Egg Bungee Jump

Overview

<table>
<thead>
<tr>
<th>Science Concept</th>
<th>Try It Out</th>
<th>ZOOMon: Change One Variable</th>
<th>Share Results</th>
</tr>
</thead>
</table>
| Technological Design | Invent a bungee jump for an egg using nylon stockings. | • Length of nylon stocking  
• Weight of egg  
• Type of stocking | • What design did you use?  
• How successful was your design?  
• How might you change your design if you tried the activity again? |

Science Scoop

In this activity, the kids are given a problem to solve: design a bungee jump for an egg. As the kids try to solve the problem, they follow the five steps of technological design:

• Identify the problem
• Design a solution
• Implement the solution
• Evaluate the solution
• Share results

Technological design offers kids a chance to apply science to real-world problems. So, what's the science behind designing an egg bungee jump? When you launch the egg, it falls toward the ground because of gravity. As the egg falls, its weight stretches the nylon stocking. The stocking stretches because it is elastic. A material is described as elastic if it has the ability to return almost to its original shape after it has been stretched or squashed by a force. Due to its elasticity, the stocking slows down the egg until it stops falling. Then, the stocking springs back toward its original shape, pulling the egg up and away from the ground. The amount the stocking stretches depends on the weight of the egg and how fast the egg is falling.
By changing the length of the nylon stocking, you can adjust how close an egg comes to the floor. You can increase the length by tying stockings to each other or decrease the length by cutting or knotting the stockings.

The weight of the egg is what stretches the stocking. Each egg has a different weight and stretches the stocking to a different length. It’s important to have the “test” egg weigh roughly the same as the real egg. Otherwise the final launch may miss its mark.

Different types of stockings have different degrees of elasticity. As you stretch a stocking again and again, it will lose some of its elasticity because the fibers become “fatigued” and do not return to their original length. (Think of how the stretchiness of a new rubber band compares to that of an old rubber band.)

**Set Up**

- Watch the Egg Bungee Jump video segment, and try the activity yourself before the meeting.
- Post the new ClubZOOM Board activities (see end of section).
- Set up a VCR and monitor to show the Egg Bungee Jump video segment (optional).
- Collect materials for the ClubZOOM Box. For each kid, make copies of the Egg Bungee Jump activity handout and the Stay Tuned (see end of section).

**Materials**

<table>
<thead>
<tr>
<th>For Each Pair</th>
<th>To Share</th>
<th>For Demonstration</th>
</tr>
</thead>
<tbody>
<tr>
<td>• egg</td>
<td>• masking tape</td>
<td>• yardstick or measuring tape</td>
</tr>
<tr>
<td>• nylon stocking</td>
<td>• scissors</td>
<td>• nylon stockings</td>
</tr>
<tr>
<td>• plastic sandwich bag</td>
<td>• newspaper</td>
<td></td>
</tr>
<tr>
<td>• 25–30 pennies</td>
<td>• ZOOM Challenge (see end of section)</td>
<td>Have extra materials available so the kids can test different variables.</td>
</tr>
<tr>
<td>• 2 paper cups</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Egg Bungee Jump handout (see end of section)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Stay Tuned (see end of section)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Run the Meeting

Kick Off the Meeting (5 minutes)

Welcome the kids and ask for a volunteer to decipher the Stay Tuned. (Answer: Drop an egg without breaking it.) Then have another volunteer read the ZOOM Challenge.

Try It Out (15 minutes)

- Demonstrate the elasticity, or stretchiness, of nylon stockings. Measure one stocking leg. Then ask a volunteer to hold one end of the leg, while another volunteer pulls from the other end. Have a third volunteer measure how long the stocking is now. Subtract to find out how much the stocking stretched. Explain that the weight of the egg provides a force, similar to the volunteer pulling on the stocking, that stretches the nylon. The kids will need to consider the stretchiness of a stocking and the weight of an egg as they build their bungee designs.

- Explain how you will launch each egg and measure where it stops. (To launch the eggs, stand on a chair and raise your arm to the same starting height for each release. To measure how close an egg comes to two inches above the floor, put a piece of masking tape between two chair rungs at that height. When you drop an egg, have a volunteer watch the tape at eye level to observe where the egg stops.)

- Organize the kids into pairs and distribute the activity materials. As the kids design their bungee jumps, remind them to think about the stretchiness of the nylon stocking, the weight of the egg, and the height of the launch point. Then have them test their bungee designs with “test eggs” that weigh roughly the same as real eggs. (See Activity Tips for how to make test eggs.)

Activity Tips

- To make test eggs that weigh about the same as real eggs, kids can use a simple scale balance. To make a scale balance, tape a paper cup to each end of a ruler. Put the ruler on top of a small object (such as a paper clip box or a small pad of Post-it® notes) and center it so that the two ends balance. Put an egg in one cup. Predict how many pennies are needed to balance the ruler. Then add pennies to the other cup until the ruler is balanced.

- To save time or when working with younger kids, make test eggs ahead of time. For each test egg, put twenty-five pennies (equal to the weight of an average egg) in a small plastic bag. Secure each bag by tying a knot.
3 ZOOMon (15 minutes)

How close did the test egg come to two inches from the floor? Once the kids have tried their bungee jumps with test eggs, ask them to evaluate their designs so far. What might they need to change before they use real eggs? What happens if they change the cord length by adding stockings or cutting the stocking? What happens if they add more weight to the egg? What happens if they use a different type of nylon stocking? Make sure they change only one variable at a time. Ask them to make a prediction before they test it out. When they’re ready, have them test their final designs with real eggs. (Set up newspapers below the jump site in case the eggs break.)

4 Share Results (10 minutes)

Have the kids share their bungee jump designs and draw conclusions about how they worked.

• What design did you use?
• How successful was your design?
• How might you change your design if you tried the activity again?

Have the kids write or draw their results on the back of their activity handouts. If they have difficulty, use the questions above to guide them. Then have the kids post their results on the ClubZOOM Board.

Send It to ZOOM!

Remind the kids to send their results and ideas about egg bungee jump design to ZOOM. They can do this by mailing their activity handouts to ZOOM or by visiting the ZOOM Web site at pbskids.org/zoom/sendit/sci-exp.html

5 Wrap Up (5 minutes)

Hand out the activity stickers and the Stay Tuned coded message for the next meeting.

ZOOM Links

Visit the ZOOM Web site and continue exploring technological design:

Bungee Jump
pbskids.org/zoom/sci/bungeejump.html
Visit the online version of Egg Bungee Jump to see the results posted by other kids.

Financial Support
pbskids.org/zoom/sci/financialsupp.html
Try to make a tower as high as you can using 50 straws and clay.

Crazy Straw Bridge
pbskids.org/zoom/sci/strawbridge.html
Build a bridge that spans thirty centimeters and supports the most weight it can, using only straws and paper clips.

Don’t Forget Square or Rectangle!

Remind the kids to keep collecting data to add to the Data Chart. Have they measured other members of their afterschool program yet?
Dear ClubZOOMers,

Rachel K. of Champaign, Illinois sent in this challenge for you: **Make a bungee jump for an egg.** The egg cannot break or hit the ground. The egg must come within **two inches** of the floor, and it **can’t touch** the floor. You might want to practice first with a **test egg** in order to get it right.

Give it a try!
Egg Bungee Jump

What You Need:
- nylon stockings
- egg
- ruler
- plastic sandwich bag
- pennies
- newspaper

1. Think of a way to use the stocking to make a bungee cord.

2. Make a test egg: Fill a plastic bag with pennies until it weighs about the same as a real egg. Then tie the bag.

3. Test your bungee design with the test egg: Put the test egg inside the stocking. Hold one end of the stocking, and drop the egg from your launch site. Measure how close the test egg comes to the ground.

4. Evaluate your design. What changes can you make to improve your bungee design?

5. When you're ready, try your bungee design with a real egg. (Spread some newspaper underneath your launch site, just in case the egg breaks!)

Try It Out!

Science Scoop

When you drop the egg, it falls toward the ground because of gravity. As the egg falls, its weight stretches the nylon stocking. The stocking stretches because it is elastic. Things that are elastic, like rubber bands and basketballs, return almost to their original shape after they've been stretched or squashed by a force. The elastic stocking slows down the egg until it stops falling. Then, the stocking springs back toward its original shape, pulling the egg up and away from the ground. The amount the stocking stretches depends on the weight of the egg and how fast the egg is falling.

Sent in by Rachel K. of Champaign, IL

Did the egg come to within two inches of the floor? If not, what could you change so that it does? What happens if you change the bungee cord length by adding stockings or cutting the stocking? What happens if you add more weight to the egg? Or what happens if you use a different type of stocking? Choose one thing to change (that's the variable) and make a prediction. Then test it and send your results to ZOOM.

pbskids.org/zoom
Here's what happened when I designed an egg bungee jump:

Dear ZOOM,

Send your ideas to ZOOM!

Send an e-mail: pbskids.org/zoom/sendit

Then instantly print out a copy of ZOOMerang—a news—letter filled with cast activity, trivia, and lots of fun! Don't forget to include your name and return address so we can send you a copy of ZOOMerang. Your ideas will be eligible for inclusion in ZOOMerang. This means that we can share your ideas with other ZOOMers on TV, the Web, in print materials, and in other ZOOMways. So mail it to ZOOM, Inc.

Or, send a letter:
ZOOM
Box 350
Boston, MA 02134

Don't forget to include your name and return address so we can include a copy of ZOOMerang in ZOOM. Your ideas will be eligible for inclusion in ZOOMerang. This means that we can share your ideas with other ZOOMers on TV, the Web, in print materials, and in other ZOOMways. So mail it to ZOOM, Inc.

Send an e-mail: pbskids.org/zoom/sendit

Then instantly print out a copy of ZOOMerang—a news—letter filled with cast activity, trivia, and lots of fun! Don't forget to include your name and return address so we can send you a copy of ZOOMerang. Your ideas will be eligible for inclusion in ZOOMerang. This means that we can share your ideas with other ZOOMers on TV, the Web, in print materials, and in other ZOOMways. So mail it to ZOOM, Inc.

Or, send a letter:
ZOOM
Box 350
Boston, MA 02134

Don't forget to include your name and return address so we can include a copy of ZOOMerang in ZOOM. Your ideas will be eligible for inclusion in ZOOMerang. This means that we can share your ideas with other ZOOMers on TV, the Web, in print materials, and in other ZOOMways. So mail it to ZOOM, Inc.
At the next meeting, you’ll be challenged to:

**HGRXPDZGVIGLZKVMMB**

---

**Crack the Code**

Read the message by learning the **Z Code**.

Here’s how it works:

The letters of the alphabet are reversed so that “Z” replaces “A,” “Y” replaces “B,” and so on. Then, the letters of the message are replaced with the code letters, with no spaces between words. For example, here’s how “SEND IT TO ZOOM” looks in Z Code:

HVMWRGGLALLN

To read the message in Z Code, find each letter in the coded message in the bottom row and replace it with the letter in the top row.

```
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
Z Y X W V U T S R Q P O N M L K J I H G F E D C B A
```
To translate a message in Morse code, find the letters that match the symbols.
Listening Table

Rest your ear on a tabletop, and have a friend tap the table with a pencil. What do you hear?

Lift your head up, while your friend continues tapping.

How do the sounds compare?

Try it again:
Tap other surfaces with other objects.

Sent in by Abigail A. of Fort Worth, TX

Hink Pinks

A hink pink is a pair of words that rhyme. A hink pink for a rodent dwelling is a mouse house.

Find the hink pinks for these things.

1. police chief
2. unusual cub
3. rosy beverage
4. bashful insect
5. noisy group
Second-graders from the Grove School in Northbrook, Illinois, are members of the ZOOMteam. They **baked 2,650 cookies** for 21 shelters for the homeless. In the photo, Kristen, Nathan, Michal, and Cole are rolling out sugar cookies.

**Why is basketball such a messy sport?**

Because you dribble on the floor!

---

Visit the ZOOM Web site for ideas on how you can volunteer. Then tell us what you did, and we'll send you a **free ZOOM Into Action** wristband and iron-on T-shirt decal.

---

Sent in by Andrea G. of Bolingbrook, IL