ACTIVITY 2:  
(35-45 minutes)

THE CYBERSAURUS MYSTERY

Introduce this activity by reviewing what was discovered earlier. **Say:** In the last activity, we discovered that people’s body proportions are often the same. What were some examples we found? Listen to responses. If necessary, **prompt:** The length of a person’s foot was about the same as the length of their forearm and head length; seven foot lengths were the same as their height, etc. **Ask:** What do you think — could animals have their own set of body proportions like we do? Listen to responses, then **say:** Many animals do have their own set of body proportions, and scientists actually use this information to figure out the overall size of prehistoric animals from single fossilized bones or tracks!

Now tell the kids the following: **OK,** now let’s enter the imaginary world of cyberspace. Close your eyes and picture this. Deep in the heart of EcoHaven Forest, Motherboard has found a very rare CyberSaurus — a baby — who’s lost its mother. Can you picture the baby? She wants to build it a home — a safe place to live — before Hacker starts any trouble. No problem so far, right? Actually, Motherboard does have a problem. The home she wants to build has a door, and Motherboard wants the door to be high enough so when the CyberSaurus is fully grown it can walk through without bumping its head! But how high is that?

It’s time to be detective scientists again. **Let’s take a look at Motherboard’s clues.** Clue #1: the baby’s footprint (**hold up BABY CYBERSAURUS FOOTPRINT**). Clue #2: the baby’s height (**hold up the 60-inch strip of crepe paper**). **And Clue #3: the length of the mother’s footprint** (**hold up the 40-inch strip of crepe paper**). **Ask:** Are these three clues enough to find out how tall the baby will be fully grown so the door will be high enough? Listen to responses. **Then say:** Let’s take a few minutes to see what we can figure out from the clues.

Organize kids in groups of 3 or 4. Give each group a roll of crepe paper streamers, a ruler or tape measure, scissors, a copy of the **BABY CYBERSAURUS FOOTPRINT**, and the 60-inch strip of crepe paper labeled ‘Baby’s Height.’ As kids brainstorm ideas, **prompt:** Is there a relationship between the length of the baby’s foot and its height? How could you find out? Listen to responses. If necessary, remind kids about how they discovered the relationship between the length of their own footprint and height. Allow time for kids to explore. Explain that they may get more ideas after they watch the next video segment.
4. Now give each group the 40-inch strip of crepe paper labeled ‘Mother’s Foot Length.’ **Ask:** Is there a relationship between the length of the mother’s footprint and the baby’s footprint? **How could you find out?** Listen to responses and allow time for kids to explore. **Then ask:** Can you think of a way to find out how tall the CyberSaurus will be so Motherboard can make the door high enough? Listen to responses. (Again, they may get more ideas after they watch the next video segment.)

**Possible solutions:** One way is to measure the baby’s height in baby foot lengths (6 foot lengths), and predict that, since the baby’s height is six times the length of its foot, the fully grown mother’s height might be six times the length of her foot. Kids could measure out six of the mother’s foot lengths on a crepe paper streamer to show its height, or multiply 6 times 40 (the length of the mother’s foot) to get 240 inches, or 20 feet tall.

Another way is to find the relationship between the baby’s foot and the mother’s foot. Since there are four baby footprints to one mother footprint, kids might reason that the fully-grown mother might be four times the height of the baby. They could then measure this out on the crepe paper strip to show the height. Or they could multiply the height of the baby (60 inches) times 4 to get 240 inches or 20 feet.

5. **Introduce the segment.** **Say:** Let’s see what the CyberSquad does to solve a problem like yours. View the segment.

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<tr>
<th>Segment Start</th>
<th>Segment Length</th>
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<td>17:22 (or about 2:46 from end of second segment)</td>
<td>1:40 minutes</td>
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<td>Matt: Come on! We can’t just stand here. We’ve got to find Choocroca before they do!</td>
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<td>Matt: And if it does, I bet the same goes for the suspect!</td>
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6. **Ask:** Did this give you any new ideas? **How can we find the height of the CyberSaurus when it is fully grown?** Listen to responses. Allow 5 to 10 minutes for groups to try their ideas. Share results.

7. Congratulate the kids on their clever sleuthing. Then say that Motherboard has one more request. She has always wanted to know what this rare CyberSaurus looks like but, try as she would, she has never been able to see one! Provide materials as time allows (paper and markers or paints, clay dough or other sculpting materials), and invite kids to draw pictures or make models to show what they think the CyberSaurus looks like. Have kids share their creations with each other.

End the session by **asking:** What did you find out about today that you didn’t know before?

*(End of Activity #2)*
How Do Scientists Know About the Size of Prehistoric Animals?

Dinosaurs don’t exist anymore, but scientists do know a lot about their size and shape. How can they know this? Paleontologists – scientists who study the fossils of ancient animals – use evidence from fossils of dinosaur bones or dinosaur footprints. From what they know about animals living today, they believe that dinosaurs had their own proportional body measurements, and they use these proportions to estimate how big the animal was.

And the math works for other prehistoric animals as well. In South Dakota, paleontologists estimate the size of mammoths that lived thousands of years ago based on the proportions of their relatives alive today. The Mammoth Site (www.mammothsite.com) is an active dig where scientists study Ice Age fossils. They have found tracks of mammoths, ancient elephant-like creatures, and use the length of the tracks to estimate the mammoths’ overall size.

How do they do this? Since mammoths are in the Elephantidae family, they are closely related to elephants. Since an elephant’s height at the shoulder is about six times the length of its footprint, paleontologists at the Mammoth Site use this information to figure out the overall size of the mammoth — when all they have are tracks!

This Columbian mammoth towered over 13 feet tall.

For more math fun, go to pbskids.org/cyberchase
WAIT, THERE’S MORE!

WORKSHOP EXTENSIONS
Many science museums display fossils of prehistoric animals. Often, these exhibits reveal the overall size of the prehistoric animals, even when the fossil remains are incomplete. To determine the overall size, paleontologists draw from what they know about the body proportions of animals living today. (For example, to estimate the wing span of a prehistoric dragonfly when a fossil shows only the length of the body, scientists would look at a dragonfly living today. They would figure out the relationship of that insect’s body length to its wing span and use that proportion to make a guess about the fossil dragonfly’s wingspan.)

You can extend this workshop by sharing exhibits in a nearby science museum with kids, or by inviting a paleontologist to talk with your kids about how they use math to figure out what animals were like thousands and even millions of years ago.

CYBERCHASE WEB SITE
For more math games related to the show, log on to pbskids.org/cyberchase!

BOOKS TO READ
How Big Is a Foot? Written and illustrated by Rolf Myller (Dell Yearling, 1990)

Cam Jansen and the Mystery of the Dinosaur Bones
by David A. Adler (Puffin Books, 1991)

There are many great books about dinosaurs available at your local library. One that we like is the Magic Tree House Research Guide #1: Dinosaurs
by Will Osborne and Mary Pope Osborne (Random House, 2000)

TAKE-HOME STORY STARTER
Give each child a copy of “My Cyberchase Adventure.” Invite them to use their imaginations to finish the adventure and draw pictures to illustrate it.
HOW TALL IS BIANCA?

(Use with Activity 1)
(Use with Activity 1. If resources allow, make enough photocopies of this page for each participant. Cut out the footprint.)

BIANCA’S FOOTPRINT

For more math fun, go to pbskids.org/cyberchase
# Cyber Sleuth Notepad

<table>
<thead>
<tr>
<th>Body Part</th>
<th>How Many Foot Lengths? (Measure to nearest foot length)</th>
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## Notes:

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Baby Cybersaurus Footprint
Saturday morning Jackie was playing in her room. Suddenly, Motherboard appeared on her computer and said, “Hacker Alert!” The next thing Jackie knew she was tumbling through a portal. She landed in R-Fair City where Inez, Matt and Digit were already waiting.

“Here’s the problem,” said Digit. “Hacker has locked the gate to the Amusement Park. No one can go on the rides or play the games!” He pointed to the lock. “To unlock this, we have to push the correct button and flip the correct switch.”

“But which of these buttons and switches will work?” asked Inez.

“Let’s just try them and see!” Matt said. He pushed a red button and flipped a blue switch. Then he tried a green button and a yellow switch, with no luck.

“Wait a sec,” said Jackie. “How are we going to keep track of what we try? There are so many possibilities!”

Help the kids get organized! Write your plan here:

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The End