N.C. STATE FAIR
NEWS IN EDUCATION
WHAT’S SO SPECIAL ABOUT APPLES? 5 APPLE FACTS

If you’re wondering about the popularity of the juicy fruit and how North Carolina ranks seventh nationally in apple production, look to Henderson County extension director Terry Kelley for five facts at the core of the craze.

1. *There’s competition in the apple world among varieties.* The Red Delicious – one of the most popular and easily recognizable apples in the country – is going out of style, according to Kelley. The Gala variety is surpassing it in common use, but at least the Red Delicious still has its pride.

2. *The apple industry in North Carolina is based on the fresh market crop.* April Blazich, the State Fair horticulture superintendent, said this means that an NC apple is always fresh-picked and sold in season, unlike in other states. Peak apple season is from mid-August through October when the cool nights change the color from green to red, which means those candy apples you eat at the fair will be fresh and ripe.

3. *But they’re not always red – other varieties can appear anywhere from yellow to black.* A Golden Delicious apple is nearly the color of the sun, while the Arkansas Black can grow to be so dark maroon that it looks black. Other classics include Honeycrisp, Granny Smith, Cameo, Fuji, Jonagold, King Luscious and one of Kelley’s favorites, the Pink Lady – a later variety that usually comes into harvest as a treat after Halloween.

4. *One county in NC is an apple overachiever.* That’s Henderson County, Kelley said. This county produces more apples alone than 41 other states can produce in total. The other areas of the state apples are grown include Haywood, Wilkes and Cleveland counties. One tree can take up to seven years to bear fruit. Overall, North Carolina has 9,000 acres of apple orchards.

5. *Apples can be eaten with more than just peanut butter.* Apple products are all the rage, Kelley said, as many apple growers in North Carolina with bakeries are also producing apple butter, pies, donuts, jelly, cider, muffins and more. But if you’re craving just the plain fruit, you’re in for a healthy treat – apples are high in fiber and potassium, and low in fat and sodium.
How to Win a Robotics Contest: Advice from Teen Engineers

Lee County High School seniors and best friends Kamryn Bivens and Greeley Hibbard arrived at the 2017 N.C. State Fair with a unique addition to their duo - a homemade robot affectionately named T.C. Robo.

Bivens and Hibbard competed at the second annual SkillsUSA Mobile Robotics and Pre-Engineering Contest at the fair, which offers middle and high school students the opportunity to build robotics projects and develop programs. They were the only all-female team to compete, and they took home the first-place prize of $325.

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Though it was their first year competing in this robotics competition, the girls have been refining their skills for years. Lee County High School offers four-year programs in technical skills called career academies, where students can take classes in anything from mobile app development to hospitality. Hibbard is a part of the engineering academy, while Bivens is in the Academy of Finance.

“I wasn’t involved in engineering at all for a while, but it’s been so fun to learn about robotics with Greeley,” Bivens said. “Now we’ve competed at the state and national level - we just went in full force.”

“How to win a robotics contest: Advice from teen engineers

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“Kamryn is a prime example of the fascination students can develop with these skills if they’re exposed to them,” added Quinlan Henry, the director of the Academy of Engineering. “She joined the SkillsUSA club, saw what the robots could do and jumped all over that.”

Hibbard, however, sparked an interest in robotics back in middle school when she applied to the academy. Even then, she said competing helped her get a grasp on what she wanted to do with her STEM background.

“I love all the hands-on projects I get to work on - they really helped me understand that there’s a scientific purpose for everything,” she said. “I fell in love with how things work.”

For the fair competition, Hibbard handled the building and engineering portion of the robot, while Bivens said she worked on the design booklet and some of the coding involved.

“They really have to design and build the robot from the ground up,” Henry said. “It’s amazing to see their eyes open up to all the possibilities.”

The competition itself requires lots of trial and error, Hibbard said. Each team is given a kit of components beforehand, and there are different tasks that the robots must be able to complete through competitors’ modifications of the machine during the contest. Last year, the task was to get each robot to pick up items such as bean bag cubes and Styrofoam stars and place them over a fence.

“The items were supposed to represent trash in national parks, and so the robots had to pick up some things to recycle,” Hibbard said. “That’s why we named it T.C. Robo - short for trash collector.”

Bivens and Hibbard said they plan to compete again this year, not only because the challenging contest is a confidence builder, but also because female representation in student engineering is lacking.

“We’re in the minority in engineering as a whole,” Bivens said. “If seeing us up there encourages other girls to join the industry, that’s awesome.”

Reading Comprehension: Fill in the Blanks

- What did Bivens and Hibbard name their robot? T.C. Robo
- Competition requires lots of trial and error and different tasks
- Hibbard is part of the engineering academy at Lee County High School
THE BEAR, THE MYTH, THE LEGEND - SMOKEY BEAR

Smokey, how did you become an icon for wildfire prevention?

The idea for wildfire prevention started in the spring of 1942 during World War II. People were afraid they would start wildfires, and with so many off fighting the war, there were only a few folks left to battle the fires at home. The idea was to prevent as many wildfires as possible, so the Forest Service started the campaign with posters that read, “Forest Fires Aid the Enemy” and “Our Carelessness, Their Secret Weapon.” In 1944, Disney gave them permission to use characters from the film “Bambi” for one year. The poster was so successful that the program developed its own mascot. I came along on August 9 that same year, and was adopted as their spokesbear.

Who was the first person to draw you?

Albert Staehle first drew me as a full-grown bear pouring a bucket of water on a campfire. It had a line that read “Smokey Says – Care Will Prevent 9 out of 10 Forest Fires.”

Why has your tagline changed over the years?

I changed from “Care Will Prevent 9 out of 10 Forest Fires” to “Remember... Only YOU Can Prevent Forest Fires” in 1947 so people would realize they had the power to help. Then in 2001, there were a lot of fires in natural areas that weren’t forests, such as grasslands, and so I started saying “Only You Can Prevent Wildfires.” We also wanted folks to understand that small, prescribed fires help the forest by getting rid of unwanted forest fuels when the weather conditions are good, so we thought it best to show the difference.

Do you have a middle name and is it “The”?

No, my middle name isn’t “The”, that would be a silly middle name. The reason people think that is because in 1952, Steve Nelson and Jack Rollins wrote a song in my honor. It’s a catchy little tune and I love it, but to make the rhythm work they put “the” between Smokey and Bear and it’s caused confusion ever since.

When you say ‘we’ who are you talking about?

All my friends in the natural resources that help protect and conserve our wildlands, especially the Forest Service.
FARM-TO-FAIR: LOCAL FOOD AT THE FAIRGROUNDS

At first glance, Al’s French Fries and Basnight’s Lone Cedar Café don’t look like they have much in common. Al’s has been around since 1959 as one of the oldest and longest-standing vendors at the fair, while Basnight’s made its debut at the fair in 2017. Basnight’s offers different seafood bites and dips, while Al’s menu is simpler – just its famous fries.

It’s a unique value that these vendors happen to share – their menus feature locally sourced ingredients straight from North Carolina farmers and fishermen.

For Debbie Anderson of Al’s French Fries, it’s all about honoring her father’s legacy.

“We’ve never strayed from what Daddy did,” Anderson said. “We still buy potatoes from Ford’s Produce, we always fry in peanut oil and we still serve Coke products.”

Anderson’s father, Al Beckwith, worked at a power company until he started the French fry booth almost 60 years ago. He built the wooden concession stand with his own two hands, and his children used that same stand until the late 2000s. Beckwith died in 2004, and Anderson and her two brothers took over ownership.

“Now our children are in the booth,” Anderson said. “People beg for chili cheese and other crazy kinds of fries, but we just don’t want to change anything about the booth.”

Anderson said she thinks their potatoes are the freshest on the fairgrounds because they have 50-pound boxes of them delivered from Ford’s Produce in Raleigh at the State Farmers Market every morning during the fair. They also have a separate trailer reserved for cutting and peeling, which Anderson’s brothers work on before the crowds come in.

“By the end of the week, my brother’s arm was 10 times bigger from slicing those potatoes,” she said.

Even though using local potatoes in bulk and choosing peanut oil for frying sometimes costs more, Anderson said Al’s French Fries hasn’t raised its prices in 10 years, even when the price of peanut oil increased. Two weeks before the fair each year, Anderson calls their farmer to ask about pricing.

“The price of potatoes hasn’t fluctuated in a while now,” she said. “So far – knock on wood – we’ve had good weather during potato season.”

Caroline Basnight also carries on a family business with Basnight’s Lone Cedar Café. Her parents opened the Nags Head restaurant in 1995, and since her mother came from a background of commercial fishing, there was never a doubt that the family would use local seafood.

Other ingredients come from Dunn, where catering coordinator Victoria Mawyer drives to once a week to get fresh produce and seasonal items. At last year’s fair, Basnight’s local menu consisted of plates like jumbo lump crab dip, bacon-wrapped scallops and shrimp and grits.

“We don’t serve salmon because there’s no local salmon in North Carolina,” Mawyer said, “but people understand because the sea-to-table movement is getting bigger in the Raleigh area.”

Even when the economy was down a few years back, Basnight said the business has stayed true to itself.

“We’ll never stray from that – that’s who we are,” she said. “If you have a choice between fresh and imported, I’d hope you choose local.”

“We’re not in it to make money,” Anderson added. “We’re in it to continue a tradition.”

Find Al’s French Fries at this year’s fair near the entrance to the Grandstand and by the Graham building, and Basnight’s is in Heritage Circle by the Our State Public House.

QUESTIONS:

• Where does Al’s Fries get their potatoes?
  A) Debbie’s farm  
  B) Outside of NC  
  C) Ford’s Produce in Raleigh

• In what city is Lone Cedar Café located?
  A) Durham  
  B) Nags Head  
  C) Jacksonville
Growing Up in the Village

Instead of having visions of sugar plums, Emily Fleenor and Sara Gatilogo dreamed of making corn shuck dolls and painting eggshells throughout their childhood.

Fleenor and Gatilogo are the granddaughters of Jim Trantham, an instrument maker in the Village of Yesteryear who served as director for many years. At a young age, the kids and their father, Doug, formed a family band using Trantham’s handmade banjos, guitars and ancient instruments such as dulcimers.

Their booth in the Village featured these items for sale, along with CDs they had made of their music. When the girls were seven or eight years old, they started attending the fair and teaching the Village visitors how their instruments worked. Before long, they felt at home among the community of experts and were proud to pass along their skills.

“We were a single income household except we had this thing that we did as a family, and in that way, it was what working on a family farm might have been like,” Fleenor said. “We all contributed, and it gave us a good sense of how to be a part of the family team.”

“We would even have to practice as one of our chores,” Gatilogo added. “I’d do the dishes, clean my room and practice.”

The girls didn’t expect to enjoy selling their music at the Village. But they did so much that they’d take time off school each year to attend from then on. But it wasn’t just about their own booth – they quickly realized that the Village was a place of learning, and developed crafting skills of their own. Fleenor remembers creating dolls, staining glass and making lace while Gatilogo spent her time braiding rugs, folding paper stars and weaving stool tops.

“Once the artists started teaching us, I was sold,” Fleenor said. “I was coming in every day of the Village for the rest of my life – I was sure of it.”

Ultimately, the craft that inspired them to take up an art hobby was Ukrainian egg dying. They became close with the booth owner, Kit Lennon, who taught them to use wax to make designs and layer different colored dyes to decorate eggshells. Once they learned how the process worked, Fleenor and Gatilogo put their own twist on it and started to make earrings and necklaces out of the eggshell art.

As the years went on, the crafters became like family to them, and the girls thought of them as their aunts and uncles. The artists taught Fleenor and Gatilogo everything they knew how to do, and even helped...
them with their homework during the fair – the husband of one woman who sold origami knew lots about calculus, and the wood carver was an expert in chemistry.

“It wasn’t just crafts – it was also life skills,” Fleenor said, “and that’s what the Village is all about. You can learn to do anything if you have a teacher and some time.”

They realized in adulthood that it was rare to carry that kind of ambition, and that the Village had helped them build their confidence and find their passion – both have careers in education. The sisters don’t describe themselves as artists, but as makers with creativity at their core. Even though design doesn’t come naturally to them, Gatilogo said that being artistic is a skill you can nurture.

“Most people see something cool and think, ‘I could never do that,’” she said. “But we have a different worldview because from a very young age, we knew that we could if we wanted to.”

Saying it’s “better than Christmas morning,” the two sisters – both now married with children of their own – feel a special kind of magic when they set foot in the Village of Yesteryear to sell their jewelry.

For them, it’s not only a crafter’s paradise they frequented as kids, but a timeless wonderland filled with creative opportunities, nostalgic music and old friends.

“We were worried that returning to the Village would ruin the childhood illusion of this awesome thing we did as kids,” Gatilogo said. “But last year when we walked into the building together, we had that exact same excitement we had felt years ago.”

**Question:**

- What Village of Yesteryear craft would you like to learn and why?
THE SCIENCE BEHIND ROLLER COASTERS

Imagine you’re on a fair ride. Do you notice how you pick up speed during slopes on the Fun Slide? What about the decreasing height of the hills on the Mighty Mouse Coaster? Do you feel like you’re being pushed outward on the Merry-Go-Round? Believe it or not, this can all be explained by scientific forces.

How does this work?

Laura Bottomley, the director of North Carolina State University’s K-12 engineering outreach unit, The Engineering Place, said the same concepts are behind almost every ride you go on at the fair.

“It’s momentum, friction and forces in motion,” she said, “and that’s all science in action.”

Let’s start with a roller coaster, like the Super Cyclone. First, Bottomley said the click-click noise as the ride car travels up the first hill is the motor adding energy to the system, and converting that electrical energy to potential energy. Another way of thinking about potential energy is “the energy of what could happen.” Then, when the car reaches the top of the hill, it has the most potential energy it can possibly possess for the rest of the ride.

“The idea that we could go down the hill if the ride let go because gravity would pull us - that’s potential energy,” Bottomley said. “If you notice, the ride will pause a little bit at the top, but that’s just to get you good and scared.”

When the car finally goes downhill, all that potential energy is converted to kinetic energy - which can be defined as “the energy of motion.” Kinetic energy is directly related to how fast you’re going, while potential energy is related to how high you are. But when you eventually reach a second hill on the coaster, it cannot be higher than the first.

“This is because the height of the hill represents the amount of energy in the system, so the total of potential and kinetic at this point can’t exceed the amount of potential energy on the first hill,” she said.

Bottomley said this means that if the second hill were higher than the first, the ride car wouldn’t be able to make it up the hill because of a lack of energy in the system. This all ties into the First Law of Thermodynamics, which says that energy cannot be created nor destroyed, only converted. So where did this energy go?

“We’re losing energy in friction because the wheels are rubbing against the roller coaster track,” she said. “Kinetic energy converts to friction, which is manifested as heat.”

You can’t feel it while you’re on the ride, but as the car is moving, the track and wheels heat up from the friction. Once the energy is converted to heat, it cannot be converted back, which is why the ride carries less potential energy with each hill or loop-de-loop.

What about other rides?

“If you get on the giant slide and go down in your burlap sack, it’s the same idea,” Bottomley said. “Your potential energy came from climbing the stairs - which came from whatever you ate for dinner - and then as you go down, this converts to kinetic.”

But as the Fun Slide evens out between hills, you probably notice that you slow down - this is energy conversion in action. And there’s friction here, too - if you didn’t have something to sit on going down, that heat may give you contact burns.

Now as you ride something like the Merry-Go-Round or a flying swing ride, there’s a different force at play called centrifugal force, which is present when you rotate something around a center and it feels as though you’re being pushed outward.

“Picture each person attached to a string in the middle as someone pulls the strings around,” Bottomley said. “There’s no strings on the ride, but the ride itself spins you around and the centrifugal force is what’s pushing you out.”

FAIR ACTIVITY:

When you visit the fair, try to write down how many different rides you go on use potential and kinetic energy. What about the Alpine Bobs ride? The Cobra Coaster? How does the Centrifuge use centrifugal force?

TRY IT OUT

Feel how kinetic energy can be converted to friction, which gives off heat. Once you get home after driving to the fair, ask an adult to step outside the car with you and touch the wheel. It should be hot from the friction, because the tires have been in contact with the road! In fact, having safe wheels are important because it’s friction that keeps the car moving. Be sure to wash your hands afterward.
This year marks the 300th anniversary of the infamous pirate Blackbeard's shipwreck and beheading at sea, but conservators at the Queen Anne’s Revenge lab in Greenville are still uncovering preserved artifacts like it was just yesterday.

At the 150th State Fair in 2017, the N.C. Department of Natural and Cultural Resources used the upcoming anniversary to create a traveling exhibit that showcases pieces of pirate history from the recovery project, such as shipboard diet and life in the 18th century. Michele Walker, Cultural Resources public information officer, said Blackbeard is an important part of North Carolina’s past.

“Blackbeard lived in Bath, and ended up dying in his favorite anchorage spot, Ocracoke Inlet,” she said. “The fact that we can touch the things he touched 300 years ago is amazing in many ways.”

Since cannons and anchors from Queen Anne’s Revenge were discovered in 1996, scientists and researchers from the conservation lab have been sponsoring annual dives to uncover more artifacts - so far, they’ve found around 400,000 of them. But because the bullets, iron, cannonballs and other items recovered from the ship have been underwater all these years, conservator Kimberly Kenyon said it takes a lot of work to make sure they don’t dry out and crumble.

“Every artifact that comes up from a marine site needs very special care,” Kenyon said. “These objects are laden with salt and can sometimes develop a crust around them called concretion, so we x-ray almost everything.”

The x-rays work just like they would for a broken arm - conservators need them to see what’s underneath the crust. The technology displays a flat image of the object and shows what metal is present by how white it appears. Nonmetal artifacts divers find can range from rope pieces to shards of a wine glass. But in 2016, conservators found something even more surprising.

“We discovered a handful of printed paper fragments inside a breech chamber – which is something used to load a cannon,” Kenyon said. “None were larger than the size of a quarter, but it was incredible that they had stayed intact at all after hundreds of years.”

She said she wasn’t trained to work with wet paper, but nevertheless set out on a yearlong research project to figure out what book the nearly illegible words on the fragments came from. For a while it seemed hopeless, but she could make out one word - ‘Hilo’ - that she thought may indicate a place name.

“With some help from other specialists, we finally found that the fragments came from Captain Edward Cooke’s A Voyage to the South Sea, and Round the World, which was published in 1712,” Kenyon said.

This sheds some light on something that wasn’t widely known before the discovery - some pirates could have been literate. If a book like that was carried on the ship, Kenyon said, someone had to be reading it.

Other discoveries help conservators understand more about pirate life, too - divers found animal bones that suggested Blackbeard and his crew ate turkeys, wild boars and possibly deer. There’s even evidence that the pirates’ French chef, Georges Bardeau, butchered beef and pork for long voyages.

While Blackbeard made most of his fortune stealing from others and got his name from his monstrous beard he wore to intimidate, Kenyon said the conservation project isn’t about praising him. Instead, she works to make tangible history from what he left behind under the sea.

“We don’t want to romanticize what Blackbeard did,” Kenyon said, “but finding old artifacts like brass buttons and signal bells help us discover shared heritage as North Carolinians.”
Eighteen-year-old Molly Carlson makes it look easy.

Carlson, a Cary native, started keeping bees in 2012 when she found her passion through a 4-H youth program. Ever since, she has been working hard to maintain as many as 20 hives at once and educate others about the importance of bees - all while juggling classes and homework.

“It takes a lot of commitment,” she said. “You can’t just go in once a year and check on your hives - you have to constantly be on top of everything.”

As she spent more time with the little insects, Carlson decided bees would be a perfect topic for her Girl Scout Gold Award, the highest honor given to girls in the organization. She wanted to focus on community outreach because she found that there weren’t many people who understood the real value of pollinators. But even with her parents’ help, she realized the project wasn’t going to be cheap.

“I needed to buy an observation hive and pay for festivals - so that’s when we created Three Little Birds,” she said.

Three Little Birds Farm, a business run by the Carlson family, helps them sell the bee products Carlson works so hard to supply. To pay for the project, she made baked goods, lip balms, lotions, candles, vapor rub and more using honey and beeswax. When she started putting her honey in jars, she had no idea it would win multiple awards at the fair.

“The first year I did it, I entered in a very fruity honey and I wasn’t sure I’d get anything, but I won a blue ribbon in the junior category,” she said. “From there, I was like, ‘I’m gonna enter more next year.’ So I entered three different categories in 2017 and won ribbons for my light and dark honey – Best in Show and Junior Sweepstakes – plus an additional blue ribbon for my other honey.”

Carlson said she hoped that entering her honey in the fair would help get her name out there as a beekeeper. That, it did. She ended up scoring an internship with the U.S. Department of Agriculture in Louisiana right after she graduated high school.

“I work at the research center, learning lab work and watching experiments – it’s been a lot of fun so far,” Carlson said. “I really want to end up helping honey bees in research projects in the future.”

But you don’t have to get a job with the USDA to help. Carlson said just being aware of how you treat the bees can make a huge difference.

“You shouldn’t be scared of them - if you see one, don’t swat at it,” she said. “Don’t be so adventurous and pick it up, but just leave it alone because if it stings you, it dies.”

Try to find some of Molly’s honey at a competition in the fair this year!

**QUESTION:**

- Why are pollinators important? What products can be made from honey and beeswax?

**Bees need you!**

Around 30 percent of the honey bee production is lost every year.

**Did you know...**

One-third of what you eat every day requires a honey bee to pollinate it? That means one of your three meals a day!
N.C. STATE FAIR CROSSWORD

Across
1. Emily and Sara sell jewelry in the Village of ________
2. The town in North Carolina that houses the Queen Anne’s Revenge Lab
3. The "energy of motion" in roller coasters
4. The month that the State Fair is in

Down
1. Smokey says only YOU can prevent ________
2. Something sweet bees produce
3. Fireworks are made from pyrotechnic ________
4. Type of contest the teen engineers competed in
5. An apple tree can take up to this many years to bear fruit
6. Al’s Fries uses this local vegetable

Answer Key:
THE ART OF FIREWORKS

David Davis may not consider himself an artist, but he spends his work days matching up colors and using the sky as a canvas.

Davis is the facility manager at Zambelli Fireworks, a company the State Fair uses each year to put on the nightly firework displays. Designers and technicians carefully plan each show to include an artistic use of colors and sound, and the N.C. State Fair is one of their special events.

“The fair is different because we do a fake finale where we shoot multiple shells at a rapid pace, let it die down until the crowd thinks it’s over, then hit them with the main finale,” Davis said.

He’s not talking about seashells. Aerial fireworks are made from pyrotechnic shells – or small tubes that hold ignitable pellets called stars. Combined with fuels and fuses, shells create designs across the sky after they’re launched into the air and reach a certain height. The largest shells Davis can use at the fair are five inches long, though he says it’s important to mix up sizes and colors to make for an entertaining show.

“You can only mix certain colors together for it to look good, but you also don’t want to put the same colors beside one another,” he said.

When preparing for a finale, Davis loads multiple shells into one firing tube so that the timing will be faster on the launches. The shells are connected by string, and he scatters different colors and types of fireworks in the chain for a colorful sky. Each firework has a unique name based on what it looks like when it explodes - Davis likes red dahlias and palm trees.

“We use high quality shells for a more brilliant color,” he said. “Reds, greens, yellows, purples – I always say, ‘The bigger, the better.’”

The timing during the shows is just as important as the color variety. Davis utilizes a mix of single and chain shells to keep things interesting, but he’s careful to make sure there’s always something in the sky, unless it’s an intentional dramatic pause.

“We call that dead space in the air, and it’s a big no-no,” he said.

Davis has been working with fireworks for 43 years now, but he said he doesn’t actually get to view the artistic shows he designs. If he did, he would be doing something wrong.

“My job is to watch the crew and the equipment, and I’m listening to the explosion sounds to make sure everything is safe,” he said. “But I like knowing all the people at the fair are enjoying the display, and sometimes I’m lucky enough to catch the end of the finale.”

This year, Davis is hoping for 11 fun-filled fair days with a clear, dry sky to show you the big display he has up his sleeve.

QUESTION:

- Why does the article call it the art of fireworks?