



Smithsonian

Helping Injured **Animals**



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Meet Karl

Karl is a hornbill who looks just like his name sounds. His **bill** looks like a long horn. Karl uses his bill to pick up food. It would be very hard for Karl to eat without it.



Karl the hornbill

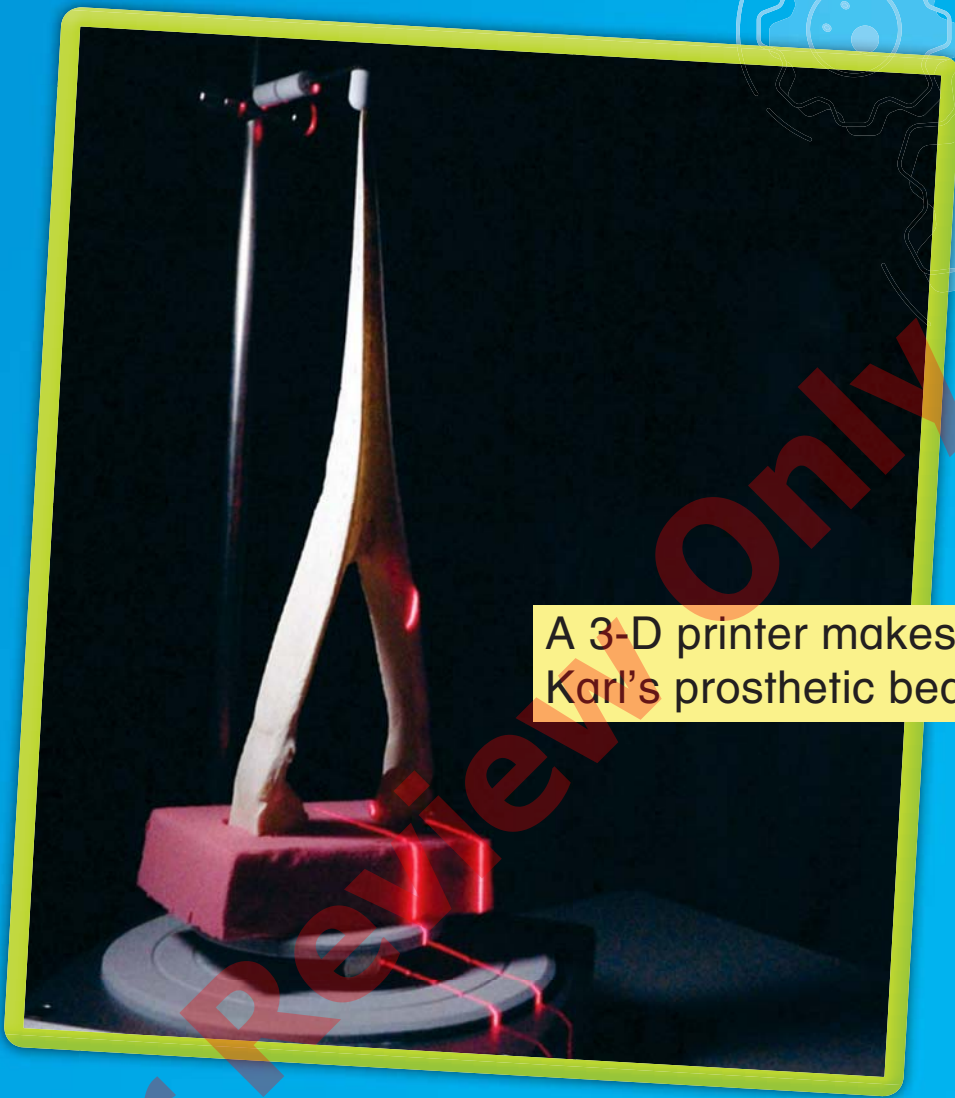
Karl uses his
bill to hold food.



Sadly, the lower part of Karl's bill had worn away! Scientists helped him. They used a **3-D printer**. With it, they made a new part. The part is called a *prosthetic beak*.



Karl's bill has worn away.



A 3-D printer makes Karl's prosthetic beak.

Technology & Mathematics

Animal Avengers

This group of people helps animals. They give their time and talents. They raise money as well. They help solve problems and protect animals.

The new part of Karl's bill is just right for him. Now he can use his bill like any other bird.

Technology is amazing. So is Karl!



Doctors make sure
Karl's new beak will fit.



Engineering & Arts

Who Are You?

Some animals use color to help spot friends and foes. Some toucans' beaks are orange. Prosthetic beaks for these birds must be orange as well. If not, the birds will be **rejected!**



STEAM CHALLENGE

The Problem

Pip the dog needs your help! She has hurt her tail, which she uses to show her feelings. Now she cannot wag it to show she is happy. She cannot lower it to show she is sad. Pip needs you to make her a tail so she can show what she feels.

The Goals

- Make a model of a tail with any material that can move and bend.
- Make a light and soft tail so it will not hurt Pip.
- Make sure your prosthetic tail can be attached to Pip.





Research and Brainstorm

Why does a dog need to communicate?
What other ways can a dog “say” what it feels?



Design and Build

Draw your plan. How will it work?
What materials will you use? Build your model!



Test and Improve

Test the prosthetic tail by attaching it to your body. Try to show feelings with it. Does it work? Can you improve it? Try again.



Reflect and Share

Why should people help animals with prosthetic parts? Are there other ways to help animals?