be flat or tilted up to form a very shallow V, not drooping down.
- If your plane zooms up or dives down when you throw it, try adding "elevators": Bend the backs of the wings upward. The higher up you fold the back of the wings, the slower the plane becomes. "This is your most powerful tweak," Hahn says. "You can make the dart fly fast and far, or you can make it fly slow and graceful, and anywhere in between." ◆

HOW I BECAME

A WILDLIFE VETERINARIAN

BY SUZAN MURRAY

I'VE KNOWN what I wanted to do since I was 5. I remember the moment — I was with my dad watching a National Geographic show with Jane Goodall, and she was doing behavioral studies on chimpanzees in the wild. I told him: "That's what I want to do! I want to work with wildlife!"

After I graduated from college with a degree in biology, I took a year off and lived in Kenya and Uganda. When I came back, I went to veterinary school. For my thesis, I got the opportunity to work with Jane Goodall in Tanzania looking at the health interactions between baboons and chimpanzees. That was something I had wanted to do since I was 5. I didn't think it would ever happen. It was a great experience.

After veterinary school, I did a surgical internship and a residency in zoo medicine, where I learned how to treat many different types of animals. Then I got a job as an associate veterinarian at the Fort Worth Zoo, and eventually I became the chief wildlife veterinarian at the Smithsonian's National Zoo. At the zoo, whether we are working on a snake's eye, an elephant's foot or a tumor in a flamingo, each day is a new challenge. I worked at the zoo for 13 years. I had a favorite elephant named Shanthi, but having said that, whatever animal we were working on that day ending up being my favorite.

Now I run the Global Health Program at the Smithsonian Conservation Biology Institute, where we use our knowledge from the zoo to help save endangered species in the wild — pandas in China, cheetahs in Namibia, rhinos and lions in Kenya. There are many different roles that veterinarians can play in investigating health and disease. A member of our team went to West Africa to take a poacher's snare off an elephant's foot. Another team member vaccinated gorillas against an illness. It's an amazing honor to be able to use our talents to save animals all over the world. *As told to Anisse Gross* ◆

HOW TO USE SCIENCE TO SOLVE A MYSTERY

BY LIZZIE WADE

your own hypothesis, think about what should happen if your guess is true. If wrinkly fingers improve underwater grip, Smulders thought, people should be able to move wet objects faster with wrinkles than without. So he timed 20 people as they moved marbles from one box to another. They repeated the test four ways: marbles underwater with unwrinkled fingers, marbles underwater with wrinkly fingers and then dry marbles with both kinds of fingers. Smulders found that everyone moved dry marbles faster than wet ones, whether they had wrinkly fingers or not. But when people grabbed the marbles underwater, they completed the test faster if they had wrinkly fingers.

Smulders was excited. He had solved the wrinkly-finger puzzle! But then, a year later, another scientist repeated his experiment and found that wrinkly fingers made no difference to how fast people moved marbles underwater. Smulders was disappointed, but mostly he was more curious than ever. Don't get too attached to your hypothesis, he advises — and don't feel bad if your experiment shows it's wrong. That doesn't mean it failed. You never know what's going to happen in a science experiment, so it can't have a right or wrong answer. Proving your hypothesis wrong is just as important as proving it right. Just make a new hypothesis and start again.

For now, wrinkly fingers remain a mystery — and you can help solve it. Follow the instructions below to try the wrinkly-fingers experiment yourself. Smulders wants to see your results too. Sometimes scientists need more data than they can collect on their own, so they turn to the rest of us for help. That's called citizen science. But if you want him to be able to use your results in a scientific paper, it's important you do the experiment in exactly the way he did. Have your parent or teacher email tom.smulders@newcastle.ac.uk for detailed instructions, and enlist your family, friends or classmates for help. And you can always use Smulders's steps — question, guess, test, repeat — to create experiments of your own. ◆

EXPERIMENT

DO WRINKLY FINGERS IMPROVE UNDERWATER GRIP?

EQUIPMENT

- **Stopwatch**
- **A bunch of glass marbles**
- **3 waterproof containers**
- **Lots of warm water**
- **Pencil and paper**

1. Put half your marbles in one container and leave them dry. Put the other half in a second container and fill it with enough water to cover the marbles.

2. Time yourself moving the dry