

ClubZOOM Launch

Before you start your first ClubZOOM activity, use the tips below to introduce your kids to ClubZOOM and engineering.

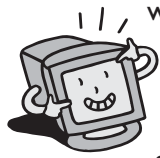
Give a sneak preview. Show the Welcome segment on the ClubZOOM video for an official greeting from the ZOOM cast and a preview of the activities your kids will be doing. Explain when and how often they'll meet. Tell them about the final meeting, where they'll have a party to celebrate their engineering inventions.



Introduce engineering. Kids may or may not know what engineers do. (It's not unusual for kids to think an engineer is someone who drives a train!) Ask kids if they have heard the word engineering or know what engineers do. After hearing their ideas, explain that engineers solve problems, and the things they make are everywhere. Buildings, cars, refrigerators, clothing—even some of the foods we eat—are all designed by engineers. At ClubZOOM, kids get to be engineers. There are five different engineering challenges for them to try. For each challenge, they'll think of ideas, design, build, test, and share their results. You can also point out that engineering is a great way to use lots of the science and math they are learning in school—such as asking questions, making predictions, measuring, testing, and sharing results.

Make kids official ClubZOOM members. Hand out the ClubZOOM membership cards. Kids can sign their names, attach the cards to pieces of yarn, and wear them at each meeting. Explain that there are boxes on the back of their cards where they'll put a sticker for each activity they complete. Encourage them to collect all five stickers! (You might want to gather cards at the end of each meeting so kids won't lose them.)





Introduce ZOOM. If some kids aren't familiar with ZOOM, have others who are describe what they like best about the TV show and Web site. If kids are interested in watching ZOOM, let them know when it airs on TV or tape an episode and make it available for viewing.



Present the ClubZOOM bulletin board. Explain that the bulletin board is a place where kids can post their activity ideas and results. It's also a place where they can read about engineers, solve brainteasers, and learn about engineering gadgets of the future.



Do an activity. Dive into engineering by building newspaper towers in the Super Golf Tower activity. All the information you need to run the activity is on the following pages.



Super Golf Tower



Make a newspaper tower that can hold up a golf ball!

Get Ready

- Watch the Super Golf Tower video segment to preview the activity. Then cue the tape to the beginning for the meeting.
- Build a quick newspaper tower and review the Engineering Scoop to become familiar with the activity.
- Make sets of newspaper (10 sheets each) for each team.
- Pre-measure the masking tape into 3-foot strips. You can hang the strips off the edge of a table for easy distribution.
- If you have a limited number of golf balls, use just one and bring it to each team when they're ready to place it on their tower.
- Move the tables in the room to the side so kids have lots of open floor space for building.
- Have a meter stick or measuring tape available to measure the towers.
- Collect activity materials. For each kid, make copies of the Super Golf Tower activity sheet and the Stay Tuned message (see end of section).
- Post the new ClubZOOM Board activities (see end of section).

What You Need

Design & Build (per team)

- golf ball
- masking tape (3 feet)
- newspaper (10 sheets)
- scissors
- Super Golf Tower activity sheets

Redesign (for the group)

- meter stick or ruler
- more masking tape
- more newspaper

Time

1 hour



Engineering Scoop

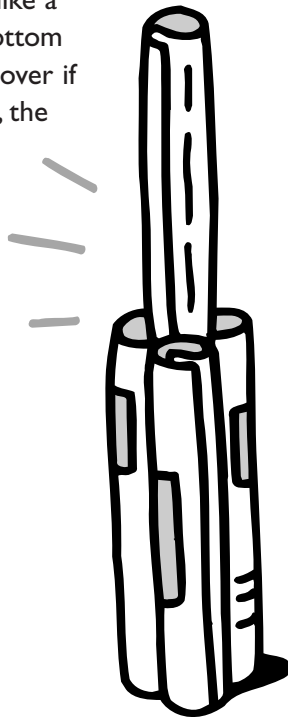
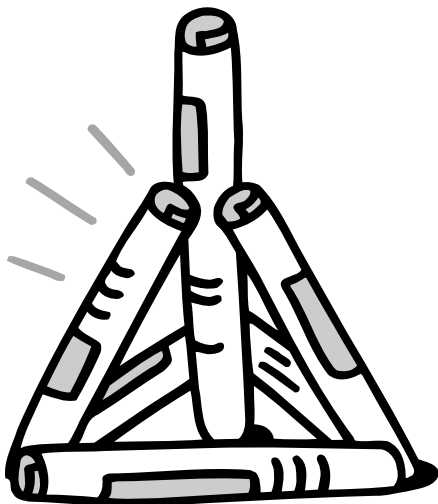
Try This First

Hold a piece of newspaper so that one edge rests on the table. Then let go. Pretty flimsy material, isn't it? Now try changing the paper: You can roll it into a cylinder, crumple it, twist it, or fold it with pleats. How does it stand up now?

The Scoop

One way to make a flimsy, flat sheet of newspaper strong is to change its shape. By crumpling, folding, rolling, twisting, and otherwise reshaping it, you can increase its stiffness so that it stands up. If you wrap masking tape around the newspaper or join together several sheets, you can make the material even stronger.

To help a tall newspaper tower stand up, you also need to think about the design, or the way you put the parts together. For example, a wide base at the bottom spreads out the tower's weight over a larger area and makes it more stable. You can make a wide base by making a triangle at the bottom (like a tripod) or by taping a few tubes to the bottom of the tower. A tower is less likely to tip over if there is less weight at the top. In addition, the joints (places where parts of the tower connect) should be strong so they don't break and cause the tower to topple.



Find Out More Books

A Skyscraper Story

Wilcox, Charlotte.
Minneapolis, MN: Carolrhoda Books, Inc., 1990.

Follow the construction of the Norwest Center building in Minneapolis, and learn how a skyscraper is constructed and about the people who make it happen.

Superstructures: Skyscrapers and Towers

Oxlade, Chris. Austin, TX: Raintree Steck-Vaughn Publishers, 1996.

Learn about skyscrapers, from the inside out. Read about the construction of the foundation, strengths and weaknesses of building materials, and the history of skyscrapers.



Web Sites

Building Big: Skyscrapers
www.pbs.org/wgbh/buildingbig/skyscraper

Find out what makes skyscrapers stand up. Then try the interactive Loads Lab and Skyscraper Challenge activities.

How Skyscrapers Work
www.howstuffworks.com/skyscraper.htm

What helps tall buildings defy gravity, high winds, and earthquakes? How do engineers solve practical problems, like moving people to the top floors quickly and safely? Find answers to these questions and more.

Run the Meeting

1 Get Started (5 minutes)

Welcome kids and introduce what they'll be doing during ClubZOOM. (See the ClubZOOM launch tips on page 41.) Then read the Challenge Letter together.

Introduce the materials to the kids. Then hold a piece of newspaper so that one edge rests on the table; let go so that it falls over. Ask: *What are different things we can do to make this newspaper stand up?* As kids brainstorm, you can demonstrate some of their ideas. Get kids thinking about the importance of a base to support the tower if they don't bring it up on their own.

2 Design & Build (15–20 minutes)

Organize kids into teams of two and distribute the activity materials. Have teams spread out across the floor so they have plenty of room to work. Let the building begin! As the kids build, ask:

- *How can you change the newspaper to make it stronger?*
- *What kind of base can you build at the bottom to help the tower stand up?*
- *How can you hold the golf ball in place?*

3 Test (10 minutes)

Have the teams stop working and take a “tour” of the towers. It's okay if teams are not finished. The purpose is to learn from other teams' designs. This is the way engineers work. Have each team talk about how they came up with their design. Ask the group to comment on what is working and to ask questions about each tower.

- *What gave you the idea to build your tower that way?*
- *Which parts hold up your tower?*
- *What's similar about the taller towers?*
- *What could you change to make your tower taller?*

Activity Tips

- This activity is fun but can require a little persistence. Some teams may not know how to begin. Others will get so far and then their tower will fall over. Encourage kids to share ideas and try new things if their first towers don't stand up.
- Kids will discover that tightly rolled cylinders are quite strong. One way to roll is to start at one corner and roll diagonally toward the opposite corner. Notice that the tighter you roll, the more rigid the newspaper tube becomes.
- Kids may have difficulty figuring out how to design a strong base for their towers. You can offer suggestions, like coiling newspaper strips around the base or using cylinders to prop up a tower.
- Have a chair ready so that you can stand on it to place the golf ball on top of very tall towers.

4 Redesign (10 minutes)

Challenge the kids to make their towers even taller! Explain that teams should concentrate on increasing the height of their own towers, not on beating the heights of other towers. The goal is for each team to reach their personal best! Offer more masking tape and newspaper to teams that want them.

5 Share Results (10 minutes)

Take a second tour to observe the final height of the towers. Praise each tower for its special features—design, height, unusual shape, or interesting use of materials. Ask kids to talk about the building process:

- *What did you do to keep your tower from falling over as the height increased?*
- *What might you do to continue to improve your design?*
- *How many different designs did the whole group come up with?*
- *Have you ever seen any towers or structures that look like these?*

You can also show the Super Golf Tower video segment and talk about ways the ZOOM cast tried to build a tower.



Then connect the activity to engineering by asking kids to name the tallest buildings they know. Talk about how these buildings are designed. You can use the “Engineering the Future” bulletin board posting to launch discussion.

6 Wrap Up (5 minutes)

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



ZOOM Links

Try these related activities on the ZOOM Web site.

Cup Tower

pbskids.org/zoom/sci/cuptower.html

Build a tower using only paper cups.

Financial Support

pbskids.org/zoom/sci/financialsupp.html

Use drinking straws and clay to build a tower that will support a cup of pennies.

Geodesic Dome

pbskids.org/zoom/sci/geodome.html

Make a giant dome from newspaper.

Strongest Shape

pbskids.org/zoom/sci/strongestshape.html

Make four different shapes with paper and find out which is the strongest.



Challenge

Dear ClubZOOM Engineers,

I'm over 20 feet tall and have very short arms. Over the years, I've developed a bad back...and a love for golf. The only problem is that my back hurts terribly when I lean over to hit the ball.

I need you to design a golf tee so that I can hit the ball at a more comfortable height. The higher, the better!

Here's the catch. Since the golf tee will be tall, it must be made from flexible material so I can fold it up and carry it. I thought newspaper might work well. So, your challenge is to use 10 pieces of newspaper and 3 feet of tape to make a tall tower that holds a golf ball on top.

Good luck, and thanks for helping to make me the next Tiger Woods!

Sincerely,



Tyrannosaurus Rita



pbskids.org/zoom

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Build a newspaper tower that will hold up a golf ball!

Super Golf Tower

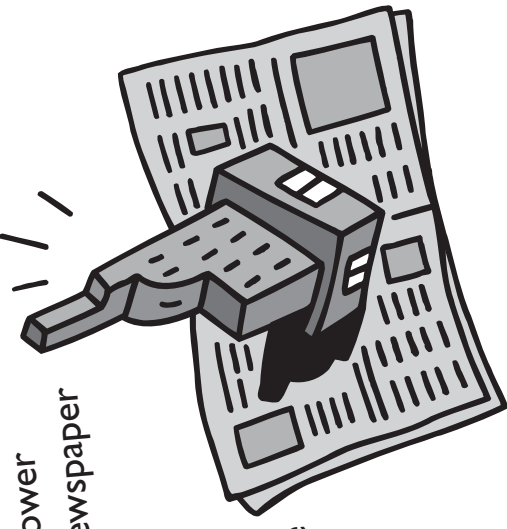
What You Need

- 10 sheets of newspaper
- 3 feet of masking tape
- golf ball
- scissors
- meter stick or ruler



Engineering Scoop

How can you make a **tall** tower from newspaper? First, you need to find ways to make newspaper **strong**. One way is to **change its shape** by rolling it into a tube, crumpling it, folding it, or twisting it. You also need to think about the **design**, or the way you put the parts together. You might make a **wide base** at the bottom. This helps **spread out** the tower's weight over a larger area and makes it more **stable**. You could also make sure there is **less weight at the top** of the tower so it won't tip over easily. How did **you** design your tall tower?



1 Build the tallest tower you can with the newspaper and tape.

2 Test your tower by putting a **golf ball** on top. If the tower falls over, **change the design** until it stands up.

3 How tall is your tower? **Measure** it with the meter stick or ruler.

4 Try to make your tower **taller**. Keep **building** until you can't go any higher.

Redesign It!

How can you make your tower even **taller**? What happens if you **change the base** of your tower? What happens if you use **more** masking tape or newspaper? Can your tower support a **different object**? Choose **one thing** to change (that's the **variable**) and make a **prediction**. Then **test it** and **send** your results to ZOOM.

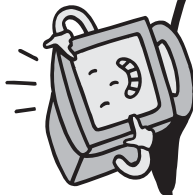
Sent in by Matt B. of Edmonton, Alberta, Canada

Super Golf Tower

Engineer's Notebook

Here's my tower design.

(Draw your tower and label the parts that help it stand up.)



Send It to ZOOM™!

Tell us about your tower at

pbskids.org/zoom/sendit

Meet an
Engineer

Miguel Rosales

Not everyone who studies engineering becomes an engineer. Take Miguel Rosales—he studied engineering and he's an architect. Miguel designs bridges, like the one he's standing in front of in Boston, Massachusetts. This bridge has an unusual shape with supports that look like upside-down Vs. At night, when the bridge is lit up, it stands out against the night sky. Miguel designs bridges that are not just strong and safe; they are also beautiful!



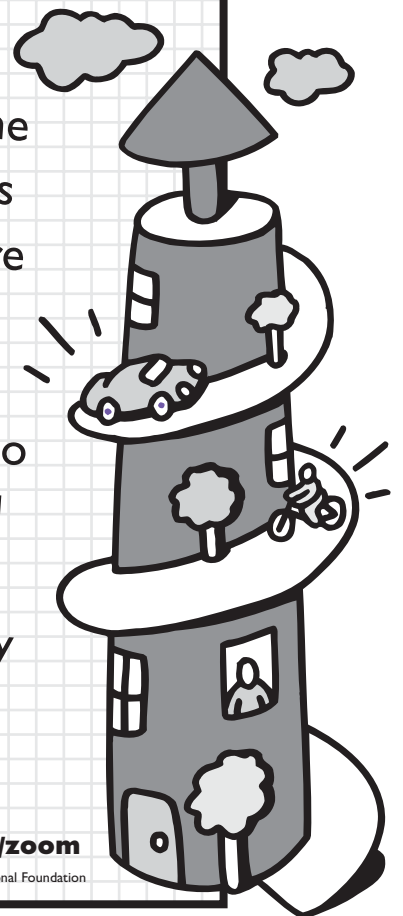
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Engineering the Future

What's the **tallest building** in the world? So far, it's the Petronas Towers in Malaysia. These matching towers are both 1,483 feet tall. (That's about as tall as 42 school buses placed end to end.) Engineers designed the towers so that they are wider at the bottom and get narrower near the top. This makes the towers very stable. Maybe someday **you** will become an engineer and design an even taller building, like the one in the picture!



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Crazy Eights

Sent in by Marie and Dana M. of Bay Shore, NY

8 8 8 8 8 8 8 8

Figure out where to put plus signs so the eight 8's add up to 1,000.

Ready to check
your answer?
Look inside!

Do you have
a brainteaser to share?
Send it to ZOOM at
pbskids.org/zoom/sendit

$$888 + 88 + 8 + 8 + 8 + 8 = 1,000$$

Put plus signs like this to get
eight 8's to add up to 1,000.

ANSWER

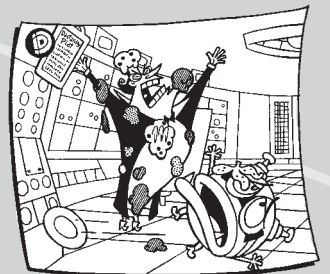
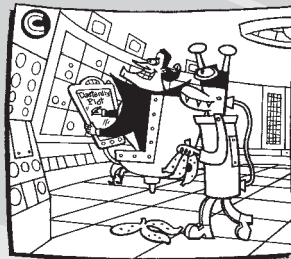
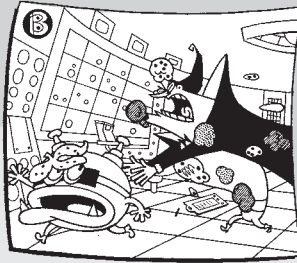
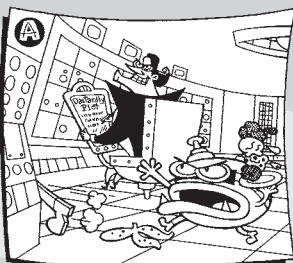
All submissions become the property of ZOOM and will be eligible for inclusion in all ZOOMmedia. This means that we can share your ideas with other ZOOMers on TV, the Web, in print materials, and in other media.


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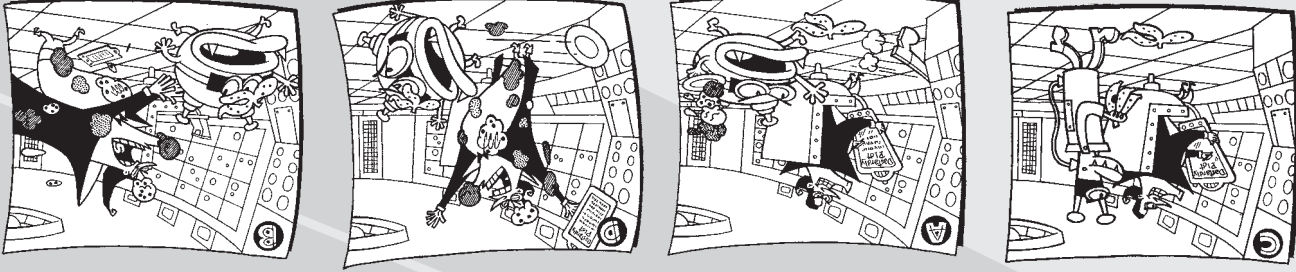
Out of Order



Can you put these pictures in the right order?



**Ready to check
your answer?
Look inside!**



The correct order is C, A, D, B.

ANSWER

www.pbskids.org

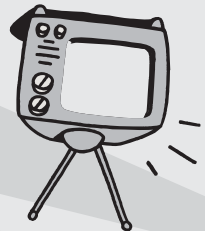
www.thirteen.org

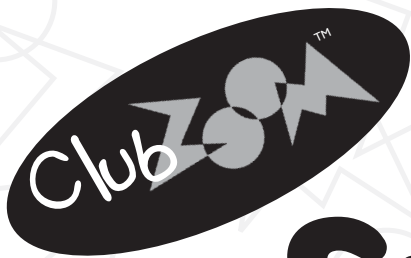


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CYBERCHASE is an animated adventure series that takes kids on a wild ride through cyberspace where they are challenged to use the power of math. Visit the CYBERCHASE Web site at pbskids.org/cyberchase to play more math games and find out when CYBERCHASE is on in your area.





Stay Tuned

**Wondering what you'll be doing next time in ClubZOOM?
Solve the secret message, and you'll get a clue!**

To read the message, you need to learn **Ubbi Dubbi™**, the secret language of ZOOM. Here's how it works. Just add "ub" before each vowel sound. Accent the "ub" each time it comes up.



Secret Message

**Ubi fluboaut lubike uba bubouat ububand
ubi huubouvuber lubike uba buubee.
Whuubat cuubould ubi buube?**



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