

Sawmill & Equipment 2026

A **Wood Magic Forest Fair** learning station for 4th graders

(science standards and points of emphasis highlighted in yellow)

Objective

Students will be able to describe the process by which a log is harvested, transported to a mill, and becomes a board and will be able to name several other solid products in addition to lumber.

Overview

Students observe a piece of logging equipment and learn how trees are harvested, merchandised, loaded, and transported to a mill. They will watch as a log is cut into boards on a sawmill and learn how finished lumber is made. They also learn how sawdust and bark are used for fuel and for the manufacture of other products. They are introduced to particleboard, plywood, and oriented strand board (OSB).

2021 SC Science Standards

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function together in a system to support survival, growth, behavior, and reproduction.

4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and how their uses affect the environment.

Materials List

Wood-Mizer LT15 portable sawmill

3-6 cedar logs (depends on diameter) for the week

PPE for sawyer

Pine 2X4 lumber piece

4-5 Rice Krispy Treats *per class*

Roll of paper towels – to illustrate plywood

12" X 12" pieces of OSB, particleboard, and plywood (labeled)

3 plys of plywood *per class (only break 1 per class)*

1-gallon Ziplock bags of wood chips, wood shavings, and bark chips

Dimensional lumber poster

Grilled cheese sandwich picture

Vocabulary signs – SOLID WOOD PRODUCTS, LUMBER, PARTICLEBOARD, OSB, PLYWOOD, CYLINDER, RECTANGULAR PRISM

Equipment picture signs – FELLER BUNCHER, SKIDDER, LOADER, LOG TRUCK WITH TRAILER

Step-by-Step Procedures: (start at logging equipment)

1. Ask class, "Which station did you just come from?" Relate what they have just seen to what they are about to see:

Ex.: *Makin' Paper* – "Guess where some of the wood chips that are made into paper come from? Sawmills ship truckloads of chips every day to paper mills so that nothing is wasted."

Say, "If you listen real closely you might win a prize!"

2. “People have been cutting trees in America for a long time. What was one of the first things the early settlers do when they came to America and wanted to build their log houses?” *[cut trees]*
“They also cut trees and cleared the forest so they could grow corn and other crops in fields. Who can tell me how else they used the trees that they cut?” *[firewood, pens for animals, handles for tools]*

“Today, we not only cut trees down, but also plant them back.”

3. Ask class, ““Did you see a movie when you first got to Wood Magic? Who was the star of the movie? *[Tim the Tree]* What did Tim want to be when he grew up?” *[part of a family’s home]*
Explain that even while Tim was standing in the forest, he was already a home for many living things, including birds, insects, and mammals. But Tim wanted to do something different. He wanted to become a home for people. Tell the students that before Tim can begin that journey, he first has to leave the forest and be turned into useful products. At this station, they are going to follow Tim's journey from a tree in the woods to lumber and other wood products used every day.

4. Explain that a person called a forester walks through the woods and evaluates each tree to decide which ones are ready to be harvested. A logger is someone who harvests trees. Not every tree is cut, and foresters and loggers make sure forests stay healthy and productive for the future.

Once Tim has been selected, a large machine called a **FELLER BUNCHER** (hold up picture) cuts the tree and lays it down in a pile with other trees.

Next, another machine called a **SKIDDER** (hold up picture) drags the trees to a collection area called a log deck.

At the log deck, an operator uses a machine called a **LOADER** (hold up picture) to delimb the tree, sort the logs, and load them onto a **LOG TRUCK** (hold up picture). If the machine looks familiar, it is a lot like the "Claw" from Toy Story—except much bigger and stronger!

Once Tim is loaded onto the truck, he is ready for the next step of his journey.

!Side note! *Common question – What About the branches and leaves?*

At this point, students will often ask: "What happens to the branches, leaves, and the stump?" Explain: "That's a great question! We usually leave those in the forest."

“The branches and leaves help cover the soil, which reduces erosion when it rains. As they break down, they return nutrients to the soil so the next generation of trees can grow. They also provide food, shelter, and habitat for insects, birds, mammals, reptiles, amphibians, and many other kinds of wildlife.”

"The stump is usually left in the ground too. Its roots help hold the soil in place, and over time the stump slowly decays and returns nutrients to the forest."

"So even the parts we leave behind still have an important job. Nothing is wasted—they're helping grow the forest of the future."

5. Walk students to the sawmill classroom area. Say, “Now that Tim has arrived at the sawmill, we can begin turning him into **LUMBER** (hold up sign). But first, we need to learn a little more about Tim.

Ask the students: "What shape is Tim?" [*cylinder*] "What shape is a board?" [*rectangular prism*] Then ask: "Can we get a rectangular prism out of a cylinder?" Say, "Of course we can! But when we do, there will be some pieces left over. I want you to keep your eyes open as our sawyer turns that cylinder into rectangular prisms that we call lumber. A sawyer decides how thick to cut each board and how to get the most lumber from each log. Modern sawmills even use lasers to scan each log and computers to figure out what size boards to cut so that the entire tree is used. Lumber is a **SOLID WOOD PRODUCT** (hold up sign). The solid wood part of a tree is made up mostly of the trunk.

Ask, "What's the job of a tree's trunk?" The trunk provides support for branches, which in turn support the tree's leaves. The trunk and branches contain the tree's "plumbing"—the tubes that transport water and nutrients to the leaves and sugar from the leaves to the rest of the tree. They also contain the growing layer of the tree that makes the trunk, branches, and roots of the tree thicker each year.

6. Say, "OK, Mr. Sawyer, show us how you turn a log into boards!" Sawyer will cut a board. Bring the board over to the students and let them smell it, but NOT touch it. Emphasize that you don't want anyone to get a splinter in their finger or worse, their nose, and you don't want anyone leaving boogers on your board. Say, "This smells good, doesn't it? This wood is called *red cedar* and has a strong smell because of its sap. Your parents or grandparents may have a cedar chest that they keep blankets or clothing in, because cedar wood has a natural insect repellent. Cedar wood is also made into shavings that people used for bedding in animal cages...like hamster or rabbit cages.

7. Ask the students: "But did Tim want to become a cedar chest?" [*No...part of a house*] Explain that while red cedar is great for cedar chests and animal bedding, it is not the kind of wood we normally use to build houses. Show the students a pine tree and explain that pine trees are commonly milled into lumber to build homes. Tell them: "We make a very special board out of pine. I'll give you a hint. It's about two inches thick and four inches wide. Does anyone know what it's called?" Allow the students to answer. "That's right—a 2×4! We use 2×4s to build the frame, or skeleton, of a house."

8. "What do you see on the ground under the saw? [*sawdust or shavings*] That's right, the saw makes a lot of sawdust when it cuts through the wood – kind of like when your dog eats his food – he's kind of messy, isn't he? Who can guess what happens to the sawdust that piles up under the saw blade? [*can be sent to paper mill or burned to make electricity*] I bet you didn't know that some mills have their own power stations that can burn dust and bark to make their own electricity or produce heat to dry dry the wood after it's been cut. So, nothing is wasted from the tree after it's been cut!

9. "There is one other thing that can be done with the sawdust. Show the smooth face of a piece of particle board and ask: "Has anybody ever seen something like this before?" Guide the students toward answers such as: Countertops, Desks, Cabinets, Shelves. Flip the board over and ask: "Can everybody see the particles? The particles are glued together to make a special kind of board. So, if we made a board out of particles, what do you think we're going to call this product?" Allow the students to answer and hold up **PARTICLE BOARD** sign. Explain that particle board is a really cool product because it allows us to use material that might otherwise have been wasted.

Say "When I think of particleboard, I sometimes get hungry, because particle board reminds me of a Rice Krispy Treat! Raise your hand if you like Rice Krispy Treats! I do, too, and you know, particle board is kind of like Rice Krispy Treats. It's made out of small pieces of wood or sawdust (that's like the rice pieces) glued together, and pressed together under heat and pressure to make a solid wood product. Rice Krispy Treats are "glued" together with marshmallows because marshmallows taste better than glue!"

10. Say, "One other engineered wood product we want to talk about today is called **PLYWOOD** [hold up word sign]. Plywood is made by peeling a log on a special machine that kind of looks like they are unrolling the wood off the tree like you unroll a roll of paper towels (illustrate by partially unrolling a roll of paper towels). These thin strips are then glued together with heat and pressure to make a board that is a lot stronger than the individual strips. It looks kind of like this grilled cheese sandwich, doesn't it? (hold up picture)

Now, we're going to do an experiment to show just how strong this plywood is." Have a student volunteer to come up and break a single ply of wood. They should be able to do it easily. Then ask, "Who do you think is the strongest person in your class? Who do you think could break a piece of plywood?" Take 3 plies of wood and show the students how each layer is turned at a right angle (90 degrees) from the one above and below it to make it stronger. Have the "strongest" student attempt to break the plywood. [Be careful of pinched fingers.] "That was pretty tough right?" Ask, "So where do you think we use plywood in a house?" Guide the students to: Roofs, Walls, Floors.

11. "Do you see all of those slabs of wood laying over there? "Can we build a house out of those?" Allow the students to answer. "Of course not! But what is it made of? That's right – it's made of wood!" What do you think is done with them? [can be *burned for electricity or sent to paper mill*] Yes, sometimes they are used just like sawdust or can be chipped, but sometimes they are made into **strands** (hold up a strand) that are then turned, or **oriented**, in different ways and layered together. The strands are then pressed together using lots of heat and pressure and this makes a **board** that is very strong.

Hold up a piece of OSB. Ask the students: "Can everybody see the strands of wood in the board? So, if we made a board out of strands, what do you think we're going to call it?" Allow them to guess. "That's right! It's called Oriented Strand Board, or **OSB** for short. (hold up sign) " Explain: "The word oriented means the strands are lined up in different directions. Just like plywood, crossing the layers makes the board much stronger."

Finish by asking: "So where do you think we use OSB?" Guide the students to the same answers as plywood: Roofs, Walls, Floors,

12. The Last Part of Tim – The Bark

Ask the students: "So, what's the last part of the tree we haven't used yet?" Hold up a piece of bark. "That's right—the bark!" Ask: "Do you remember seeing bark being used in the movie? What were they doing with it?"

Guide the students to the answer: "They were spreading it around bushes and flowers. When we

use bark like that, we call it mulch. But at a sawmill, bark often has another very important job.”

Ask: "Can bark burn?" Allow the students to answer. "Yes, it can! As I said earlier, at many sawmills, the bark is burned in a boiler to heat water and make steam. That steam spins a turbine, the turbine spins a generator, and we get electricity!"

(If time allows, cover I-Beam. If less than one minute or horn has already blown, skip to the wrap up)

Ask: "Can anyone tell me what parts of this beam are made from plywood or laminated veneer, and what parts are made from OSB?" Allow the students to identify the different materials.

Then ask: "Where do you think you would find one of these in a house?" Guide them to the answer:

"These are called floor joists. They support the floor and help hold your house up." Explain:

"Years ago, a beam this size would have been cut from one very large tree. Today, thanks to engineered wood products, we can build beams just as strong using medium-sized and smaller trees."

13. Conclude: "Engineered wood products help us make better use of our forests. By using trees of many different sizes, we can build strong, safe homes while making the most of this valuable renewable resource."

14. "OK, now it's time to see how much you've learned here at the sawmill! Raise your hand if you know the answer to these questions and if you're the first one to answer correctly you'll win a Rice Krispy Treat! *(Please call on students who have not already volunteered and have a quiet hand raised.)*

- a. What is the sawdust and leftover scraps used for after the board is cut? [*burned for electricity or sent to paper mill*]
- b. What do you call the boards that have layers in them like a sandwich? [*plywood*]
- c. What is OSB made out of? [*small shreds of wood glued together*]
- d. What is the type of board that has sawdust glued together and looks like a Rice Krispie Treat? [*particleboard*]
- e. True or False? Growing and harvesting trees to make products for our everyday life is environmentally friendly. [True]

Wrap-Up

"Today you've seen a real, live sawmill cut a log into boards. Foresters and loggers take good care of the forests and make sure they are healthy and the trees grow big. Forests provide homes for the wildlife, give us places to play, and provide us with a lot of other "gifts." Then when it's time to thin some of the trees out of the forest or cut all of the trees and start a new forest, sawmill people make sure that nothing in the tree is wasted. By not wasting anything, we are not adding to landfills which conserves the natural resource of land. Because of good forest management and planting more trees than are harvested each year, we have more trees today than 100 years ago."