Teaching Monitoring and Clarifying in Grades 3–5
Simple Machines: Wheels, Levers, and Pulleys by David Adler

Overview and Rationale

This informational text provides readers with an engaging introduction to basic physics. Young readers will be surprised to know that they use simple machines every day—wedges such as knives and forks, inclined planes such as playground slides, and levers such as seesaws. Told by two young children and their comical cat, *Simple Machines* explains how these basic machines work.

Informational text—with its myriad of technical vocabulary, nonlinear text structure, and assumption of background knowledge—is a logical source of confusion and comprehension breakdowns. To model how I monitor my comprehension and clarify when it falters, I've selected this book because of its highly technical content. *Simple Machines* also does not have many of the features inherent in informational text—headings, glossary, and table of contents. Without the road map that these text features provide, young readers may struggle to navigate through this content-heavy book.

Lexile Framework: 690

Grade-Level Equivalent: 4.3

What the Text Says	What I Say
It's a simple machine that helps break things apart. (p. 2)	*I don't understand here why the author is comparing my smiling in the mirror to a machine called a wedge. When I look in the mirror at my smile, I see my teeth. It sounds like the author is trying to tell me that my teeth are a wedge, but I don't really understand that. I need to keep reading to see if I get more information about wedges.*
. . . that splits the apple into pieces small enough to swallow. (p. 2)	*I was correct—reading on gave me more information to see how my teeth are like wedges. If a wedge is a machine that breaks things apart, my teeth break apart the food I'm eating. So that's what the author meant by telling me my teeth are a machine—one called a wedge.*
The force of the lumberjacks' swing drives the wedge into the log. (p. 3)	*I'm unclear what force is. Does that mean how strong something is?*
. . . into a sideways force that breaks the log into smaller pieces. (p. 3)	*The author doesn't come right out and tell me what force is, but if I try to put the book into my own words, I see that force might be related to power. I'm learning here that the force of the ax helps to break the log.*
The front is narrow so it can push easily through the water. (p. 4)	*Wow. I have to slow down here to think about how all of these things—stuff I use all the time—are wedges. It might help me to reread the part where the text tells me that a wedge "helps breaks things apart." That helps me understand that a thumbtack breaks apart paper, and knives break apart food.*
If you have, you played on a simple machine. (p. 5)	*Now I'm confused! Is a slide another example of a wedge? It doesn't seem like a slide breaks things apart. Let me keep reading.*
It makes it easier to carry things up or down. (p. 6)	*At first, I thought the author was saying that a slide is a wedge. But when I kept reading, I could see that the author wanted to introduce a new kind of machine—one called an inclined plane. I need to remember that this kind of machine makes it easier to move things up and down.*

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What the Text Says	What I Say
The more gradual the slope of the ramp, the easier the work. (p. 7)	*That word slope at first was tricky. I'm not familiar with a slope of a ramp. But then I remembered I have heard slope used in the winter about ski slopes. It think it has to do with how steep something is. So this sentence means that if a slope were smaller—"more gradual"—then it would be easier to push something up a ramp.*
An inclined plane gets the same work done with less force over a greater distance. (p. 8)	*There's that word force again! It must be a really important word in talking about machines. Here I'm unclear if ramps and inclined planes are the exact same thing, so let me read on to see if this question gets answered.*
Mountain roads are inclined planes. (p. 9)	*Let me think about this with something more familiar to me—not driving a car, but riding my bike. The text is telling me it's too steep to drive a car right up a mountain—just like it's too steep to ride my bike. The road is an inclined plane to help move me and my bike up it.*
. . . the greater the distance you have to drive to reach the top. (p. 10)	*There's that word* slope *again—I'm glad I slowed down to think through that one. Let me break down these two long sentences into smaller parts to think through them more clearly. The road—an inclined plane—makes it easier to ride my bike up a steep mountain. But if the slope isn't very big, I will have to drive farther to get up. That makes sense.*
. . . to make it easier for people in wheelchairs to get around. (p. 11)	*I see wheelchair ramps outside most buildings, so now I see how that is an inclined plane to move wheelchairs up and down.*
. . . you are moving it in along a circular inclined plane. (p. 12)	*I don't do a lot of building, so this example of a screw as an inclined plane was not as helpful to me. But I think what it's saying here is that the twisting helps move something up and down, just like the road up a mountain twists around.*
Have you ever played on a seesaw? (p. 13)	*I recognize this kind of question! The last time I got confused and didn't realize it was the author's way of signaling that I'm about to read about a new kind of machine.*
It's a simple machine that makes lifting easier. (pp. 13–14)	*This is a lot of new vocabulary for me—so I need to slow down and repeat the words so I'm really clear on them. The most important thing is that a lever has a bar and a pivot. The pivot stays still. And a lever helps to lift things.*
The load feels lighter. (pp. 15–16)	*To really understand this, I need more information on why moving my hand makes it feel lighter. I'm thinking the author will explain this next.*
. . . it's making it easier to lift the sand. (p. 16)	*Wait a second. I thought a pivot stays still. My hand can move. I'm confused if pivots never move or if that was the pivot in the seesaw that doesn't move.*
. . . the rubbing of the bottom of the box against the ground—that makes moving the box so difficult. (pp. 17–18)	*I'm a bit confused if the box is hard to move because it's heavy or because of the friction—this rubbing against the ground. Why don't we just use a ramp to move the box? Is there a better machine for this?*
It's the wheels and axles on the wagon that makes your work easier. (p. 18)	*I certainly know the job of wheels, but I'm not familiar with this word* axle. *Let me read on to see if the author tells me more.*
Wheels reduce friction. (p. 19)	*So there's my answer to what an axle is. But this last sentence "Wheels reduce friction" is unclear to me. How do the wheels make less rubbing on the ground? Don't wheels touch the ground too?*

What the Text Says	What I Say
A wheel and axle also multiplies the distance something turns. (pp. 19–20)	*Let me see if I can clarify this confusing statement by rewriting it into my words. I know that the friction makes things hard to drag, but a wheel touches less of the ground and so it has less friction.*
On a Ferris wheel, the distance the axle turns is multiplied. (pp. 21–22)	*This is confusing. I'm having a hard time understanding what moves and what turns. I had to reread it a couple of times, but what I see now is that there are two circles on a Ferris wheel—one for the axle and one for the wheel with all the people in their seats. The axle does lots and lots of little turns to move the big wheel with the people in their seats.*
. . . you are turning a wheel and axle. (p. 23)	*I don't understand yet how my bathroom faucet is an axle. But I know that this author has a pattern where he explains in more detail, so I'm going to keep reading.*
The larger the knob, the easier it is to turn the thin shaft. (p. 24)	*I had to reread this part twice, and I'm now beginning to understand that the part I turn is connected to an axle that moves to turn the water on and off.*
They spin around it. (p. 25)	*So what I think this is telling me is that when I peddle a bike, I'm not really peddling the wheels, but rather I'm peddling the axle.*
Gears can change the speed, power, and direction of a machine's work. (p. 26)	*The author is giving me another important vocabulary word—*gears, *which means wheels with teeth. It would have been useful if the author had given me a glossary to help me keep track of all these new words.*
It's fixed—attached—to the top of the pole. (p. 27)	*I was sort of confused at first because there is no real definition of a pulley. But when I reread the example of the flagpole, I could see that a pulley helps me to pull things.*
The more pulleys you add, the less force you need. (p. 28)	*That word* force *keeps popping up again and again. If I use the word* power *in its place, this paragraph tells me that two pulleys add more power.*
With the pulleys the motor in the crane needs less lifting power. (p. 29)	*This book doesn't really have much of a conclusion or a part where the author summarizes everything that I've read. But I'm getting the sense that these simple machines—pulleys, levers, ramps, axles, gears—all work together to lift and move heavy things and to make jobs easier.*