

Design Challenge: Ewok Escape

Can you design and build a balancing device to help an Ewok escape the Imperial forces by sliding down a tightrope to safety?

Goal:

Try to build the tallest structure possible that will support the Ewok and still balance as it travels down the wire.

Time:

30 Minutes for the activity, 20 minutes for setup and cleanup.

Materials:

- Tight-rope tracks
- Balance carts
- 1/2" metal nuts
- Pipe-cleaners
- Wooden dowels
- Yellow pipette trays with velcro
- Film canisters with holes
- Tinker-Toy connectors
- Plastic clips & Binder clips
- Plastic pieces with holes
- Cups (Dixie, or plastic)
- Ewoks (or other figures)

Design Cycle!

1 Ask/Imagine/Plan

Think of how things balance. Explore the materials. How could you use them to balance your device? Which materials are heavy? Which are light? How can you use their weight in your design? Brainstorm designs for a device to make the cart balance. Then select from these ideas and draw up one of the designs to build. How will your device stay on the cart? What materials will you use? Where will the Ewok be? Focus on making a device that balances first, then build for height.

2 Create

Begin constructing your device according to your plan. If something isn't working ask a Design Challenges staff member for help, or go back and revise your plan. Be sure to think about how to attach or place your device on the cart.

3 Test

When you have built your device, test it out on one of the short test tracks to see how it balances. Try sliding the cart back and forth to simulate the movement of traveling down the wire. If your cart balances well, you can test it on the large inclined track. If not, think about why it is falling over, then go back through the design cycle to solve the problem. Feel free to test more than one design and compare the results.

4 Improve

Which of your designs performed the best when you tested it? Choose that design, or, select certain aspects from multiple designs and combine them into a new device. Then, try to improve your design and build a taller structure on top of the cart.



Ewok Escape: Facilitation

Talking Points

- When a tightrope walker is balancing on a wire what forces are influencing his or her ability to balance?
- What is the balance point?
- What is center of mass?
- On earth, is there a difference between center of mass and center of gravity?
- Can you balance a ruler on your finger? What happens when you add additional weight to one end of the ruler? Can you still balance the ruler?
- Is it easier to balance with more weight above or below the balance point (finger, wire etc.)?
- Which is more stable, fixed weights or swinging weights and why?
- What is the Engineering Design process?
- Why would engineers be interested in balance?

