The Princess Program STEM

Habitat Heroes

Building Animal Homes with STEM MagicPOWERs

By The Princess Program STEM

Habitat Heroes:

Building Animal Homes with STEM MagicPOWERs

This book belongs to:

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Developed for The Princess Program STEM by Dr. Kelsey Kirrene
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Meet The Fairy God Engineer

The Fairy God Engineer is a whimsical and wise mentor known throughout the kingdom for her enchanting STEM Magic Powers. With a passion for problem-solving and designing magical solutions, she helps princesses, inventors, and dreamers alike bring their grandest ideas to life.

Join the Fairy God Engineer on an exciting adventure where creativity meets STEM Magic, and together, we'll build a world of endless possibilities!

What is Engineering?

Engineering is like being a problem-solving superhero! Engineers use their creativity and knowledge to design and build things that help people and the world.

They might create cool gadgets, build strong bridges, make fast cars, or even design amazing buildings. Engineering is all about using design, science, and math to come up with solutions to make our lives better and solve important challenges!

Engineers often work as a team, combining their unique skills and ideas to tackle big challenges and create amazing inventions that would be difficult to do alone.

WHAT ARE SOME THINGS YOU HAVE SEEN THAT AN ENGINEER BUILT?

WRITE OR DRAW THEM BELOW!

Engineering MagicPOWER

The Fairy God Engineer is no ordinary fairy; she has extra special STEM magic powers that she uses to help animals all over her kingdom, and you can too!

P

Plan for Known Needs

The Fairy begins her mission by planning meticulously. She studies and understands the specific needs of various animals and their habitats. Whether it's a burrow for rabbits, a nest for birds, or an aquatic home for fish, the Fairy ensures that her designs cater to every creature's unique requirements.

O

Organize Innovative Designs

Armed with insights into animal needs, the Fairy uses her engineering skills to organize innovative habitat designs by brainstorming! She gets creative, thinking about how to make these homes safe, cozy, and sustainable. Her designs are not just functional but also environmentally friendly, using materials that harmonize with the natural world.

W

Work on Prototypes

The Fairy doesn't stop at sketches and plans. She rolls up her sleeves and gets to work on building prototypes of her habitat designs. Using twigs, leaves, mud, and other natural materials, she brings her visions to life, ensuring that they can withstand the real-world challenges animals face.

E

Evaluate Your Solutions

Once the prototypes are ready, the Fairy subjects them to rigorous testing. She observes how animals interact with these habitats, making note of any improvements needed. She listens to their feedback and uses her keen engineering mind to refine the designs for maximum comfort and safety.

R

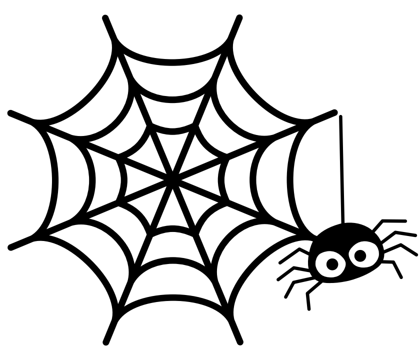
Refine for the Perfect Design

The Fairy understands that perfection is a journey, not a destination. She takes the feedback from testing and iterates on her designs, making them even better. She pays attention to every detail, from the angle of an entrance to the warmth of the insulation, ensuring that her habitats are impeccable.

Drawing Inspiration from Nature

The Fairy God Engineer draws inspiration from nature and animal engineering for their creative and sustainable solutions. She admires the skills animals use to build habitats that seamlessly integrate with their environment and the creativity of animals to use the resources around them.

Can you name the animal habitats pictured below? What others can you think of?



Build Your Own Animal Habitat

As rainy season approaches, let's help The Fairy God Engineer build a sustainable and cozy shelter that will keep her friend Sunny the duck stay dry in the rain!

1) Collect Your Materials

- Recycled materials (e.g., cardboard, plastic bottles, old fabric)
- Natural materials (e.g., leaves, sticks)
- STEM kit items
- A squirt bottle or a small cup to rain test

2) Plan for needs

Write down some of Sunny's needs (to stay dry) and wants (favorite colors).

3) Organize ideas by brainstorming

Sketch out some ideas of what Sunny's habitat might look like!

4) Work on a prototype

Use the materials you've collected to build your own habitat!

5) Evaluate your solution

Use the spray bottle or small cup to drop a little bit of water over the prototype - we recommend testing in a sink to keep your space clean. Write down your observations - does Sunny stay dry? Did the habitat change when it got wet?

6) Refine your solution

Try to make some improvements to your design and then try again!

Eco-POWER-Engineering

Incorporating sustainability into the POWER engineering design process is both eco-responsible and essential for creating lasting solutions!

P

Plan for Sustainability

Plan for Resource Efficiency: Plan to use resources efficiently. Minimize waste, choose eco-friendly materials, and consider how your project can have a positive impact on the environment.
For example, can you use recycled materials or make a design that enhances biodiversity?

O

Organize Ideas with Sustainable Features

Conduct Life-Cycle Analysis: Consider the entire life cycle of the habitat, from construction to maintenance and eventual removal. Design for durability and ease of maintenance to extend the habitat's lifespan.
For example, how will you repurpose or recycle the materials when Sunny needs a new habitat?

W

Work on Prototypes Sustainably

Practice Adaptive Prototyping: Be prepared to make adjustments based on ecological feedback. If the prototype disrupts the environment or harms wildlife, modify the design to minimize negative impacts.
For example, if you notice your habitat is creating litter can you adapt?

E

Evaluate Your Solution's Impact

Monitoring and Data Collection: Continuously monitor the habitat's performance and its impact on the environment. Gather data on species interactions, water quality, and other relevant metrics.
For example, measure how much waste you created with your design.

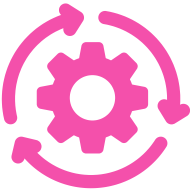
R

Refine for Environmental Stewardship

Ecosystem Integration: Encourage the habitat to become an integral part of the local ecosystem. Seek ways to enhance biodiversity and support the habitat's resilience in the face of environmental changes.
For example, how can oither creatures use Sunny's habitat?

Learn Some More

Now that we've mastered the engineering design process, you can always work your way through it again and improve your design!



Iterate:

- Did you have any leaks you need to patch up?
- Did Sunny fit comfortably in the habitat?
- Was it easy for Sunny to get in and out of her habitat?

Add more constraints:

- Do you think Sunny might get some wind and need a sturdier house?
- What about testing Sunny's house for earthquake resistance? (You can put it on a baking sheet and give it a little shake, or just wiggle the table you built on)
- If Sunny was going to help her friend build a house, do you think her friend would have all the same materials? How could you simplify the design to make it easier to duplicate?

Congrats, Habitat Hero!

Way to unleash your STEM SuperPOWERs

An activity by The Princess Program STEM

Tag @theprincessprogramstem and use #HabitatHeroes to share your habitat design with others!

Check out more fun and free STEM activities on our website ThePrincessProgramSTEM.com