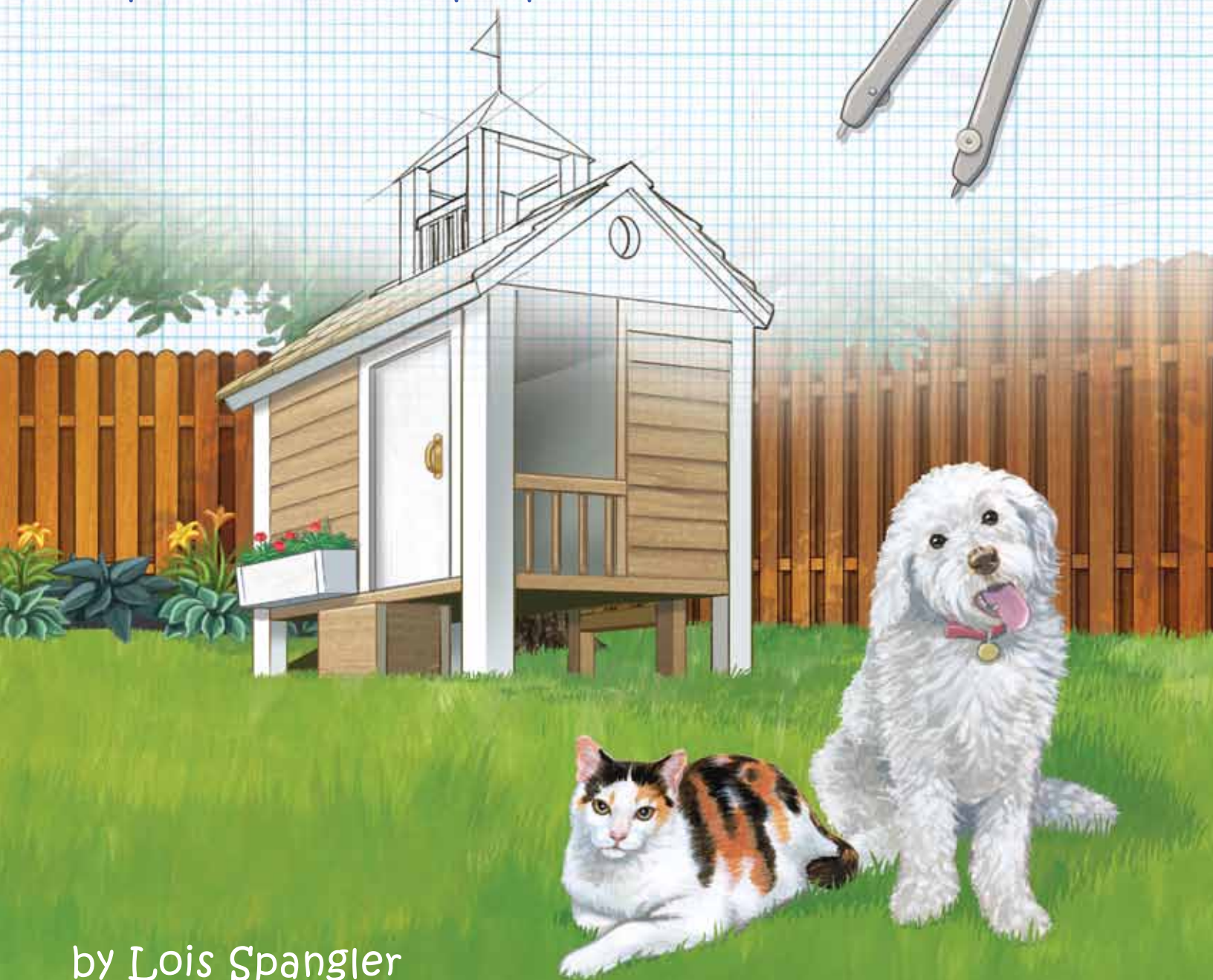


The Fort on Fourth Street

A Story about the Six Simple Machines



by Lois Spangler
illustrated by Christina Wald

The Fort on Fourth Street

A Story about the Six Simple Machines

When a young child decides to build a fort in the backyard, Grandpa comes forward to help. But they can't do it alone—they get help from the six simple machines: lever, pulley, inclined plane, wheel and axle, screw, and wedge. Told in cumulative rhyme, similar to *The House That Jack Built*, this story follows grandfather and grandchild as they build a fort together from start to finish.

This is so much more than a picture book! This fun-to-read story is a launch pad for learning and discussion, at home or in the classroom. We encourage adults and children together to explore the activities in the back of the book and on the book's homepage. Free online resources and support at ArbordalePublishing.com include:

- For Creative Minds as seen in the book (in English & Spanish):
 - Simple Machines
 - Match the Machine
 - Measuring Tools
 - Hands On: Building a Fort
- Teaching Activities (to do at home or school):
 - Reading Questions
 - Math
 - Language Arts
 - Science
- Aligned to State and Core Standards
- Interactive Quizzes: Reading Comprehension, For Creative Minds, and Math Word Problems
- Related Websites
- Reading Levels: AR, Lexile, Fountas & Pinnell

Interactive eBooks with dual-language selectable text (English and Spanish) and auto-flip pages with audio are available for purchase online.

Thanks to educators at the Franklin Institute for verifying the accuracy of the information in this book.

Lois Spangler, M. Ed., is a retired educator who has received many teaching awards during her 32 years in education. This is Lois's debut picture book, but not her first publication. Throughout her career, she has written several ancillary science books, reading comprehension books, and writing books, and has also been published in NSTA's *Science and Children*. Lois lives in northern New Jersey with her husband. Lois inherited her love of storytelling and teaching from her parents and grandparents, and she shares her love of stories with all her readers and students. Visit her website at www.edconnectionsllc.com.

In addition to illustrating *A Fort on Fourth Street*, *A Warm Winter Tail*, *Habitat Spy*, *Little Red Bat*, and *Henry the Impatient Heron* for Arbordale, **Christina Wald** has illustrated for a wide variety of toys, games, books, and magazines. From a book that featured hundreds of animals on each page (*Look, Find, and Learn: Animals of the World*) to games including the Star Wars role playing game series, every assignment covers something new and exciting. In recent years, she has illustrated tons of different animals for books and other publications. Christina enjoys the research aspect of such projects, saying that each new book is a fascinating new learning experience. She often integrates travel to research for her illustrations. She lives in Ohio with her husband and three cats. Visit Christina's website at www.christinawald.com.



Lois Spangler



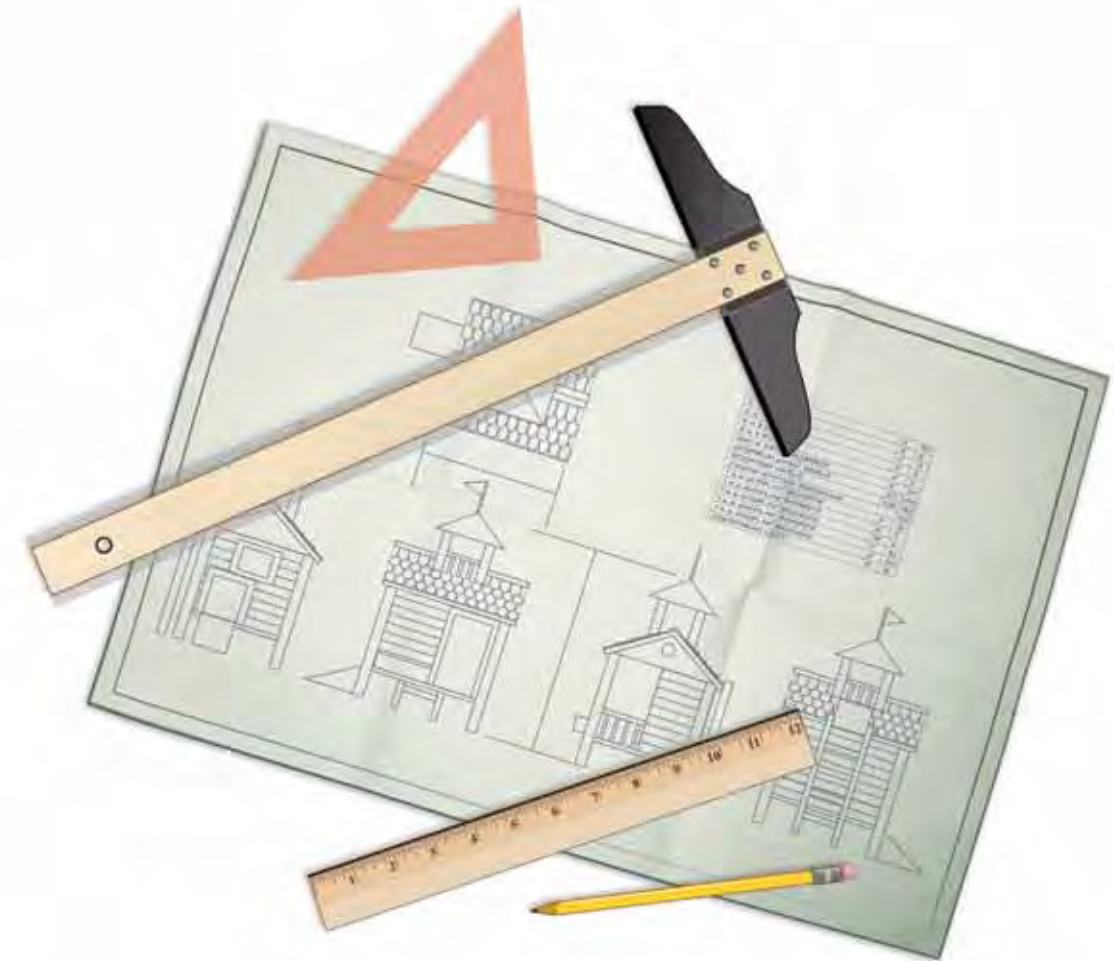
Christina Wald

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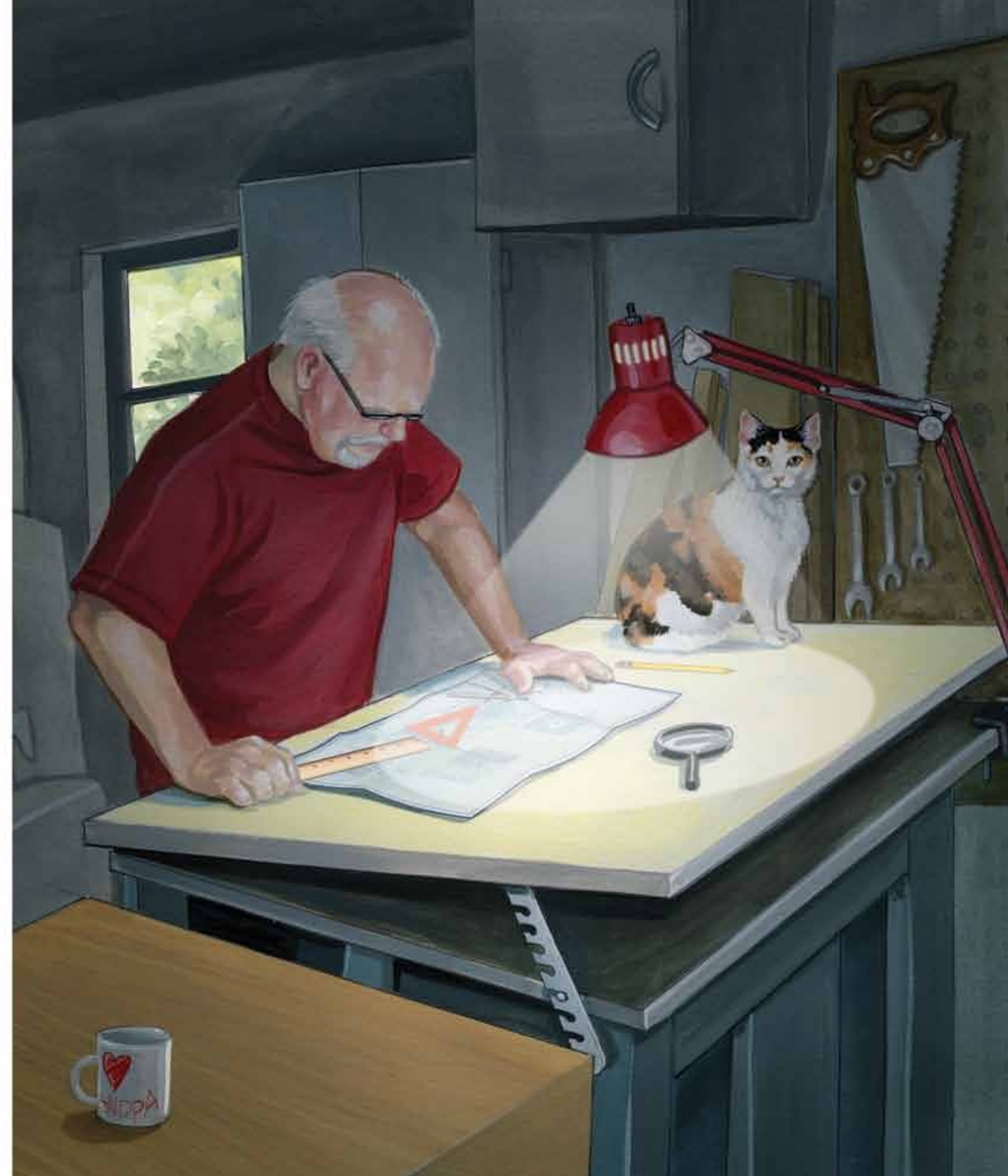
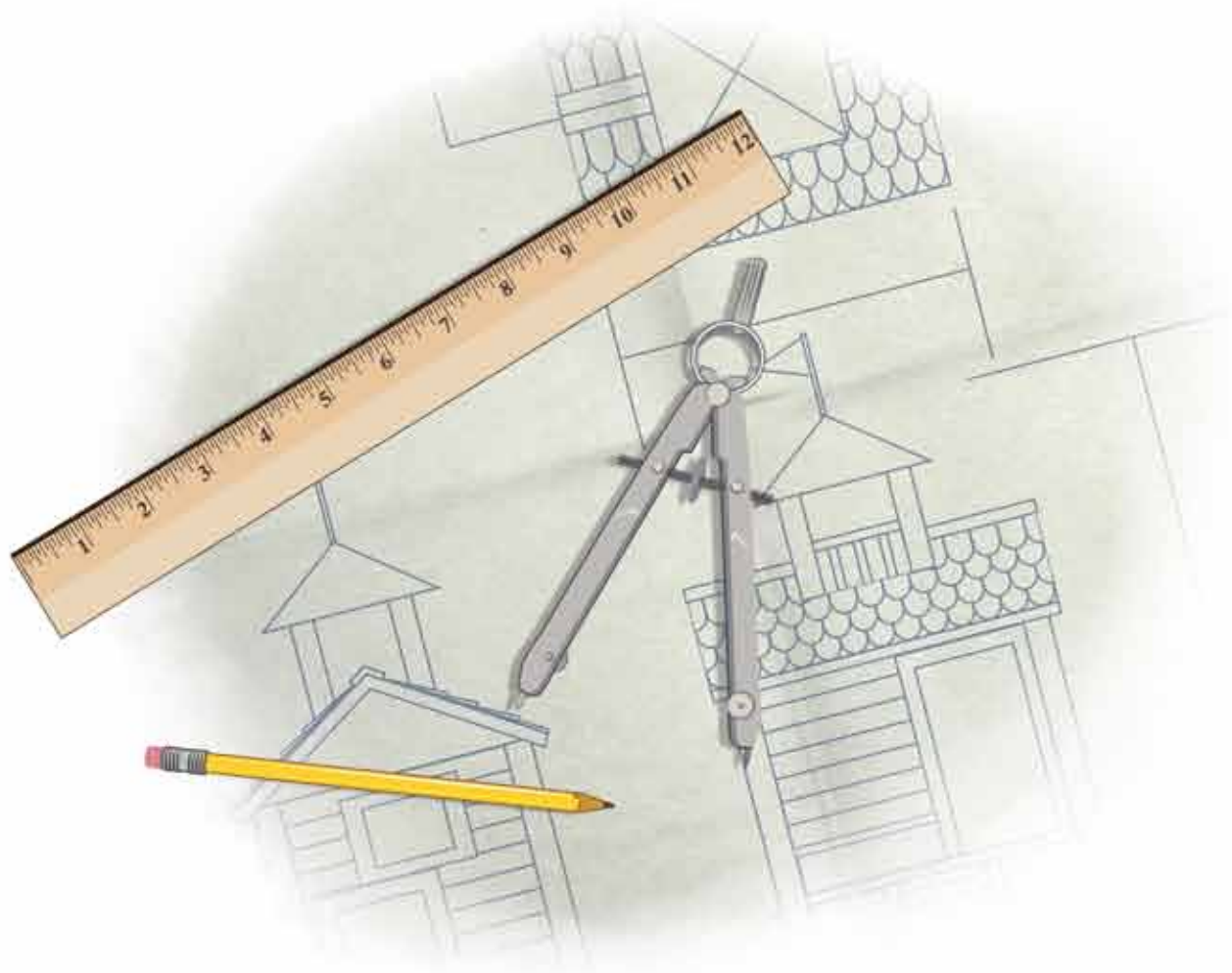
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**This is the yard on Fourth Street
where I'm building a fort that will be very neat!
Who will help me build it today,
and what will I need to make a fun place to play?**

**This is the fort that we will build by hand;
with Grandpa's help, we'll build it as planned.
I'll use imagination to create fun spaces.
It will even include some secret places.**



These are the wheels and axles
that move my wagon without hassles.
It carries wood in a great, big mound,
with wheels that make a squeaky sound.



The hands that use simple machines
to build the fort on Fourth Street.

**This is Grandpa's saw, which is a wedge.
Watch your fingers—it has a sharp edge!
It's bumpy and prickly and cuts the wood,
making each board fit as it should.**



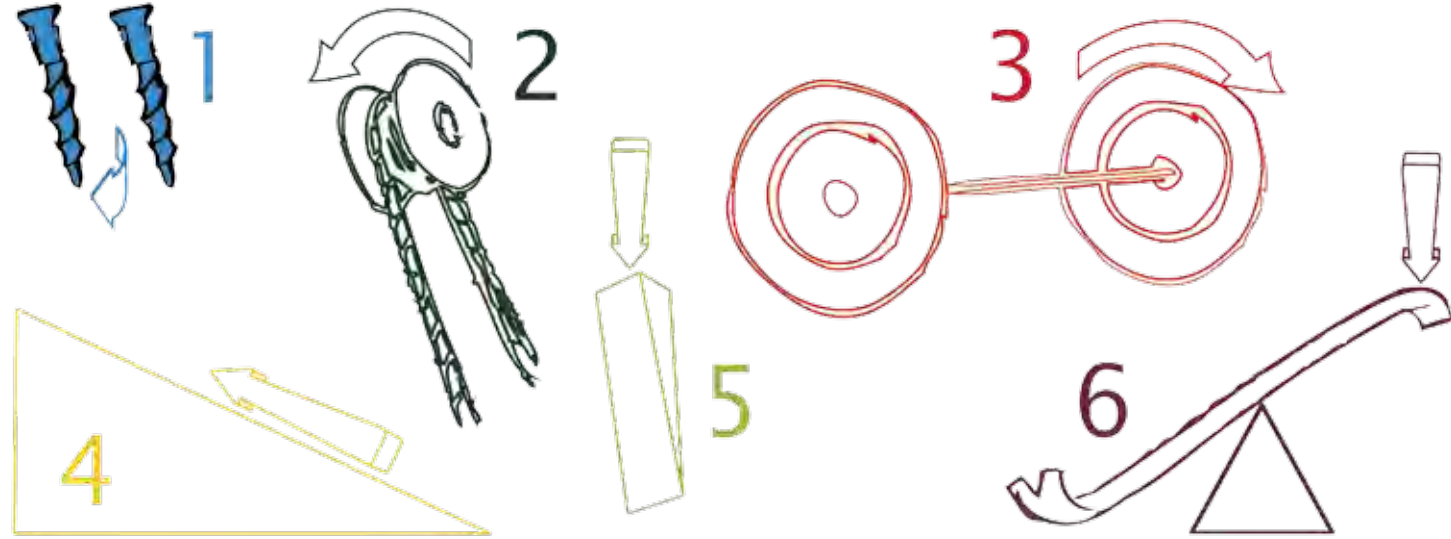
*And my wagon makes a squeaky sound,
when the wheels go round and round,
pulled by the hands that use
simple machines to build the
fort on Fourth Street.*



For Creative Minds

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Simple Machines



Simple machines have been used for hundreds of years. There are six simple machines—the wedge, wheel and axle, lever, inclined plane, screw, and pulley. They have few or no moving parts and they make work easier. When you use simple machines, you use a force—a push or a pull—to make something move over a distance. There are six types of simple machines. Use the color coding to match the machine's description to its picture.

A **lever** is a stiff bar that turns on a fixed point called a fulcrum. When one side of the lever is pushed down, the other side of the lever lifts up. A lever helps to lift or move things.

An **inclined plane** is a slanted surface that connects a lower level to a higher level. Objects can be pushed or pulled along the inclined plane to move them from a high place to a low place, or a low place to a high place.

A **pulley** has a grooved wheel and rope to raise and lower a load. Pulling on the rope causes the wheel to turn and raise the object on the other end of the rope.

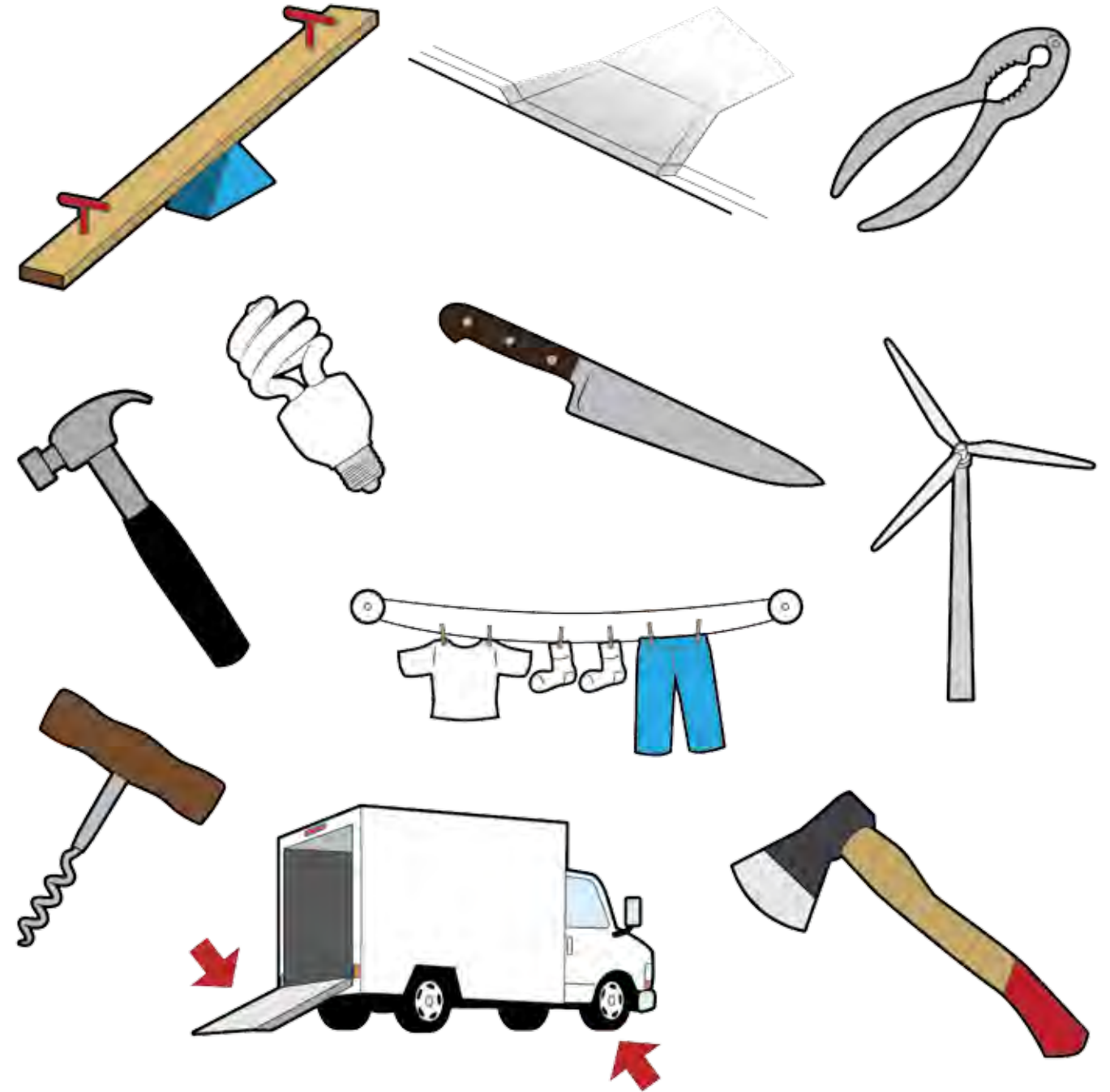
A **screw** has an inclined plane (a thread) wrapped around a shaft. The screw's thread interlocks with an object so that the screw cannot be easily pulled out. A screw holds two or more things together.

A **wheel and axle** is a wheel with a rod (the axle) through its center. A wheel and axle help move things by rolling instead of sliding or dragging.

A **wedge** is an object with at least one slanting side. A wedge is pushed into a single object or between two objects. A wedge can hold things in place or force things apart.

Match the Machines

Which of these are levers, wedges, pulleys, inclined planes, screws, or wheels and axles?



Answers: levers: seesaw, hammer claw, nutcracker, pliers; knives, axe; pulleys: clothesline; inclined planes: ramp on the back of truck; screws: bottom of a light bulb, corkscrew; wheel & axles: windmill, wheel.

Measuring Tools

In addition to the simple machines, Kathleen and her grandfather used measuring tools when building the fort. Which tool would you use to measure the following:

1. Kathleen used screws every six inches (15 cm). Which measuring tool do you think she used? Why?
2. Grandpa cut wood into 5-foot sections (1.5 m). Which measuring tool do you think he used? Why?
3. Grandpa measured a 35 degree angle on a board. Which measuring tool would he use? Why?
4. Kathleen measured one of Grandpa's boards. It was exactly 36 inches long. Which measuring tool did she use? Why?
5. Grandpa had some extra wood. Kathleen asked her Grandpa to cut four circles out of the wood. Which tool would Grandpa use to measure the circles? Why?

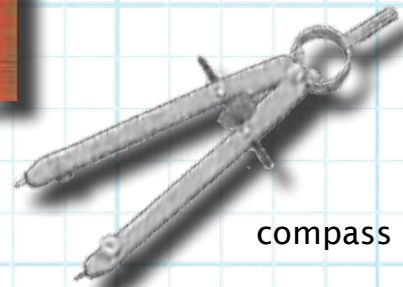
yard stick



ruler



protractor



compass

Answers: 1: ruler, 2: measuring tape, 3: protractor, 4: yard stick, 5: compass

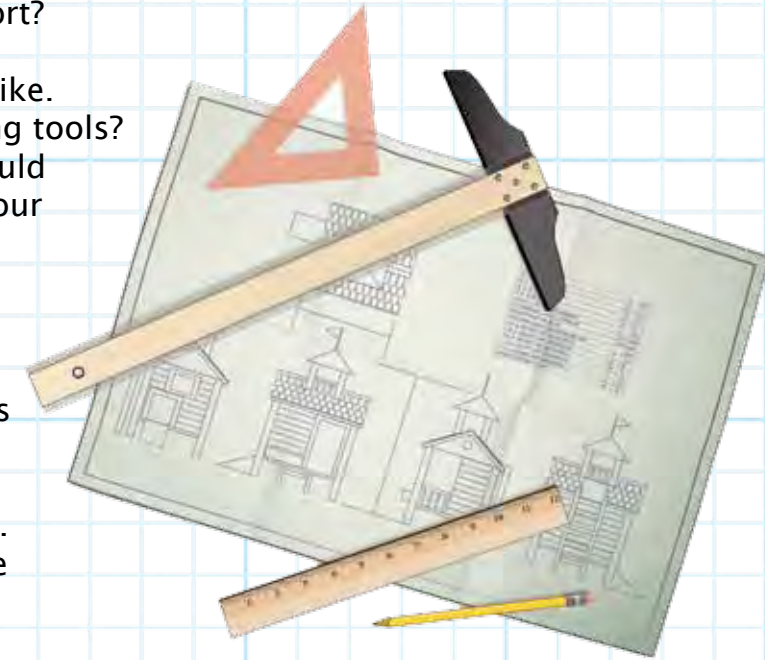


measuring tape

Hands On: Building a Fort

Before you get started, think about what kind of fort you want to build.

- Do you want your fort to be inside or outside?
- Are you building a temporary fort or a permanent fort?
- How many people should fit in the fort?
- What materials do you need to build the fort?
- How will you hold the materials together?
- Draw a picture of what your fort will look like.
- Can you scale your picture using measuring tools? For example, in your drawing, one inch could represent one foot. This drawing can be your "guide" when you start to build your fort.

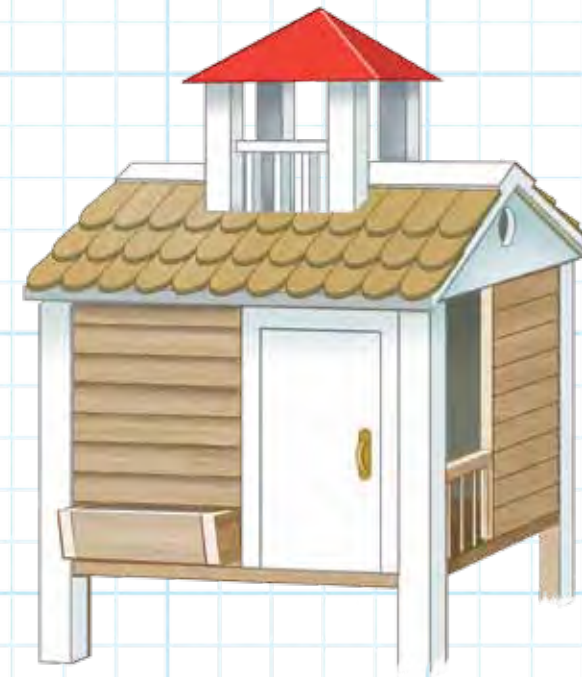


Build your fort!

- Make sure you have permission and always follow safety rules.
- Who will help you build the fort?
- Gather together all the materials you need.
- Do you need any simple machines to make your fort?
- Where can you find simple machines?
- Who will help you use them?
- What are your first steps in building the fort?
- As you are building, do you want to add extra materials?

Look at your finished fort:

- Does your fort look as you thought it would?
- Draw your fort now and compare it to the drawing you made before you built it.
- Did you have to make any changes to your fort's design?
- If so, what did you change while you were building? Why?
- Can you measure your fort?
 - How tall is it?
 - How long are the sides?
 - How many "rooms" does it have?
 - What else can you measure?
- How many people do you think can fit inside your fort?



With love to my husband Larry, son Robert, daughter-in-law Carmen, and my mother Madelon. They are my inspiration and I am eternally grateful for their continued support—LS

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