

## **The Home Fort Challenge**

### **A project for PK-5 students**

**\*\*This is an overview of the project. The fully developed lesson, in a family-friendly format, can be found at <https://prezi.com/view/yFXHvHJJDDsntTRuntnr/>**

### **Standards**

Forces: compression, tension

Engineering design process

Creativity

Measurement: measuring length and width with non-standard or standards units, and/or area and perimeter

How-to writing/Informational Writing

**Driving Question:** *How can I teach my classmates how to make a strong and sturdy (and really cool!) fort they can build in their home?*

### **Entry Event Choices:**

- Read *Christina Katerina and the Box* by Patricia Lee Gauch
- Martha Speaks (about designing and building a doghouse for Martha): [Martha in The Doghouse \(video\)](#)
- Ask a family member(s) to share their memories of making forts inside or outside of their home.
- Build background knowledge for what a fort is (see Prezi for pictures and details)

### **Anticipated Need to Knows:**

What will a home fort look like?

Can I build one?

Where should I build it?

What materials will I need?

How can I be sure it won't fall down?

How can I be sure it will be big enough?

How can I teach my classmates how to build it?

How will my classmates know how big it is when they are not at my house?

### **Day 1: The Launch/Identify the Problem**

Choose an activity to get your child thinking about the challenge:

- Read a book about building forts, or creative use of materials such as *Christina Katerina and the Box* by Patricia Lee Gauch or *The Fort that Jack Built* by Boni Ashburn.
- Watch Martha Speaks (about designing and building a doghouse for Martha): [Martha in The Doghouse \(video\)](#)
- Have your child ask a family member to share their memories of making forts inside or outside of their home.
- Build background knowledge for what a fort is (see Prezi for pictures and details).

*Find more resources at [3csnh.org](http://3csnh.org).*

After a brief discussion about what they discovered/learned after participating in the activity, introduce the question:

*How can I teach my classmates how to make a strong and sturdy (and really cool!) fort they can build in their home?*

Ask your child what they need to know to answer the question (either you or they can make a list of questions). They may ask questions like these:

- What will a home fort look like?
- Can I build one?
- Where should I build it?
- What materials will I need?
- How can I be sure it won't fall down?
- How can I be sure it will be big enough?
- How can I teach my classmates how to build it?
- How will my classmates know how big it is when they are not at my house?

## **Day 2: Introduce the Engineering Design Process**

Do you know what an engineer is? They use a very special process to solve problems. During this project we are going to be like engineers, and use parts of their process. (You can discuss the role of an engineer or use one of these videos to explain it):

**\*\*For the project's purposes the process will be: Ask--imagine--create--test--improve** (a free poster can be found at <https://www.teacherspayteachers.com/Product/Engineering-Design-Process-Posters-Freebie-888579>)

Younger kids:

(two parts): <https://safeshare.tv/x/ss5e8341219f737> and <https://safeshare.tv/x/ss5e8342611d888>

Brainpopjr (free access right now): [Engineering and Design Process](#)

Older kids:

<https://safeshare.tv/x/ss5e833fc93b11c>

Brainpop (free access right now):

<https://www.brainpop.com/technology/scienceandindustry/engineeringdesignprocess/>

**Ask (continued):** Since your child has already asked questions, see if s/he has any more. You can also ask about any problems they foresee. (Remind this is the “ask” part of the process)

*Find more resources at [3csnh.org](http://3csnh.org).*

**Imagine:** Next have your child imagine (like an engineer) ways they can create a fort in their home with the materials available to them. Have your child draw two or three ideas, with good details, and labels if they are able, depending on age.

### **Day 3: Gather Information**

Before building the fort, show your child these videos:

How to build a fort (tension): <https://www.youtube.com/watch?v=7aaPBp2gw3k>  
(same link, on safesharetv) <https://safeshare.tv/x/ss5e821b8504b78>

How to build a fort (compression): <https://www.youtube.com/watch?v=iPZEwgkY5TQ>  
(same link, on safesharetv) <https://safeshare.tv/x/ss5e821bf428a42>

Have your child choose the one plan they would like to try and add revisions and more details if necessary, making sure the materials they will need are clear.

**\*\*If possible have students share their plan with someone at home, a classmate, or their teacher in order to get feedback.**

### **Day 4: Build it!**

**\*\*remind your child about the design process steps as s/he works**

**Create:** Today your child will gather all the necessary materials and build the fort (ideally in a place where it can stay up for more than one day). When they are done, they can read in their fort and make sure it is how they would like it to be. Discuss how when they created/tested their design they were also improving it, fixing what didn't work, etc. Finally, they can evaluate their design...

#### **Test/Improve:**

Can I fit inside to read a book or do my schoolwork?

Did it stay up for more than one day?

Did I make any changes to my plan? What were they? Why did I change? Is there anything else I need to do to make it better?

Reflection form link: [The Home Fort Challenge Reflection](#)

Take a picture of your child in their fort and send it to their teacher.

**\*\*Teachers:** if possible, make a slideshow to share fort pictures, or maybe hold a class "meeting" with kids in forts!

### **Day 5: Share it**

How will you teach your classmates how to make this cool fort?

Think about each and every step you did to make your fort. Draw each step on a piece of paper.

If you would like a template you can use this one:

<https://www.scholastic.com/parents/kids-activities-and-printables/printables/writing-worksheets/create-your-own-graphic-novel-template.html>

### **Day 6: Create the Directions**

Take out the steps you drew yesterday. Using these pictures, write directions for how to make your fort (Teachers: students can also make a video; Flipgrid is a great tool for collecting and organizing student videos). Use words like first, next, then, and finally. Don't forget to include a list of materials. Younger children can use pictures, and labels if they are able. You will be testing these directions later.

**\*\*Students can also record these steps and teachers can provide a Flipgrid for this project.**

**\*\*expectations for different grade levels are included in the Prezi**

Free paper template:

<https://www.teacherspayteachers.com/Product/How-To-Writing-Paper-Template-238955> and <https://free-printable-paper.com/writing-paper/>

### **Day 7: Measure it!**

How will my classmates know how big it is when they are not at my home?

Today your child will be learning about measurement so they can measure their fort. Younger children can just measure the length, height, and/or width of their fort using non-standard (objects) or standard (inches, feet). Older students can find the perimeter and area inside their fort. Your child's teacher can give you guidance about how to approach this with your child.

Learning about measurement videos:

PK-K (non-standard units): [Dinosaur Train . Bridge Builder](#)

**\*\*Have your child practice measuring the length of different objects using household items that you can line up end to end (and that you have many of) like same-sized blocks, spoons, a pair of shoes, throw pillows...Have conversations that compare the length of objects (I am taller than this chair, the rug is shorter than the couch, etc.).**

### **Grade K-1**

(brainpop jr Non-standard units): [Nonstandard Measurement](#)

Khan Academy Kids has a free app with videos about using non-standard units of measurement (under Logic+): <https://learn.khanacademy.org/>

**\*\*Have your child practice measuring the length of different objects using household items like Legos, same-sized blocks, shoes, etc. Teach them how to line up end-to-end in a straight line with no gaps or overlaps.**

### **Grades 2-3**

Khan Academy about measuring length:

<https://www.khanacademy.org/math/early-math/cc-early-math-measure-data-topic/cc-early-math-measuring-length/v/measuring-lengths-2>

\*\*Have your child practice measuring different items in your home using inches, feet, centimeters, and/or meters.

### Grades 3-5

Brainpopjr movies: [Area](#) and [Perimeter](#)

Other videos about area: <https://safeshare.tv/x/ss5e835fab866e4> and perimeter: <https://safeshare.tv/x/ss5e836142e0f41> .

(finding the perimeter and area of a shape):

[Perimeter: introduction \(video\) | Perimeter](#)

[Counting unit squares to find area formula \(video\)](#)

\*\*Have your child practice finding the area and perimeter of a table, their room, or a rectangular rug.

### **Day 8: Measure your Fort**

Today your child will measure their fort, based on what their learning goals are. They can measure length, width, height, perimeter, and/or area. Have your child write down the measurements they take. Don't forget to include the units!

### **Day 9: Test your directions**

Now that you have written the directions on how to make your fort, and measured it, take your fort apart. Ask someone in your home to help you test your directions. Go over your directions with them and have them build your fort. How did it go? Did your directions work? Were you missing any steps? Revise your directions to make them clearer. Add details or pictures.

### **Day 10: Share**

Now that your directions have been revised, email them to your teacher. She can share them with your classmates, and you can all have fun trying to build each others' forts! If someone tries your fort they can give feedback either by emailing the teacher or the teacher can set up a Padlet for this purpose.

### **Day 10: Reflect**

Discuss with your child: How did it go? What went well during this project? What could have been better? What did you learn about measurement? What did you learn about writing the directions? Think about the engineering design process...how did you go through the steps of ask-imagine-create-test-improve? Older students can email the answers to these questions to their teachers. Hopefully you will get some other ideas for cool forts to build in your home. Go try them!