

Facilitator Guide

Amazon Fulfillment Center Tour

For Brownie and Junior Girl Scouts



Amazon + Girl Scouts of the USA Collaboration

Amazon and Girl Scouts of the USA (GSUSA) have partnered to develop customized in-person and video tours of Amazon Fulfillment Centers. Girl Scout programming has long introduced girls to critical STEM concepts such as algorithms, computer coding, robotics, and engineering. Now Girl Scouts will have the opportunity to see these concepts come to life as Amazon employees work side by side with robots in Fulfillment Centers to pack and ship customer orders. By having the opportunity to meet and/or see female employees in STEM roles at Amazon, girls will leave the tour imagining how they can build the future with STEM.

Amazon is also providing grants to 23 select Girl Scout councils to help even more Girl Scouts take part in this unique, real-world STEM experience. Thanks to Amazon's support, the in-person tour will be available at select Fulfillment Centers around the country in Fall 2022, and the video tour will be available on Girl Scouts at Home Activity Zone in Fall 2022. Girl Scouts attending the tours may also have an opportunity to receive a free, limited-edition patch.

Girl Scout Programming

At [Girl Scouts](#), we believe in the power of every [girl](#) to change the world. We're the preeminent leadership development organization for girls. And with programs from coast to coast and across the globe, Girl Scouts offers every girl a chance to practice a lifetime of leadership, adventure, and success.

We introduce Girl Scouts of every age to STEM to help them see how they can actually improve the world—whether they're discovering how a car's engine runs, learning to manage finances, or caring for animals. We'd like girls to explore different aspects of STEM every year, so we've developed a unique, "fun with purpose" K-12 curriculum to inspire them to embrace and celebrate scientific discovery in their lives.

By inspiring girls to discover more of what they really care about, they explore a wide variety of interests—everything from the arts to the outdoors to, of course, STEM—through [skill-building badges and leadership Journeys](#). Learn more about Girl Scouts [here](#).

Short activities sprinkled throughout the tours relate what Amazon does to connect with Girl Scout values and programs. Girl Scouts will leave the tour with ideas to build the future with STEM. Also, by completing the optional activity associated with the tour, Girl Scouts can fulfill the following badge requirements:

- Brownie Digital Game Design Step 2
- Junior Digital Game Design Step 2

Get Involved

One-time Opportunities to Volunteer With Girl Scouts

One-time volunteers can serve as experts for council and troop events, assist in facilitating Girl Scout badge and Journey activities, and provide pivotal support to troops by lending expertise in a variety of program areas. [Visit us online](#) for a list of short-term volunteer opportunities.

Amazon Employees Who Are Also Girl Scout Alums

If you were a Girl Scout at any point in your life, consider signing up for the [Girl Scout Network](#), a powerful community of adults—both Girl Scout alums and supporters from across the country—who believe in preparing girls to be our future leaders.

Tour Script

Welcome (5 minutes)

Location: Welcome Room

Steps:

Introduce yourself to the Girl Scouts.

SAY:

- Hello, everyone! My name is [NAME]. You can refer to me using [PRONOUNS] pronouns.
- You may have noticed that I told you my gender pronouns. Does anyone know what a pronoun is?
[Girl Scouts may say, “A type of word; words like she; etc.”]
- A **pronoun** is the word we use when speaking about a person or object. When speaking about a person, a pronoun refers to their gender.
- When we introduce ourselves, I am going to ask everyone to share with us what gender pronouns you use.

Note to Tour Leader:

If Girl Scouts ask for a longer explanation on pronouns, here is some recommended language to share:

- We tell each other our gender pronouns because someone’s gender identity—whether they feel they are a girl, a boy, neither of those, or something else—is a personal feeling.
- However, it is very common for us to assume, or to guess, someone’s gender identity based on what they look like—how long their hair is, say, or what clothes they’re wearing. We might automatically think they’re a boy or a girl and choose a pronoun that matches what we assume is their gender.
- The problem is that we could be wrong, and that could hurt someone’s feelings because we made an assumption about them. That really doesn’t feel good.
- The truth is that you actually cannot tell someone’s gender just by looking at them! So, it’s important for us to remember this and not assume we know their pronouns.

Introduce Girl Scouts to “fulfillment.”

SAY:

- I am the Tour Leader here at the [SITE], and I’ll be your guide on an adventure into the world of Amazon Fulfillment Centers!
- But what is fulfillment? **Fulfillment** means completing a customer’s order. A **customer** is a person who buys something from a business.
- Fulfillment is doing everything it takes to get the item a customer orders to them. So our Fulfillment Centers, or “FCs” for short, are where we store, pack up, and send out millions of items to our customers.
- Before we begin our tour, I’d love to hear from a few of you. What grade are you in? Where do you live? Before you answer, please tell me your name and pronouns.

Give Girl Scouts the opportunity to introduce themselves. If the tour group is large, you may opt to have just a few people introduce themselves; if it’s a smaller group, you may opt for everyone to give an introduction.

Then share the importance of efficiency, protecting the environment, and customer service.

SAY:

- Today, we're going to learn how Amazon uses technology to deliver packages to customers all over the world.
- Does anyone know someone who works in a Fulfillment Center? Or maybe you know someone who delivers the packages once they're ready to be shipped?

Let Girl Scouts share any personal connections they may have with people who work in shipping or fulfilling orders.

SAY:

- We use computer science and robots to help our employees do this quickly and efficiently. Does anyone know what "efficient" means?
[Girl Scouts may say, "Doing things quickly; doing things without wasting time or resources; I don't know; etc."]
- **Efficient** means doing something using the least amount of time and resources, like energy, people, or materials.
- This means doing things quickly but also without errors. We use robots and people to get it done!
- During the tour, we'll explore how Amazon efficiently gets purchased items to customers.
- Along the way, you may notice some things that remind you of Girl Scouts. For example, Amazon cares about protecting the planet. We try to use fewer natural resources, like water or trees, and use resources that are renewable, like wind and solar energy.
- Caring for nature and the environment are Girl Scout values too. What are some ways you have learned to care for the environment through Girl Scouts? What has been easy to do in your own life to help the planet?
[Girl Scouts may say, "My troop participated in the Girl Scout Tree Promise; I try not to use single-use plastic; I help in a community garden; etc."]
- At Amazon, we're also committed to excellent customer service. **Customer service** is how a business helps the people who buy their products. We want our customers to have a great experience when they order items from Amazon.
- Girl Scouts also know something about customer service! If you sell cookies, how do you make sure your customers have a good experience?
[Girl Scouts may say, "We answer their questions; we suggest cookies they might like; we're careful when adding up their total cost and making change; we're polite and friendly; etc."]

Go over logistics and safety for the tour.

SAY:

- Before we get started, let's go over a few things. Today's tour will be about an hour long.
- Safety is important. As we go through the Fulfillment Center, please make sure to stay together in our group. If we are in a green walk lane, please stay within that lane. For your safety, we ask that you do not run while in the FC.
- During our tour, we will go up and down some stairs. Please maintain three points of contact when you're on the stairs. This means that you should always have one hand on the handrails and your feet should be facing the direction you're going in.
- You'll see a lot of equipment on the tour today. For your safety, it's important that you don't touch any of the equipment and always follow my directions.
- Also, you may not take pictures or record anything while on the tour. We have a place where you can have your photos taken at one of our tour stops.
[Note to Tour Guide: Please make sure to alert your tour group when you reach the location for photos! Also let the tour group know how to access restrooms and water if needed.]

- You can ask questions as we go and at the end too. We will certainly stop to ask for your ideas and to take a few polls along the way.
- Any questions about safety or the plan for the tour?
- OK, let's get going on today's tour!

Stop: Inbound (5 minutes)

Location: Receiving

Steps:

Introduce "Receiving" and explain how the cloud works.

SAY:

- Before we can ship items to our customers, the items first need to travel to the FC from the people and businesses who make them. These items come from all over the world and are made by all types of people.
- All the items in the FC that we sell and ship to our customers are called our **inventory**.
- From here, you can see where we receive new inventory.
- Our employees unload the items from trailers in our Receiving area and get them ready to be put away. Then other employees will check in the items and put them on shelves.
- It's kind of like when you get a present delivered to you at your home. When you bring that package inside, you're receiving it.
- Take a minute to picture the way you organize things like clothes, toys, or books. Do you have a special place to keep them? Do you keep them in any order?

Give Girl Scouts time to think about organizing and share their ideas with a partner.

SAY:

- If you were a computer, all those things you organize would be data. Where you keep them, and the order you keep them in, is a database!
- When companies send us items to sell, like sports equipment, toys, or school supplies, they also send information, like what the item is, how much it weighs, and how big it is.
- We save all this information in "the cloud." That's a group of large computers that are connected, called a network, where information or data is stored online. Then all of that information is stored together in our online database, kind of like an online library!
- At Amazon, the cloud organizes the information that helps us with our fulfillment process.

Move to view stowing from viewing area on the second floor; introduce "Stow." Note that some Girl Scouts may have read a book or seen a movie where a character is a "stowaway." If this comes up, explain that the word relates to objects and not people.

SAY:

- **Stow** means "put away." At this station, our employees receive products and place them into our inventory.
- Stow is one part of the process we call "Inbound" because it's where products come into the FC. What do you think we call it when we send products out to customers?

Let Girl Scouts answer.

SAY:

- Right, we call it “Outbound.”
- When new inventory arrives at the FC, our employees scan the barcode of each item. Does anyone know what a barcode is?

Show Girl Scouts an item with a barcode.

SAY:

- A **barcode** is a group of different-sized lines that represent numbers. Each barcode is a special ID number for a product. When an employee scans a barcode, information about the product pops up on their screen.
- This is a Non-Sortable Fulfillment Center where we use PIT equipment to stow items. “PIT” stands for “powered industrial truck.” One type of PIT equipment you might recognize is a forklift. I call the equipment we use for stowing a PIT stower.
- Next, the employee puts the item on a shelf and scans the barcode that’s on that shelf. All that information—what the item is and where it is on the pod—goes to the cloud. That helps us know exactly where the item is.
- Once the stowing process is finished, a robot moves it to be stored until a product on it has been ordered.
- Did you know that at some of our FCs, there are robots called drive units that move big yellow storage pods? That type of fulfillment center is known as an AR Sortable FC.
- Our newest type of drive unit is called Hercules. Hercules is a character from Roman mythology (in Greek mythology, he’s known as Herakles). He’s famous for being very strong. I can’t say for sure that Amazon’s Hercules was named after him, but I think the name fits.
- And that’s it for “Inbound.” Now our system has the information it needs to help the employees fill customer orders.

Ask Girl Scouts the “Poll Question” below and invite them to raise their hand for the answer they choose.

Poll Question:

At Amazon, FCs are sometimes 28 football fields large. We store tens of millions of items on shelves. How do you think we arrange all of our inventory in the warehouse and on shelves? What do you think is the best way to organize our inventory to ship customers’ orders as fast as possible?

- A. Alphabetically by name
- B. By their purpose (cleaning supplies, art supplies, sports items, clothes, etc.)
- C. By their color (orange items, green items, blue items, etc.)
- D. Randomly—we don’t organize them in any way

Share the answer: D. Randomly—we don’t organize them in any way.

SAY:

- Surprise—we don’t use any kind of order! We physically store most products in our FCs randomly, or without an order, on shelves.
- We do this because we discovered that it’s faster to have items spread out than it is to have them in one spot. And our database and robots help us make it happen!

- You'll see how this works at our next stop, where we will move on to "Outbound" and see how items leave the FC to go to customers.
- As we move to our next stop, chat with your partner about why you think storing items randomly may be more helpful for our goal of being efficient.

Stop: Outbound Intro (15 minutes)

Location: Picking

Steps:

Introduce the "Outbound" process and algorithms.

SAY:

- Here we are able to see the picking area, and guess what? It's at the exact same location as the stow area!
- We just learned how the items we sell online arrive at our FC and how information about them goes into the cloud.
- Now let's explore what happens when a customer orders an item from our website.
- Has anyone you know, like your family or friends, ever ordered from Amazon? What did they buy?
[Girl Scouts may say, "Clothes; food; books; everything; etc." If needed, show or describe a sample item.]

Ask Girl Scouts the "Poll Question" below and invite them to raise their hand for the answer they choose.

Poll Question:

Computers help speed up our fulfillment process from the time a customer orders an item to when we send it out. So what do you think is the shortest amount of time it's taken Amazon to deliver an item, from the customer clicking "Buy" to the product being in their hand?

- A. 3 minutes
- B. 13 minutes
- C. 33 minutes
- D. 53 minutes

Share the answer: B. 13 minutes. Introduce algorithms.

SAY:

- The correct answer is 13 minutes! That's superfast. Our average time is around 24 hours.
- But how do computers help Amazon deliver our customers' orders so fast? How do computers know what to do? By using algorithms!
- An **algorithm** is a set of step-by-step instructions for how to do something. When an algorithm is written in a language computers can understand, or "coded," the algorithm becomes part of a computer program.
- Programs can tell computers to do everything from turn on and off to play a video to get our customers their orders.
- Let's do a quick activity now to explore algorithms in small teams of three or four.

Have Girl Scouts divide into small groups of three or four.

SAY:

- Do you think you can write an algorithm to tell another team member how to complete a familiar task, like making a sandwich or brushing your teeth? With your team, pick a simple physical task to turn into an algorithm. Then brainstorm the steps needed. Try to choose a simple task that could be completed in about ten steps or less.
- Then choose a team member to act out the algorithm, with other members telling them the steps one at a time. As you test your algorithm, pay attention to any problems you find.
- Let's take a few minutes now to create and test algorithms!

Give teams five minutes to brainstorm and act out their algorithms. If they need ideas for simple tasks, offer suggestions like sorting objects into different bins by size or color, vacuuming a room, feeding a pet, or wrapping a present. If they have trouble testing, ask questions like, "Do you just need to rearrange the steps or did you leave something out?" After five minutes, have each team share and act out their algorithm.

After teams have shared, encourage reflection and allow Girl Scouts to talk about their experience.

Ask questions like:

- What was it like to create an algorithm?
- Did you have any challenges? Was it harder or easier than you thought it would be?
- Did you have to make changes?

SAY:

- Now that you know all about algorithms, let's take a look at how our system uses them. It all starts with a customer.
- When a customer buys something from our website, our system uses algorithms to figure out which FC has the item in stock. It uses another algorithm to analyze the customer's address for delivery, and chooses the best FC to deliver from. Our system looks at a combination of what's fastest, how an item will travel best (such as by air or land), and who is available to bring it to its destination.
- Once the system chooses a Fulfillment Center for the order, the "Outbound" process begins. It has four steps.
- First is "**Pick**," where we gather the items for customer orders from storage.
- Then there's "**Pack**," where we place the items into boxes for delivery.
- Next is "**SLAM**," where each package is checked and labeled with the customers' addresses.
- Finally, there's "**Shipping**," where we load the packages onto trucks and send them out for delivery to our customers' doors!
- All four of these steps can happen very fast. A customer's item can arrive at their doorstep as soon as an hour after they order it. Sometimes, we've managed to do it even faster than that!
- And as I said before, we wouldn't be able to fulfill orders that quickly without the help of all the amazing technology (and algorithms!) that are part of this process.

Stop: Pick (10 minutes)

Location: Picking

Steps:

Introduce “Pick” and explain how robots are used in the fulfillment process.

SAY:

- Welcome to our next step, Pick! Here you can see our OPs, or order pickers, in action. OPs are just another type of PIT equipment used in this building to pick customer orders.

Have Girl Scouts examine the “Pick” station.

SAY:

- Our “Pick” stations are loaded with technology to make the process efficient and keep our employees safe.
- Our system uses **data**, or information to guide our scanners and pickers. I have a scanner here so you can all see what it looks like.
- The data from the cloud about the items on the shelves helps us figure out where the item we need is stored.
- Does anyone remember how we store our inventory? (**Answer: Randomly.**)
- Items are stored randomly. We’ll use data from the cloud to find the best picking order so our employees won’t have to go back and forth to pick.
- The system uses an algorithm to figure this out. It finds the most efficient combination of picker, shelf, and aisle to process each customer order.

Explain what people do at “Pick.”

SAY:

- The picker drives the order picker PIT equipment into the aisle where the customer’s item is stored. The picker knows which aisle to go to because their scanner shows them the exact aisle, shelf level, and bin location to pick from.
- When the picker arrives at the correct location, they check their scanner, which will show them the item they’re looking for. The screen on the scanner gives information to help our picker find the exact item they need, including the product’s name and type.
- Once the picker finds the item, they use the scanner to scan its barcode.
- Then the picker places the item into a plastic box, or tote.

Show Girl Scouts some of the sensors at the Pick station.

SAY:

- The picker continues putting items into this tote until it’s full, either by volume or by weight. Does anyone know the difference between volume and weight?
[Girl Scouts may say, “How heavy it is; how full it is; I don’t know; etc.”]
- Volume is how much space something takes up. **Weight** is how heavy something is.
- For example, a tote could be full with one really big but light item, like a giant pillow, that has lots of volume. Or a tote could have a few really heavy items, like bowling balls. Or a tote could have 50 smaller items, all belonging to 50 different customers!
- For safety, the weight limit for a tote is 25 pounds. That’s how much an employee can safely carry a short distance. The employees decide when a tote is full by volume—like with that great big pillow.

Stop: Pack (8 minutes)

Location: Pack Station

Steps:

Introduce the “Pack” stop.

SAY:

- Welcome to Pack! This is where all of the items picked by our picker wonder team go into our smile boxes.
- As a business that sends out a lot of packages, we have a responsibility to ensure that we are doing everything we can to limit ways we might hurt the environment, so we try not to use more materials for packaging than we have to. And we want the packaging materials to be recyclable.
- Why do you think it’s important for us not to use extra boxes and for our packaging materials to be recyclable?
[Girl Scouts may say, “Plastics never go away; extra boxes means cutting down extra trees and using resources like electricity to make them; recyclable materials can be used again and that means new resources aren’t needed; etc.”]
- Yes! It’s important to remember that there are only so many natural resources on this planet, like trees, which are used to make boxes. In some places, trees are being cut down faster than they can regrow. We need to be mindful of the resources we use, and do what we can to reuse and recycle as much as possible!
- Amazon customers can decide if they want fast shipping in many boxes or everything shipped together in fewer boxes—it may take us a bit more time to deliver everything at once, but we save resources and help the planet!
- Using fewer natural resources, like water, trees, or energy, is one of the ways we try to make our process more **sustainable**. Sustainability also means using resources that nature can replace, like wind and solar energy.
- To help, we created the Frustration-Free Packaging Program, which works with sellers to use packages that are 100% recyclable and ready to ship. Since 2015, the program has allowed us to not use 2 billion cardboard boxes!
- This FC has large items, like bicycles and kayaks. We even have a machine that automatically builds the boxes around items, to make sure we use the least amount of cardboard needed!
- We also have a sustainability team that has the big job of finding ways to make our process better for the environment. They look for new ways to use recycled materials and clean energy sources, and environmentally friendly ways to deliver packages.
- Before we see the packing process, let’s do a quick poll to see how you think this all works.

Ask Girl Scouts the following “Poll Question” and invite them to raise their hand for the answer they choose.

Poll Question:

How does a packer choose the most efficient box for packing?

- A. They get years of training with the experts at our Special Packing School.
- B. They follow on-screen commands based on information about the item’s size.
- C. They use rulers and tape measures on each item and compare their measurements to the available boxes.
- D. They choose the box that looks big enough.

Share the answer: B. They follow on-screen commands based on information about the item’s size.

SAY:

- The correct answer is B. The packer follows on-screen commands based on information about the item's size.
- To ship orders efficiently, we need to pick the smallest box possible while also protecting the items.
- Remember how we learned in "Inbound" that data about each new item that arrives to the FC is added to the cloud? This is how the cloud knows things like an item's height, width, and weight.
- At "Pack," we use this same data to look up the item's size and weight. Then the system uses an algorithm to automatically figure out which box will be best (even when combined with other items!).
- Our database helps us ship orders efficiently by figuring out the package size for our employees.

Optional: Efficiency Experiment

Materials:

- Three shirts or sweaters with buttons

Steps:

Show Girl Scouts the sweaters/button-up shirts.

SAY:

- Let's do a quick efficiency experiment.
- When you button a shirt, do you usually start at the top, at the bottom, or in the middle? Do you think one way is faster than the other? If you do, which one?

Allow Girl Scouts to answer. Have them vote on which method they think is the fastest by raising their hand when that method is named.

Then ask for three participants to volunteer to wear the items. Give each one a shirt or sweater to put on. Ask one to button from the top, one from the bottom, and one from the middle.

SAY:

- Let's find out. We want the shirts to be buttoned up correctly—with all the buttons in the proper buttonholes.
- When I say go, start buttoning. 1, 2, 3...GO!

Watch to see who finishes first. Usually, buttoning from the bottom is the quickest method, with the fewest mistakes, but it doesn't matter which one is fastest.

Then have Girl Scouts reflect on the experiment.

SAY:

- Why do you think this method was the most efficient—the quickest with the least mistakes?
[Girl Scout answers will vary.]
- Instead of buttons, what could we use on the shirt to make putting it on more efficient?
[Girl Scouts may say, "A zipper; snaps; Velcro; nothing—a pullover; etc."]

Explain how Amazon makes packing orders efficient.

SAY:

- At Amazon, we studied the most efficient way to package customers' purchases and used what we learned to create the pack process.
- We have empty boxes, a paper dispenser [or site equivalent], a tape machine, a screen, and a scanner at our packing stations. The **scanner** captures images, or pictures, of the orders as they're packed, so employees can see them on computers. There's also a conveyor belt that moves the orders from stop to stop.
- To start the packing process, an employee takes a tote or large cart filled with items and scans its barcode. This tells the system which tote or cart we are working with. Now remember, our system already knows which items are inside this tote or cart because our picker scanned the items into it!
- Next, the employee takes an item, double-checks that it's in good condition, and scans the product barcode. The system tells the employee which box to use.
- After that, we come to the tape machine! The tape in this machine is different from the types of tape we use at home.
- There are two taping systems used in this FC. One is for small- to medium-size boxes, and the other is for larger boxes. Let's talk about the small to medium boxes first.
- At first, the tape isn't sticky at all. But at the press of a button, the machine cuts the correct length of tape for the box and, at the same time, gives it the biggest wet lick you can imagine, making the adhesive, or glue, sticky, just like an envelope. For larger boxes, we use a tape machine with clear tape that we can apply to the box as it moves down this conveyor belt, or we can apply clear tape manually using a handheld tape gun.
- In goes the item, along with any padding that's required, and the box is taped shut.
- Then a new barcode label is scanned and put on the box to identify it, like the license plate on a car. At this point, it's just a bunch of numbers and letters with a barcode that only the system understands.
- You see, we don't place the customers' details on the box; we don't even tell the packer who it belongs to. That's because we think it's important to protect our customers' privacy.
- Once packed, the package goes onto the conveyor belt, joining all the other packages that our team of packers has assembled.
- And that's all for packing!
- As in all other areas of our FCs, we continue to find ways to improve this process to be even more efficient and friendlier to people and the environment.
- What ideas do you have for how we could improve our process?

Let Girl Scouts share ideas before moving to SLAM.

Stop: SLAM (7 minutes)

Location: SLAM Station

Steps:

Introduce SLAM and explain what it means.

SAY:

- Welcome to **SLAM**. SLAM stands for Scan, Label Apply, and Manifest.
- This is the station where our system uses data stored in the cloud to check that each box has the correct item and gives it a shipping label. This is important because we want to send the exact item our customer ordered. This is called quality control.
- **Quality control** happens when we check to make sure the products are well made and every order is correct.
- For example, imagine you're getting ready to go on a camping trip. Before you leave for your trip, you want to be sure you're well prepared. Where or when would you stop and check to make sure you had what you needed for your trip to be safe and successful?
- Turn to the Girl Scout next to you and brainstorm some places you'd do quality control to prepare for a camping trip.

Give Girl Scouts a few minutes to brainstorm quality control points. Then ask teams to share one of their ideas. *[Girl Scouts may say, "Check to make sure I have all my gear; check the weather to make sure I have correct clothing and gear for the expected conditions; check to make sure I've told people where I'll be hiking and camping in case of emergency; check guidelines at campground and hiking trails to make sure what I want to do is possible; etc."]*

SAY:

- There are lots of chances for quality control when you're planning a camping trip!
- And just as you make sure you're prepared for a camping trip, we want to make sure our customers' orders are correct. Why? Because we want our customers to be happy, and we want our process to be efficient and sustainable.
- Next, you'll learn how SLAM works at this stop, but first, that's right! Let's do a quick poll!

Ask Girl Scouts the "Poll Question" below and invite them to raise their hand for the answer they choose.

Poll Question:

When the SLAM system performs one final check to make sure the item is correct, what does it do?

- A. Weighs the box as it goes over the conveyor belt.
- B. Uses an X-ray machine to scan the box and check if the item inside is correct. An X-ray is a special kind of picture that can show you what's inside the box.
- C. Uses a robotic arm (a mechanical arm that lifts and moves things) to rattle the box and microphones to listen for the correct sound.
- D. It doesn't perform any more checks—this is a trick question.

Share the correct answer: A. SLAM weighs the box as it goes over the conveyor belt; that weight gets compared with the item's weight using information from the cloud.

SAY:

- First, at **Scan**, the label is scanned and tells the system what is supposed to be in the box.
- The box is also weighed so it can compare the box’s weight with the item’s weight, using information from the cloud.
- If the weights match, then the mailing address is printed and put on the box. That’s **Label Apply**, or the L and A part of SLAM.
- As the name suggests, a robotic arm slams down onto the box, sticking the label. Well, actually, it kind of stops just before touching it, and a tiny air hose blows it the rest of the way. This helps us avoid air bubbles.
- If the weights don’t match, the box gets sent to another station where an employee can fix the problem.
- That leaves us with the Manifest part of SLAM. A **manifest** lists information about the package, like what’s in it, its weight and measurements, how it’s being shipped, and who it’s going to.
- At Manifest, the shipping label is scanned one more time. This puts all of the data about the package into our database.
- If everything works as planned, SLAM happens without any humans involved. Can you believe that? Using all the data we have stored in the cloud, the system can check the order, apply a label, and send the package to shipping.
- Of course, people—like engineers and programmers—make *that* possible by designing the machines and algorithms that tell the system how to do it all. And if there is a problem, only a human being can fix it!

Stop: Ship (5 minutes)

Location: Area overlooking Shipping

Steps:

Introduce Girl Scouts to “Shipping.”

SAY:

- Welcome to “Shipping,” the last stop and final part of the journey our items take before leaving the FC for our customers’ addresses.
- Here we have a bunch of trucks that our packages are loaded into, each going to a different place based on the item type and the customer’s address.
- Before we explore how shipping works, let’s do another poll!

Ask Girl Scouts the “Poll Question” below and invite them to raise their hand for the answer they choose.

Poll Question:

How are packages organized for loading onto the trucks?

- A. They aren’t organized; just as in our storage locations, we randomly load our trucks with packages.
- B. The packages are presorted using a high-tech conveyor system, like the roller-coaster conveyor belts and ramps that move products and boxes throughout the FC.
- C. Robotic arms pick up each item and sort it into the truck.
- D. Packages are sorted by hand, with each address label being read by an employee.

Share the correct answer: B. The packages are presorted on the conveyor system. The system pushes the packages off on the chute for the correct truck.

SAY:

- As packages make their way from SLAM, they travel onto the sorter conveyor belt where another sensor will scan each box. Then the system will figure out exactly which truck each package needs to be loaded into.
- Once a box reaches the off ramp closest to that truck, the conveyor will move that box into the truck.
- From there, boxes are either loaded into cages or rolled directly into the trucks.
- For the packages rolling directly into the trucks, our employees pack them just like you might fit your camping supplies into your backpack. They don't know what size box is coming to them, but they need to make it fit within the walls of the truck.
- Once the truck is full, it leaves for the customers' addresses.
- Along the way, the trucks go to delivery stations where the packages are loaded into smaller delivery vans.
- Otherwise, huge trucks would have to deliver customer orders—that wouldn't be very efficient at all! Using a huge truck to deliver individual packages would waste fuel and be a waste of all that space on the truck!
- So what do you think would be a better way to deliver packages?

Ask Girl Scouts the “Poll Question” below and invite them to raise their hand for the answer they choose.

Poll Question:

What does the future of Amazon delivery look like?

- A. Electric delivery vehicles, like cars, trucks, and vans powered by electricity instead of gas or diesel fuel.
- B. Delivery robots that move on wheels and have boxes or coolers to deliver products to customers.
- C. Drone delivery, using a flying vehicle that's controlled remotely and has no human pilot onboard.
- D. All of the above!

Share the correct answer: D. All of the above! Amazon already uses electric vehicles, robots, and drones to deliver packages.

SAY:

- We have many exciting new ways to deliver items to our customers.
- Remember how Amazon wants to protect the environment?
- We plan to have 100,000 custom-built electric delivery vehicles, fueled by electricity instead of gasoline. Why do we want to use electric vehicles instead of ones fueled by gasoline or diesel fuel?
[Girl Scouts may say, “I don't know; gas-fueled cars cause pollution; electric vehicles don't create pollution; etc.”]
- These electric vehicles don't cause pollution. Electricity is also a renewable fuel. That means we won't run out of it, like gasoline, which comes from oil in the ground. Some of these vehicles are already being used to deliver orders today!
- We also use a robot called Scout to deliver packages in many cities in the U.S. Just like the Girl Scouts, Scout is helpful! Wouldn't it be fun if Scout delivered Girl Scout cookies that people buy through your virtual cookie booth?
- But possibly most exciting of all is the development of our Prime Air delivery drones. A **drone** is a remote-controlled flying vehicle. It will be able to deliver smaller items to customers within 30 minutes of orders being made! Can you imagine a little flying machine bringing the birthday present you ordered for your friend to their house?
- So the answer to the last question is: “All of the above!”

Closing (5 minutes)

Location: Welcome Room

Steps:

Review the fulfillment process with Girl Scouts.

****Note to Tour Leader:** If you're doing the optional activity at the end of this script, complete it before moving ahead with the tour wrap-up below. Alternatively, you can distribute the **Hercules Robot Challenge** handout to each Girl Scout to complete the activity after the tour.*

SAY:

- So that's how we get customers the things they order from Amazon. Did you enjoy learning about how we do it?
- Do you remember the four steps? (**Answer:** Pick, Pack, SLAM, Ship.)
- What was your favorite step? Why?
- Do you have any questions about robots, the cloud, or sustainability?

Invite Girl Scouts to reflect on what career(s) they may be interested in.

SAY:

- Do you think you'd like to work with robots, like the robotics engineers? Or design workstations to be safe and efficient? Engineers do that too. Did you like creating algorithms or seeing how our system uses algorithms to guide Hercules or help employees? You might like to write computer code! We also always need more people to think creatively about how to protect the environment.
- If you had fun today, you can continue to learn about robotics, engineering, computer coding, and the environment with Girl Scouts.
- Thank you all for attending!

Optional Activity: Hercules Robot Challenge (20–30 minutes)

**Note to Tour Leader: If you're doing this activity, complete it at the beginning of the Closing section before wrapping up the tour. Alternatively, you can distribute the Hercules Robot Challenge handout to each Girl Scout to complete the activity after the tour.*

Materials for each team of 3–4 Girl Scouts:

- **Hercules Robot Challenge** handout
- Pencil
- Paper
- **Optional:** To create a life-size grid, you'll need masking tape or 36 sheets of scrap paper AND 5 boxes or books to represent pods

Prepare Ahead: To do this activity with a life-size grid:

1. Create a 6x6-inch grid with sheets of paper or masking tape for each team. Make sure the boxes are big enough for a child to act as Hercules during the activity and follow their teammates' instructions to navigate the grid.
2. Following the grid on the **Hercules Robot Challenge** handout, mark one box with a star or sign—this will be the special pod for Hercules to retrieve. Then mark Hercules's starting point with tape in the box and the Pick Station with tape or a sign in the box.

Steps:

Introduce the activity.

SAY:

- Remember how the Hercules robots move the pods to the picker? How do the robots move around on the floor and not bump into each other?
[Girl Scouts may say, "They move on a grid and use sensors to know where they are and not bump into things; they use scanners and the cloud; I don't remember; etc."]
- Hercules robots move around the robotic field on a grid or checkerboard. They use sensors to scan each square of the grid to tell the system in the cloud where they are in the grid. They also have sensors to tell them if there are obstacles, like pods or people, in their way. Our system identifies which pod they need to take to the picker.
- Next, working in small teams, you're going to write an algorithm to navigate the Hercules robot through the FC. Your goal is to use a set of commands to move the Hercules robot around every obstacle, to pick up the correct pod, and to move the pod to the picker.
- To help, we have a grid, like a checkerboard, as a map of the robotic floor. The grid shows where the Hercules robot starts and the pick station where it needs to bring the correct pod. It also shows other pods that might be in the way.

Next, go over the commands Girl Scouts can use to direct the Hercules robot (also found on the handout):

- **Forward:** Move one square forward. The Hercules robot cannot move off the grid.
- **Back:** Move one square backward. The Hercules robot cannot move off the grid.
- **Right:** Turn to the right, do not take a step, and stay in the square.
- **Left:** Turn to the left, do not take a step, and stay in the square.
- **Pick Up:** When you reach an object, pick it up.

SAY:

- Now, to play, study the grid and create an algorithm using the commands. For example, where's the Hercules robot? Where's the pod? Where's the picker?
- First, notice where the Hercules robot starts: on the square in the grid opposite the pick station.
- The picker's station is along the side of the robotic field—that's where the Hercules robot will bring the special pod. That's your goal.
- So, how can you move the Hercules robot to the pod, command it to pick up the pod, and bring the pod to the picker?
- Create an algorithm to test and try it out!
- Remember, you can use the commands: FORWARD (plus the number of squares), BACK (plus the number of squares), RIGHT, LEFT, and PICK UP.

Divide Girl Scouts into small groups of 3–4 for the activity and distribute supplies. Answer questions and provide support as teams create their algorithms. While working, they can either: 1) give commands aloud, testing their algorithm step-by-step as they go, or 2) write all steps of the algorithm on their handout before testing it.

As teams create and test their algorithms, introduce debugging.

SAY:

- Testing is an important part of robotics and computer science.
- After you create or write your code, make sure to test it, moving the pieces on the grid to make the Hercules robot go to the correct pod and take it to the pick station.
- If you find problems, rewrite your algorithm to fix it. That's called **debugging**.

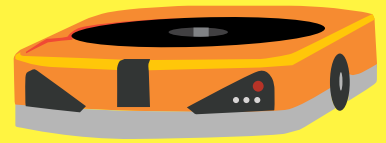
Once teams have navigated the Hercules robot through the grid, rearrange the obstacles (pod), and teams can create another algorithm to play again!

After Girl Scouts have completed the activity, let them reflect on their experience.

SAY:

- How did it go writing code to guide the Hercules robot?
[Girl Scouts may say, "It was fun; it was hard; it was easy; etc."]
- Do you think you'd like to be a computer scientist or a robotics engineer?
[Girl Scouts' answers will vary.]







Hercules Robot Challenge



A computer program is a type of algorithm—a set of step-by-step instructions. The list of steps for telling the robot how to complete a task is an algorithm. Recipes and driving directions are algorithms too! Computer programs are written in code, a language that can be understood by machines.

Your Challenge:

Use the set of commands to navigate the Hercules robot through the FC. Move the Hercules robot from the starting point around every obstacle to pick up the correct pod and move it to the picker.

	POD with item for customer's order 				
			POD 		
POD 					
				POD 	
		POD 			
START					PICK STATION 

Tip: Use a ball of paper to represent your robot! Move it around the grid to test your program.

COMMAND SET

- ▶ **Forward:** Move one square forward. The Hercules robot cannot move off the grid.
- ◀ **Back:** Move one square backward. The Hercules robot cannot move off the grid.
- ↘ **Right:** Turn to the right, do not take a step, and stay in the square.
- ↙ **Left:** Turn to the left, do not take a step, and stay in the square.
- ^ **Pick Up:** When you reach an object, pick it up.