Barnyard Chronicles

Tails From The Inside

Volume 4

The Scavenger Hunt

Barnyard Chronicles *Tails from the Inside Volume IV*

meets the following national and Indiana education standards:

National Science Education Standards

Science as Inquiry

- Plan and conduct a simple investigation (4ASI1.2)
- Communicate investigations and explanations (4ASI1.5)

Understanding about Science and Technology

- People invent tools and techniques to solve problems and avoid new problems (4EST2.2)

Science in Personal and Social Perspectives

- People continue inventing new ways of doing things/solving problems (4FSPSP5.1)
- Science and technology have greatly improved things for some people (4FSPSP5.2)

Indiana Educational Standards

Reading

- 4.RF.1 - Apply foundational reading skills to demonstrate reading fluency and comprehensive

Science

- 3.1.1 - Identify the common structures of a plant including its roots, stems, leaves, flowers, fruits and seeds.
- 4.3.4 - Describe a way that a given plant or animal might adapt to a change arising from a human or non-human impact on the environment.
- 4.2.6 - Describe ways in which human have changed the natural environment. Explain if these changes have been detrimental or beneficial.

It's a lazy Saturday afternoon at the Johnson Family Pig Farm. Albert is excited to see his friend Lucy appear over the hill.

"Hey, Lucy. I'm glad you made it," says Albert. "And right on time!"

"Yeah, thanks to this great new phone that I got for my birthday," replies Lucy. "Look, it has GPS on it. I just pecked in your address, and it told me how to get here—step by step."

"Nice!" says Albert. "GPS is cool, isn't it? Mrs. Johnson told me all about it. Did you know she and Mr. Johnson use GPS technology to help plant and grow our crops?"

"Really? I didn't know technology could do that, too." replies Lucy. "So... what do you want to do today?"

Seed, Tractors and Smartphones!

Like most kids your age, you probably like to download apps to your smartphone or your family's tablet for games, social media or other activities. And the adults you know probably download apps for news, sports highlights, recipe ideas and more!

Guess what? Farmers use smartphone apps as well.

For example, Joe Steinkamp, a corn and soybean farmer, has an app on his smartphone that allows him to check the soil types and soil health on his farm.

Has your mom or dad ever used GPS for directions? Believe it or not, GPS technology is used in farming, too. The GPS, which stands for Global Positioning System, sends signals to monitors located inside the tractor. These signals tell farmers where they are as they work in their fields.

GPS-based technology also helps farmers be more precise with what they do. They can use satellite maps to tell them exactly how much crop was grown and what the nutrient needs are for each field. Not only is this faster for the farmer, it also helps ensure the best outcome for the crop when it's done growing.

Fields of Fuel

Farmers grow more than just food. Many now grow fuel. Not literally. But the crops they grow are used to produce alternative fuels such as soy biodiesel and ethanol from corn.

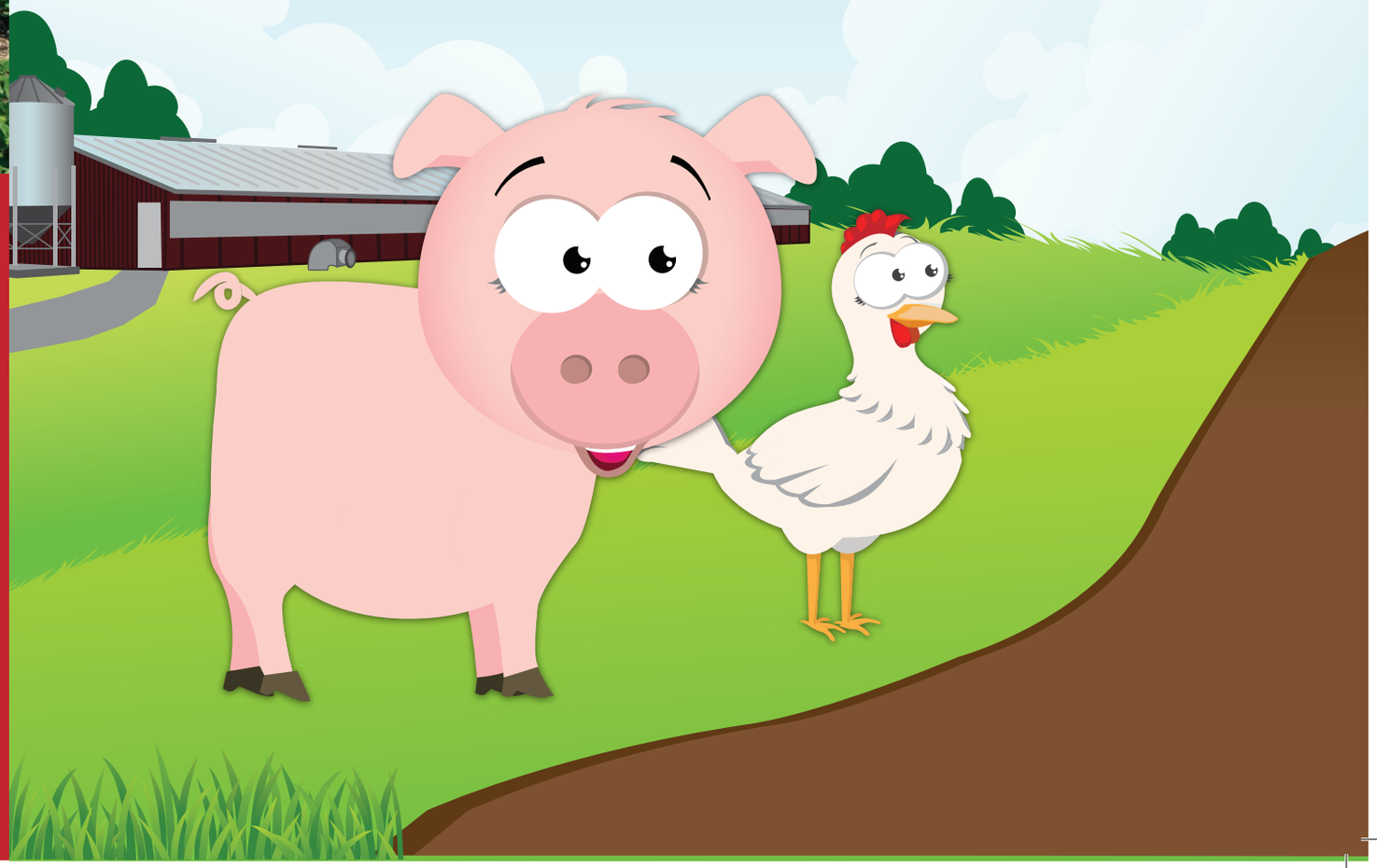
Substituting with Soy Biodiesel

Biodiesel is made from vegetable oils, including soybeans. Soy biodiesel contains no petroleum and can be substituted for regular diesel. However, it can also be mixed at any level with petroleum diesel to create a blend. Today, biodiesel is used in a variety of vehicles and machinery, including bulldozers, school buses, snowplows, semi-trucks and boats.

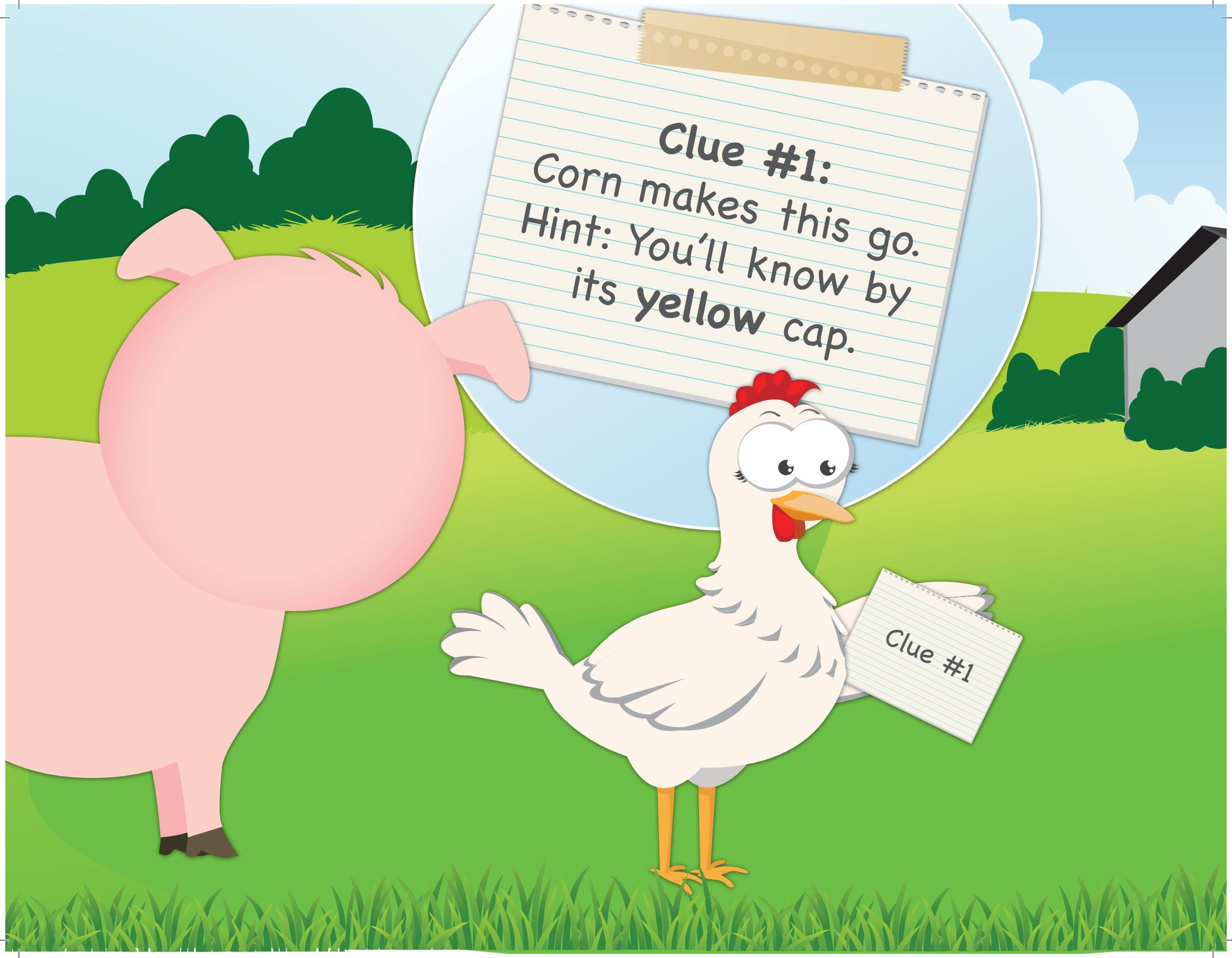
"I have noooo idea," cries Albert. "I can't think of anything fun."

Overhearing the conversation, Albert's mom interrupts. "I had a feeling you two might be looking for something to do today. So why not go on a scavenger hunt? It's a beautiful day—plus, it will be a great way for you to show Lucy around the farm, Albert."

"That sounds great!" says Lucy. "So what do we do?"




Scavenger Hunt
#1
#2
#3
#4
#5


Clue #1:
Corn makes this go.
Hint: You'll know by
its yellow cap.
Clue #1

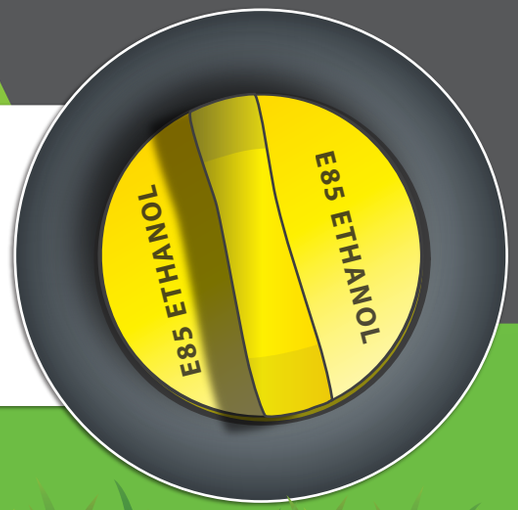
"Well, I've already hidden five different clues around the farm," says Mama Pig. "If you follow each clue carefully, you just might find a tasty treat at the end of your search!"

Mama Pig gives Albert and Lucy the first clue. "*Corn makes this go. Hint: You'll know by its yellow cap.*"

The friends look around and spot the yellow fuel cap on the family's pickup truck.

How to Spot a Flex Fuel Vehicle

All vehicles that can use E85, an ethanol-based fuel, have a yellow gas cap. So check out your family's vehicles or even cars at the filling station and see if you can spot any with the yellow ethanol fuel cap!



Fueling Cars with Corn

Ethanol is made from corn and other plant material. Ethanol is mixed with regular gasoline for use in vehicles. Most cars can use E10 or E15. The number after the "E" indicates the percentage of ethanol in the ethanol-gasoline mixture. So E10 has 10 percent ethanol and 90 percent gasoline. Flex Fuel vehicles can use E85, which is mainly made up of ethanol.

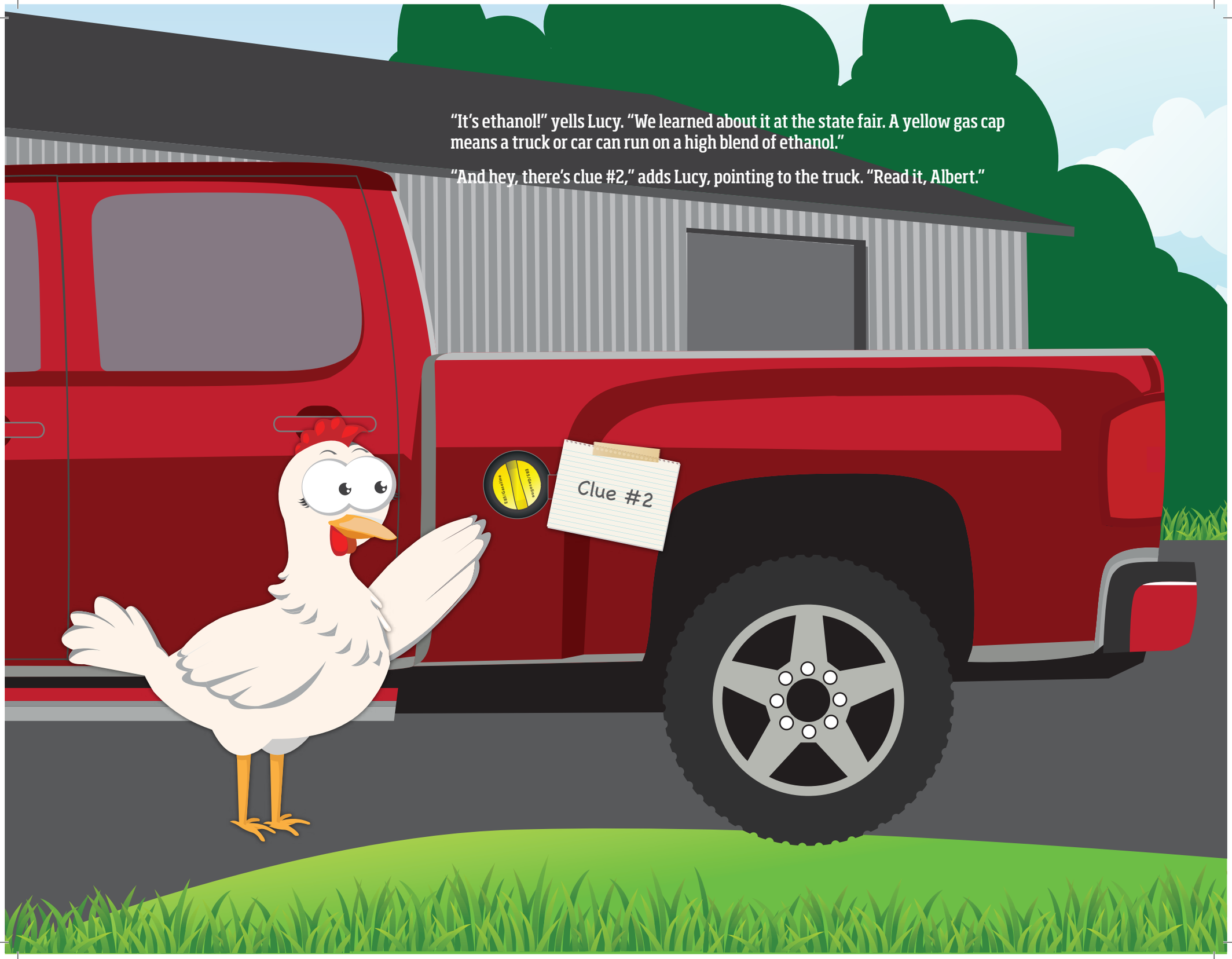
Advantages of Biofuels

Ethanol and biodiesel are called "biofuels" because they are made from living matter. They offer three advantages over regular gasoline and diesel:

Clean burning: Because they're made from natural products, biofuels are the cleanest automotive fuels available today. They are better for your vehicle and the environment!

Renewable: Because it's plant-based, what is used each year can be re-grown–it doesn't run out.

Homegrown: Using corn and soybeans for biofuels is another way to support all those who have a career in agriculture.



"It's ethanol!" yells Lucy. "We learned about it at the state fair. A yellow gas cap means a truck or car can run on a high blend of ethanol."

"And hey, there's clue #2," adds Lucy, pointing to the truck. "Read it, Albert."

"This next item is made from soybeans, can come in many colors, and is a favorite of many young artists!" states Albert. As he finishes reading the clue, a look of excitement flashes across Albert's face. "Follow me, Lucy," he adds. "I know what this one is."

Lucy complies, but not before taking a selfie (something she loves to do!).

Different Uses of Soybeans

- Carpet backing
- Seating foam
- Soybean meal for pigs, chickens and cows
- Newspaper ink
- Plywood adhesive
- Plastics, like the type used on John Deere combine panels
- Paint
- Candle wax
- Crayons
- Biodiesel
- Food products such as soy sauce, vegetable oil and salad dressing

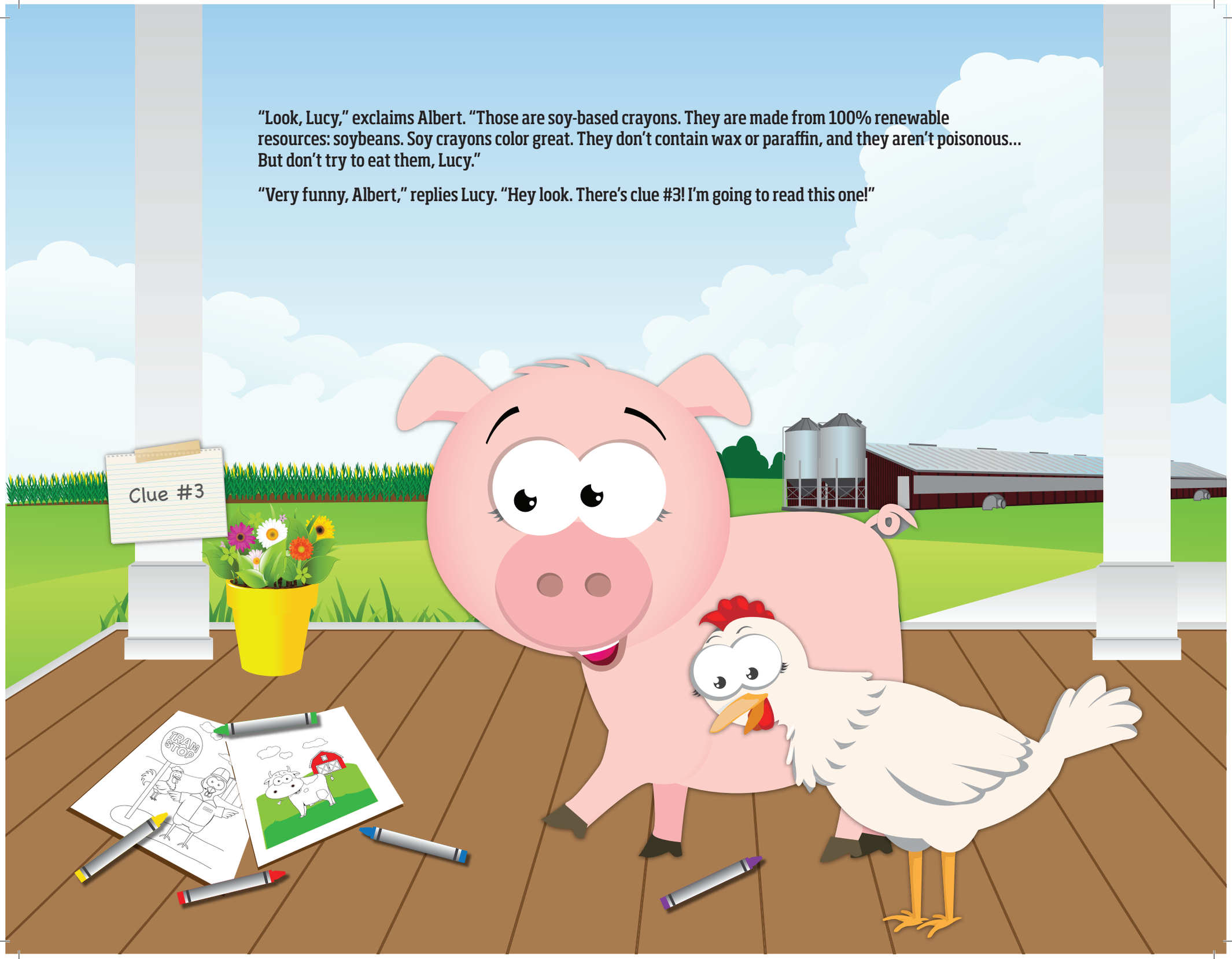
I Spy Soybeans!

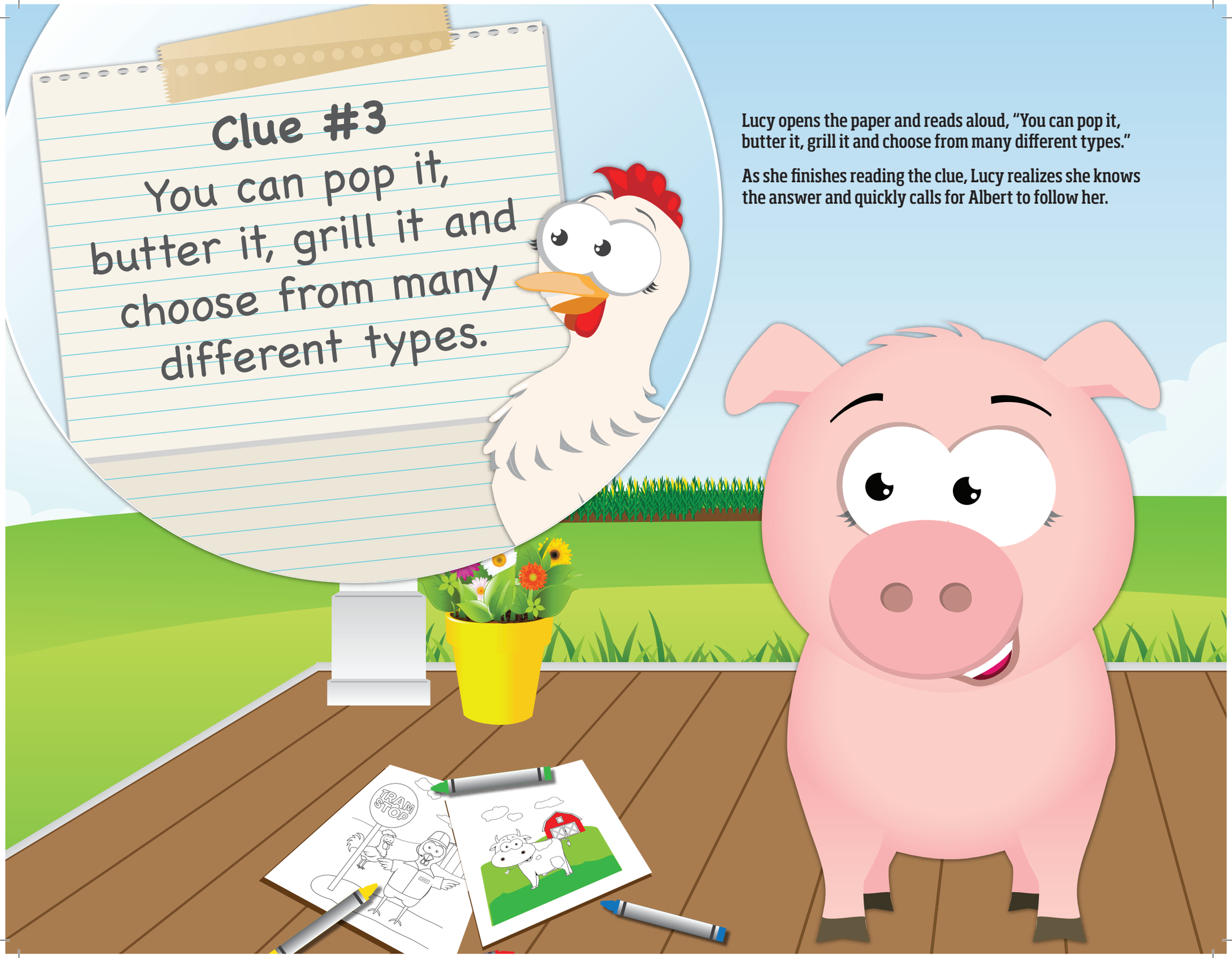
Look around your house and see if you can spot any products made from soybeans.

The friends walk to the front of the farmhouse where, earlier that day, Albert saw the Johnson's daughter coloring.

"Look, Lucy," exclaims Albert. "Those are soy-based crayons. They are made from 100% renewable resources: soybeans. Soy crayons color great. They don't contain wax or paraffin, and they aren't poisonous... But don't try to eat them, Lucy."

"Very funny, Albert," replies Lucy. "Hey look. There's clue #3! I'm going to read this one!"





Lucy opens the paper and reads aloud, "You can pop it, butter it, grill it and choose from many different types."

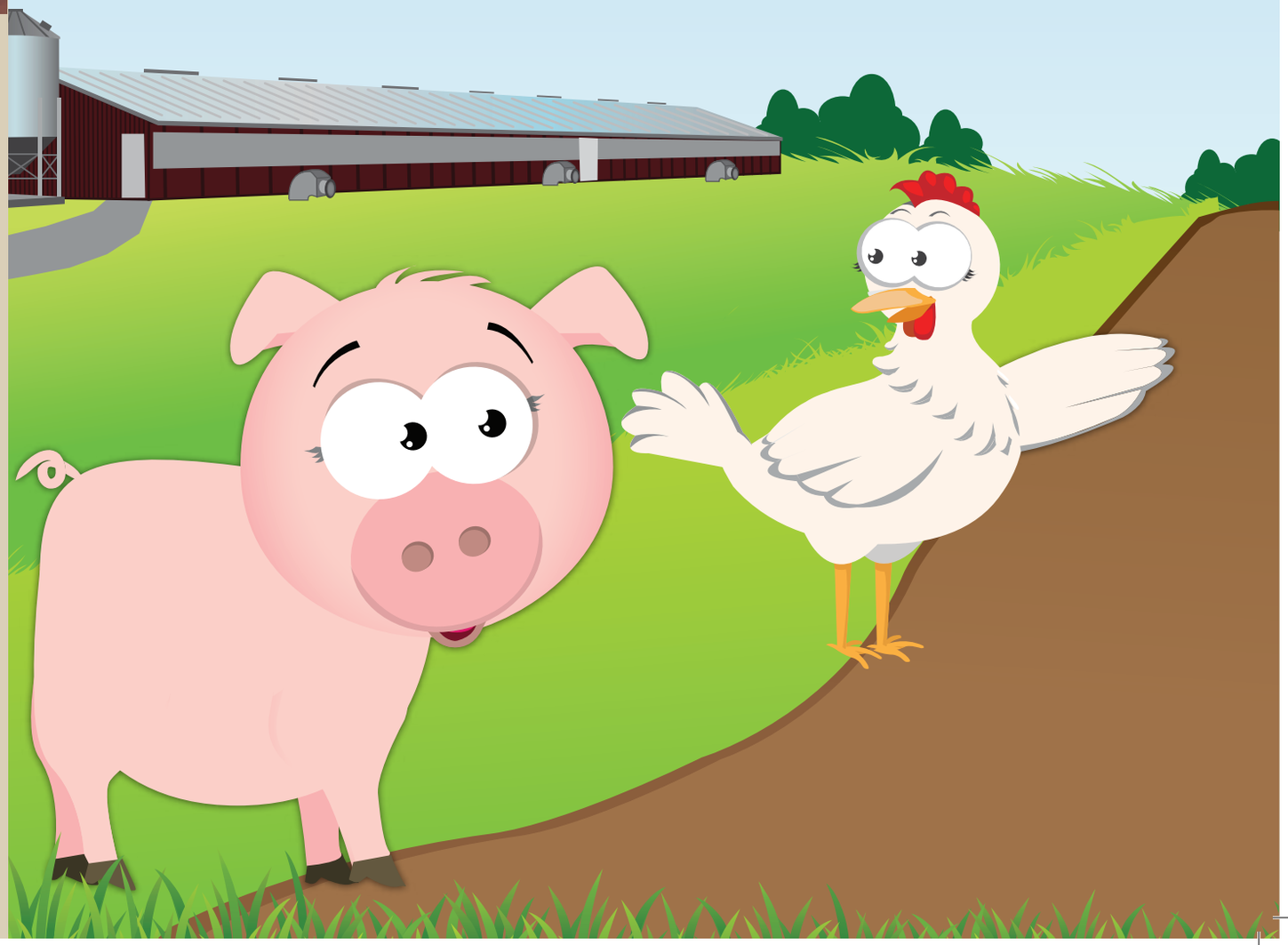
As she finishes reading the clue, Lucy realizes she knows the answer and quickly calls for Albert to follow her.

Different Uses of Corn

- Cornmeal for animal feed
- Penicillin
- Starch
- Corn oil used in cosmetics, soaps and medicines
- Ethanol
- Plastics used in food packaging, disposable dishware and gift cards
- Glue and other adhesives
- Corn syrup used as a sweetener in beverages, candies and cough drops
- Food products such as cereal and tortilla chips

Count the Corn!

Look around your house and see how many corn-related products you can find. A good place to start is in your pantry and kitchen cupboards.



Corn is Corn, Right?

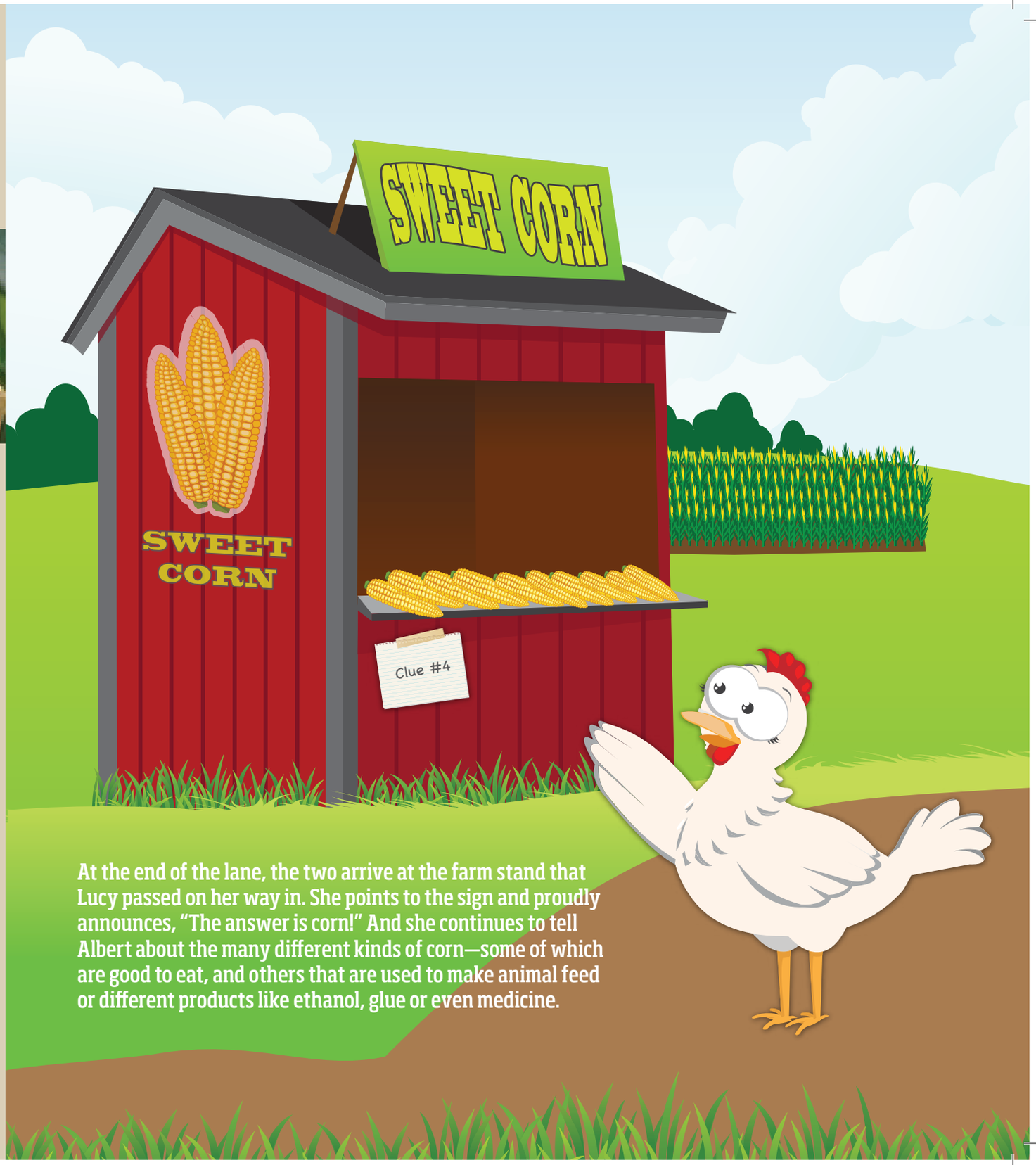
Wrong. There are many different types of corn. The most common types are:

Dent corn: Dent corn, which can be white or yellow, is used for animal feed, corn syrup, ethanol and biodegradable plastics. Most of the corn you see in farm fields is dent corn.

Flint corn: Flint corn, which is also known has Indian corn, has a hard outer shell and kernels with a range of colors from white to red.

Sweet corn: This is the type of corn we eat as a vegetable! It is eaten on the cob or it can be canned or frozen.

Popcorn: When popcorn is heated, the natural moisture inside the kernel turns to steam that builds up enough pressure for the kernel to explode. And we love to salt and butter the exploded kernel and enjoy it as a snack!

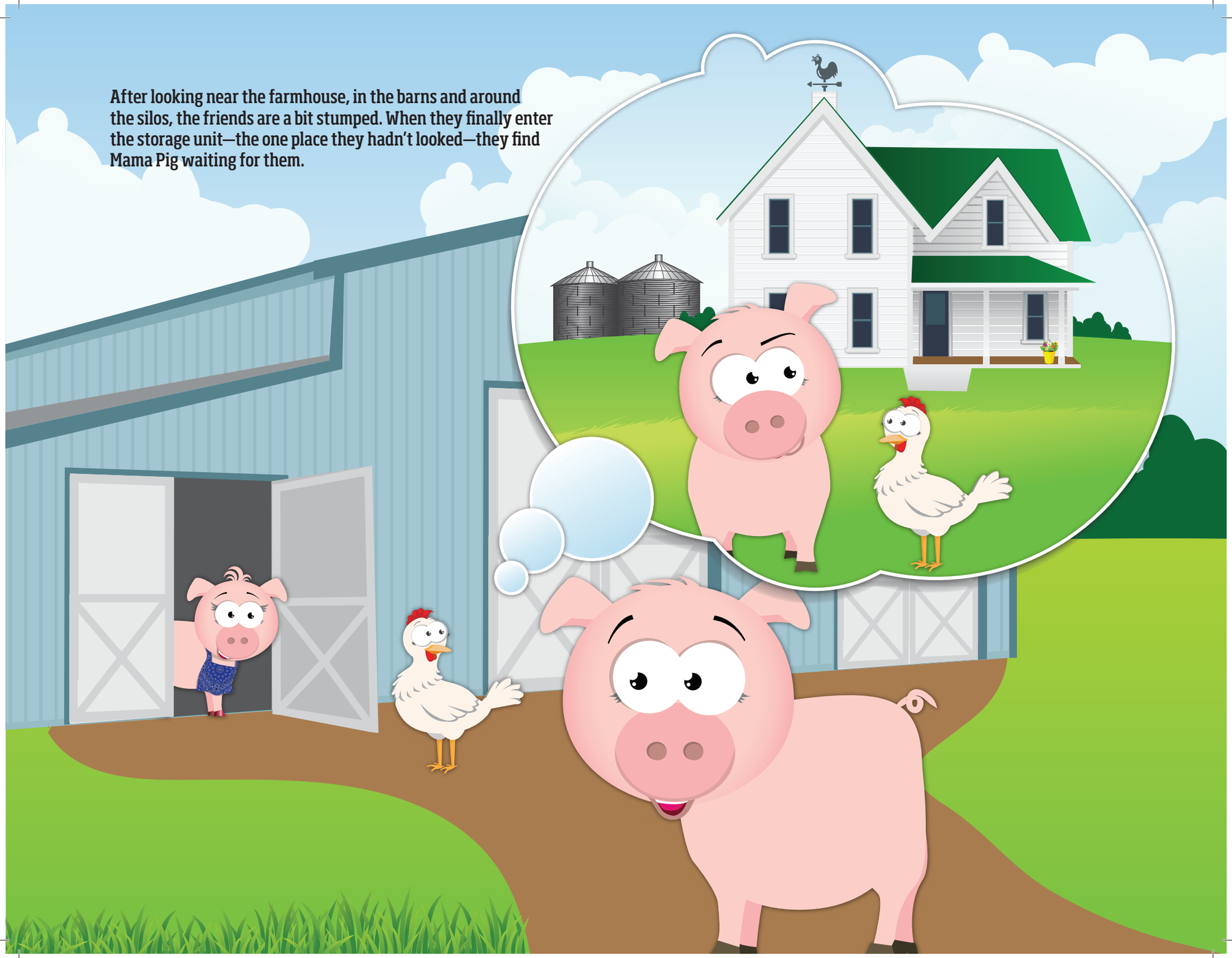


At the end of the lane, the two arrive at the farm stand that Lucy passed on her way in. She points to the sign and proudly announces, "The answer is corn!" And she continues to tell Albert about the many different kinds of corn—some of which are good to eat, and others that are used to make animal feed or different products like ethanol, glue or even medicine.

Albert interrupts Lucy's long-winded speech on corn by encouraging her to take a selfie in front of the farm stand (which he knew she'd be more than happy to do!). This gives Albert an opportunity to open Clue #4, which was a little tougher than the others.

This clue consisted of one simple statement:

"This can also be used to package foods."



After looking near the farmhouse, in the barns and around the silos, the friends are a bit stumped. When they finally enter the storage unit—the one place they hadn't looked—they find Mama Pig waiting for them.

"That clue was a little tricky, so I thought I'd help you out," says Mama Pig. "Did you know that, in addition to being a great food source and a renewable resource used to make fuel, corn can also be used to make plastic food packaging? It's true!"

Mama Pig continues to explain how soybeans are also used to make a more industrial type of plastic that can be found on cars. Albert and Lucy are amazed at all they've learned about the many uses of corn and soybeans.

It's finally time for the last clue, which is read to the pair by Mama Pig, "This puts nutrients in your body every day."

"Feed corn," shouts Albert. "And soybean meal," adds Lucy.

"You're both absolutely right! I wonder how I knew you'd get that one right," she laughs.

A Healthy Dose of Nutrients

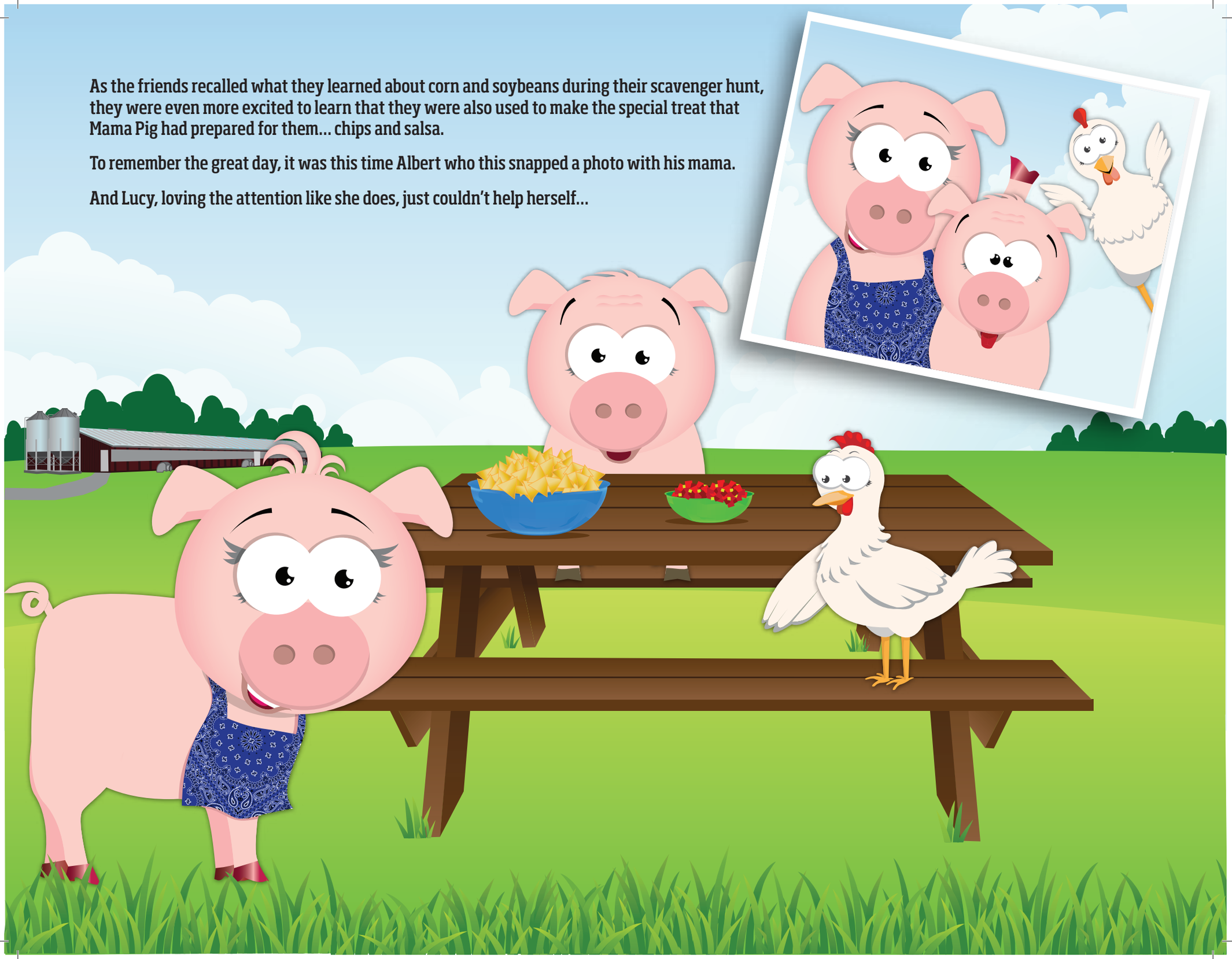
Just like your parents want to make sure you eat healthy, farmers want to take good care of their animals and make sure they get plenty of nutrients. That's why pigs, chicken, cattle and sheep are typically fed corn and soybean meal as part of their daily diet.

Farmers like to use corn and soy as a base for animal feed because they are a great source of protein, digestible energy and weight gain. And guess what, animals love these! They get excited when the feed is poured—probably just like you do when your parents come home from the grocery store with your favorites!

As the friends recalled what they learned about corn and soybeans during their scavenger hunt, they were even more excited to learn that they were also used to make the special treat that Mama Pig had prepared for them... chips and salsa.

To remember the great day, it was this time Albert who this snapped a photo with his mama.

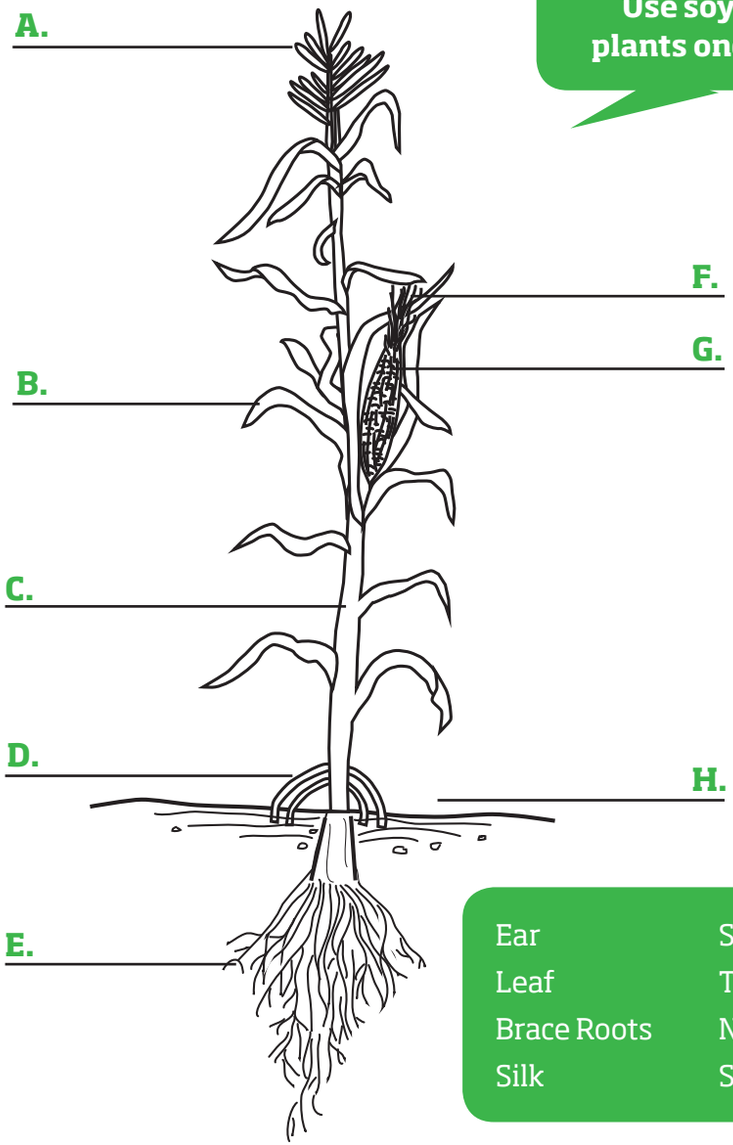
And Lucy, loving the attention like she does, just couldn't help herself...



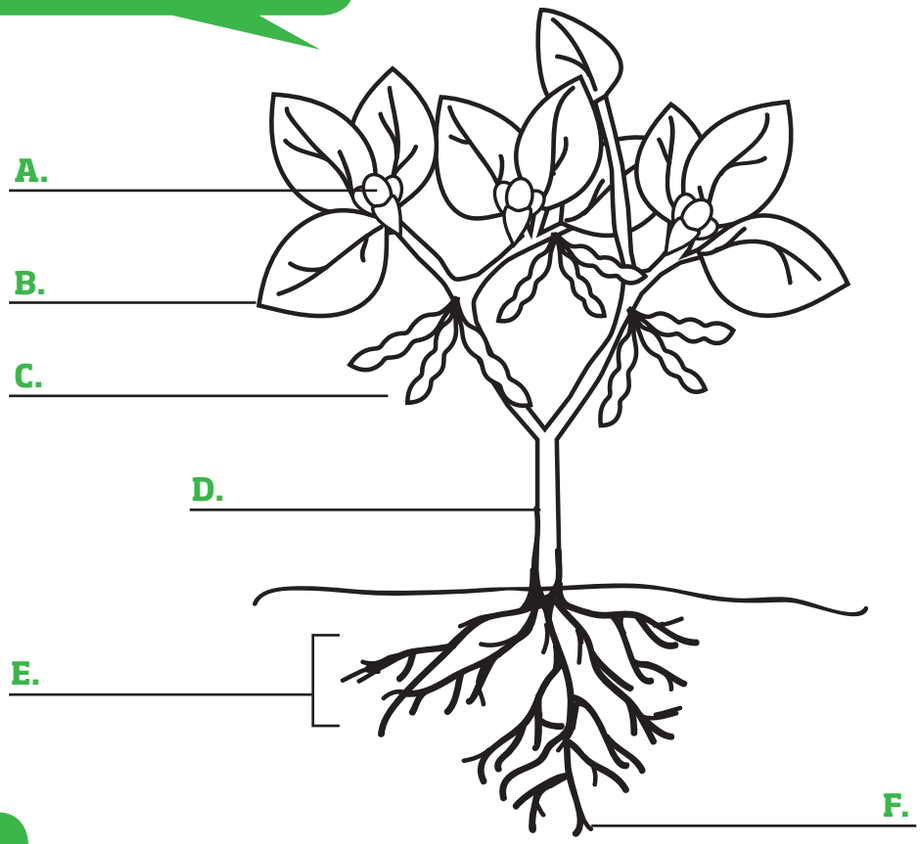
Soybean and Corn Plant Activity

Many family farmers in Indiana plant corn and soybeans each year. See if you can identify the parts of each crop below.

Use soybean crayons to color in the plants once you've identified the parts!



Ear	Soil Level
Leaf	Tassel
Brace Roots	Nodal Roots
Silk	Stalk



Leaves	Roots	Stem
Pods	Nodules	Flower

A. Tassel, B. Leaf, C. Stalk, D. Brace Roots, E. Nodal Roots, F. Silk, G. Ear, H. Soil Level

A. Flower, B. Leaves, C. Pods, D. Stem, E. Roots, F. Nodules

More Barnyard Chronicle Books

You can read more about Albert, Lucy and their friend Clara in the other Barnyard Chronicles books:

Volume 1: Charlie's Rescue

Volume 2: Community Day

Volume 3: Game Show

Read these books online at **barnyardchronicles.com**.

There are also videos, games, recipes, lesson plans and more!

Want to win an all-expenses paid free classroom visit to the Glass Barn at the Indiana State Fairgrounds?
Visit **www.glassbarn.org/barnyard** to learn more and sign up!

You can also visit **www.glassbarn.org** and **www.incorn.org/resources** for more soybean and corn facts.

Barnyard Chronicles books were funded with Indiana soybean and corn checkoff dollars.

Science Experiments!

Make Corn Putty

Play with it like clay, then watch it become liquid again.

- 1 cup cornstarch
- 1/4 cup + 1 tablespoon water
- Food coloring

Blend mixture with fork. It should flow when the bowl is tipped but feel solid when you touch it. If it's too thick, add a little water. If it's too runny, add a little cornstarch.

Make Your Own Plastic at Home!

What you will need:

- 2 tablespoons cornstarch
- 2 tablespoons water
- 4-5 drops of soybean oil (found in grocery stores as vegetable oil)
- 2-3 drops of food coloring (use your favorite color!)
- Resealable plastic bag

What you do:

Place the cornstarch in the plastic bag and add the water, soybean oil and food coloring. Be sure to seal the bag completely and knead the bag for 3 minutes to mix all the ingredients together. Unzip a small opening in the bag to use as a vent and place in the microwave for 30 to 40 seconds. Remove the bag and open once the plastic has cooled. Tah-dah! Your own homemade plastic made from soybeans!