mystery science

Grades K-5
Mini-Lesson + Activity: “What’s the biggest apple in the world?”

VIDEO TRANSCRIPT

MINI-LESSON VIDEO 1

Hi, it's Doug! What I'm holding here is an apple, but it's not just any apple. It's my favorite kind of apple. It's a kind called a Pink Lady. And I get excited when I see these at the grocery store because they don't always sell these. A Pink Lady is somewhere between being sweet and sour; it's what people call tart.

Someone named Audriana has a question about another kind of apple. Let's give her a call now.

[Video Call]

- Hi, Doug!

- Hi, Audriana!

- I have a question for you. What's the largest apple in the world?

- That is a great question.

When you hear the word apple, you probably think of this. But you might know that there's different kinds, or varieties, of apples—like, there's also this. Have you had one of these before? It tastes really sour. It's a kind of apple called a Granny Smith. Now, at the grocery store, I'm guessing you've seen a few others. Maybe you even have a favorite. I know whenever I ask people, it seems like Red Delicious and Fuji seem to be a lot of people's favorites, at least in the U.S., where I live. Fuji is a kind of apple that tastes really sweet, but what if I told you that there are even more varieties of apples than what's sold at the grocery store? There are so many

different varieties of apples! There are apples that have different tastes, not just sour-tasting and sweet-tasting apples. They say this variety tastes a bit like a banana. There are apples that come in different shapes; these ones look almost more like a donut. There are apples that come in different colors, like this one with dark purple skin, or this one that's yellow, or even this one that's red on the inside. (What?) The main reason you can't find most of these apples at the grocery store is because there are just too many different kinds for the grocery store to keep in stock. How many different kinds of apples are there? Are you ready for this? The total number of different kinds of apples…there are more than 4,000 varieties of apples. But where do all these different kinds of apples come from? How did we even get different kinds of apples in the first place? What do you think?

MINI-LESSON VIDEO 2

One idea you might have had—maybe you thought, "Well, different places in the world have different kinds of plants and animals. So maybe there are just different kinds of apples that grow in the different places on Earth." That would be a really great guess, but it turns out that nearly all of the different kinds of apples we eat today come from just one kind of apple tree, one that originally grew a long time ago only in Central Asia. So how do we have over 4,000 varieties of apples all from just one kind of tree? The answer is all thanks to people like these: apple breeders, people who plant and grow apple trees. You probably know that an apple tree grows from one of the seeds you find inside an apple. You can think of that seed as being a baby apple tree, and the tree that the apple came from was one of the baby's parents. Apple breeders know an important secret about apples and really all plants. They know that just like with people and with animals, baby plants get some of the same traits as their parents. When an apple seed gets planted, it's going to have some of the same traits as its parents—similar-looking flowers,

probably similar-looking leaves. But also, like with people and animals, just because a baby gets some of the same traits from its parents doesn't mean it's exactly the same as its parents. We all have differences, each one of us, that make each of us who we are. The same thing is true with apples. If you plant the seed from a big, sweet red apple, the baby apple tree that grows won't be exactly like its parents. It might still be red, but maybe a little more sour. Or it might still be sweet, but maybe a little smaller or more green. Using this knowledge, apple breeders have created so many different varieties of apples. It's a special process known as selection. Apple breeders have been doing this for so many years now that they've managed to create a huge range of apple colors, tastes, and sizes, including this—currently the biggest apple in the world. It's a variety called Hakuto, and according to *The Guinness Book of World Records*, the largest Hakuto ever grown was this one, grown in the country of Japan. It weighed over four pounds. That's the same weight as a small watermelon.

So in summary, using their knowledge of how apples pass on their traits, apple breeders have managed to create over 4,000 different varieties of apples, the largest of all being the Hakuto. That's all for this week's question. Thanks, Audriana, for asking it.

Now, after this video's done playing, my friends and I here at Mystery Science have created a step-by-step engineering activity where you'll create a device that helps you pick apples. I hope you'll try it. Have fun, and stay curious!

ACTIVITY: GRADES K-2

ACTIVITY INTRODUCTION VIDEO

In today's activity, you're going to create a device that we're calling the Apple Trapper. It's an invention that collects apples from inside your classroom. Now, you probably don't have an apple tree in your classroom. So first, you're going to make some model, or pretend, apples using paper. And instead of being up in a tree, your apples will be sitting on your desk, just out of reach. The challenge today is to invent a device that can reach those apples, pick them up, and safely bring them to a partner. It may not work at first. In fact, it probably won't, and that's totally okay. You'll get the chance to build it, test it, and try again. It's a chance for you to think like an inventor. How many apples do you think you'll be able to trap? We'll show you how to get started, step by step.

ACTIVITY STEP 1

Find a partner. Decide who will be Red Apple and who will be Green Apple. You and your partner will share ideas, but you'll each make your own Apple Trapper. If you're working alone, that's okay, but you might want to find a friend to help. When you're done with this step, click the arrow on the right.

ACTIVITY STEP 2

Get these supplies.

ACTIVITY STEP 3

First, you're going to make some pretend, or model, apples. To do that, take your piece of red or green construction paper and crumple it up into the shape of an apple. Now, it's okay if it doesn't look exactly like an apple. Remember, it's just pretend.

ACTIVITY STEP 4

Making observations about the size, shape, and weight of your apple model will help you when you build an Apple Trapper in a few minutes. So, go ahead and do this now. Feel how heavy your pretend apple is. I'm guessing you'll notice that it weighs a lot less than a real apple.

ACTIVITY STEP 5

You won't be able to reach your apples, so you need to invent an Apple Trapper that can reach the Orchard. Now, there are a lot of different ways to reach something that's far away. So, have a look at these examples and discuss.

ACTIVITY STEP 6

You can use the pictures you see here as inspiration for your Apple Trapper invention. What will your Apple Trapper look like? How do you think it'll work? For now, just think about the shape of your Apple Trapper. You'll find out what materials you have to build it with in just a minute.

ACTIVITY STEP 7

Before you start building your Apple Trapper, let's see how far your invention needs to reach. Red Apple: Reach your arm out in the direction of your partner. Green Apple: Reach your arm toward your partner. Put your hands together, like this. The distance between your hand and your partner's head is how far your Apple Trapper will need to reach. As you do this step, your teacher will come around and collect your apples so that they can put them in your classroom Apple Orchard.

ACTIVITY STEP 8

Now you're going to start inventing your Apple Trapper using paper. Now, you might be thinking to yourself, "Paper? How can I possibly do this using paper?" But let me tell you, paper is amazing! You can build so many things with paper. Your Apple Trapper will need to reach pretty far. It won't work if the paper flops. So your first challenge is to figure out ways to make your paper stiff. If you're not sure what to do, that's okay. You can talk with a partner and share ideas.

ACTIVITY STEP 9

Here are some of our ideas to make paper stiff. First, we found that you can roll paper. We also folded the paper in half to make it a little stiffer. And when we made more folds, that made it even stiffer. You can even just crumple a piece of paper, like this. You probably have some other ideas too!

ACTIVITY STEP 10

Okay, your second challenge is to connect pieces of paper together so that you can reach your apple. You already have ideas to make your paper stiff, but one sheet of paper won't be long enough. You have some stickers at your desk that you can use to connect paper. But there are other ways to connect paper without using stickers. If you're not sure what to do, that's okay; you can talk with your partner to share ideas.

ACTIVITY STEP 11

Here are some of our ideas to connect pieces of paper together. One way is to use stickers or tape, and that works most of the time. You can also tuck one piece of paper into another, like this. Or, you can overlap two pieces of paper and crumple them up really tightly with one another, like this.

ACTIVITY STEP 12

Now that you have some ideas of what you can do with paper, it's time to create your invention. Here are the pictures of tools again to remind you of the different ways your Apple Trapper could look. I'll set a timer for six minutes, in case that's helpful.

ACTIVITY STEP 13

Now you're ready to test your Apple Trapper. Your teacher will tell you where the Apple Orchard is in the classroom. Bring your invention and stand around the Apple Orchard. Everyone: Take one big step back from the table. Red Apples: you'll try your invention first. Without moving your feet, see if you can use your invention to reach for an apple, pick it up, and bring it to your

partner. Then, switch roles so that Green Apples can test their invention. Remember, it's okay if your inventions don't work the first time; that's just part of the process of inventing. If it doesn't work, watch closely to see what happens, then think about what you can change so that it does work.

ACTIVITY STEP 14

Now that you've tested the first version of your Apple Trapper, it's time to try building again. If your invention was able to pick up one apple, that's great! Think about what you can change so that it can pick up two apples at one time. If your Apple Trapper didn't pick up an apple, that's okay too; just think about ways to change it. Like, was it too floppy? Then try rolling more paper to make it stiffer. Did it fall apart? Try adding a few more stickers. I'll set a timer for another five minutes so that you can build again, in case that's helpful.

ACTIVITY STEP 15

Now it's time to test the new version of your Apple Trapper. Make sure that the apples are back in your Apple Orchard. Take one big step back and then try again to bring one or two apples to your partner. Make sure to take turns with your partner as you test your inventions.

ACTIVITY STEP 16

After you've tested your Apple Trappers, discuss these questions. Have fun, and stay curious!

ACTIVITY: GRADES 3-5

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ACTIVITY STEP 2

Get these supplies.

ACTIVITY STEP 3

First, you're going to make some pretend, or model, apples. So, take your piece of red or green construction paper and crumple it up into the shape of an apple. Now, it's okay if it doesn't look exactly like an apple. Remember, it's just pretend. You'll notice that your pretend apple weighs a lot less than a real apple. Making observations about the size, shape, and weight of your apple models will help you when you build your Apple Trapper in a few minutes.

ACTIVITY STEP 4

Each pair will keep their apples in an orchard at their desk. Red Apple: place the Apple Orchard at the far edge of your desk. Green Apple: add one sticker to both sides so that your Orchard stays in place. Then, put your apples in the Orchard.

ACTIVITY STEP 5

You won't be able to reach your apples, so you need to invent an Apple Trapper that can reach the Orchard. Now, there are a lot of different ways to reach something that's far away, so have a look at these examples and discuss.

ACTIVITY STEP 6

Now it's time to draw ideas for your Apple Trapper on your worksheet. You can use these pictures as inspiration for your invention. I'll set a timer for three minutes, in case that's helpful.

ACTIVITY STEP 7

Share your ideas with your partner. What will your Apple Trapper look like? How will it work? Do you and your partner have similar ideas? If you're not sure yet what to build, that's okay. See if your partner has any ideas that can help you get started.

ACTIVITY STEP 8

Before you start building your Apple Trapper, let's see how far your invention needs to reach. Red Apple: Reach your arm out in the direction of your partner. Green Apple: Reach your arm towards your partner. Put your hands together, like this. The distance between your hand and your partner's head is how far your Apple Trapper will need to reach.

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Now you're ready to test your Apple Trapper. Both you and your partner will stand up and take one big step back from your desk. Red Apple: You'll try your invention first. Without moving your feet, see if you can use your invention to reach for an apple, pick it up, and bring it to your partner. Then, switch roles so that Green Apple can test out their invention. Remember, it's okay

if your inventions don't work the first time. That's just part of the process of inventing. If it doesn't work, watch closely to see what happens. Think about what you can change so that it does work.

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ACTIVITY STEP 16

Now, it's time to test the new version of your Apple Trapper. Make sure that the apples are back in your Apple Orchard. Take one big step back, and then try again to bring one or two apples to your partner. Make sure to take turns with your partner as you test your inventions.

ACTIVITY STEP 17

After you've tested your Apple Trappers, discuss these questions. Have fun, and stay curious!

ACTIVITY STEP 18

Now, if you have time, you can try a bonus challenge. How many apples can you collect in under one minute? See what you can do. If it doesn't work the first time, that's okay. Trying again and again is part of the fun of inventing things. Have fun, and stay curious!