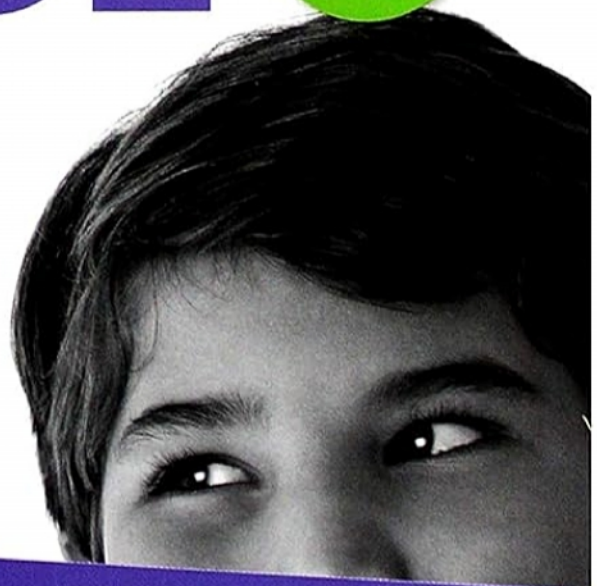


BIG

SCIENCE 4



WORKBOOK

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Unit 1

Technology and the Design Process



How can technology affect our lives?

1 What are the names of these machines? Unscramble the words.



1 nca rponee
can opener



2 cswer



3 eax



4 ocrsiss



5 sasewe



6 lehew

2 Which machine does what? Look at 1. Match the machine to the job.

Which machine...

- 1 cuts paper? scissors
- 2 chops wood? _____
- 3 helps drive a car? _____
- 4 lifts someone up high? _____
- 5 opens a can? _____
- 6 holds two things together? _____

3 Where do these words go? Read the texts. Complete with words from the box.

technology wheels complex screw ~~design~~

Cool technology

Technology and (1) design make sports better. When my mom was my age, she went roller skating. I go rollerblading. It's just like roller skating, only cooler! Rollerblades don't have four (2) _____ like roller skates. They have a line of three to five wheels along the center, so they can go much faster! I love it! *Becky, 11*



rollerblades

Do you ever think how (3) _____ affects our lives? We use it every day in everything we do. Technology isn't only about (4) _____ machines. It is about simple things, too. These things make our everyday life easier, but we never stop to think how great they are! Here's my example: When I skateboard, I get thirsty, so I have a metal thermos with a (5) _____-top lid. I fill the thermos with cold juice and put it in my backpack. The juice doesn't spill, and it stays cold. How cool is that? *Ed, 10*



thermos

4 True or false? Look at 3. Circle T (true) or F (false).

- 1 Becky's mom doesn't know how to skate. T / **F**
- 2 Rollerblades always have four wheels. T / F
- 3 Technology is complex machines only. T / F
- 4 Ed says that technology makes our lives easier. T / F

5 How about you? Read what Ed says about his thermos in 3. Write about a simple thing that you use every day. How does it make your life easier?

I use _____.

This is how it works: _____

It makes my life easier because _____.

Lesson 1 • What is a machine?

1 What is work? Circle the correct words.

Work is the use of a **distance** / **force** to move an object across a **distance** / **force**.

2 Are they work? Think of some activities that you do. Complete the lists with your ideas.

Work

kicking a ball

Not Work

solving a math problem



Reading Tip

When you find a word in a text that you don't know, try to understand its meaning from the words around it. Even if you don't understand the word exactly, you can get a general idea.

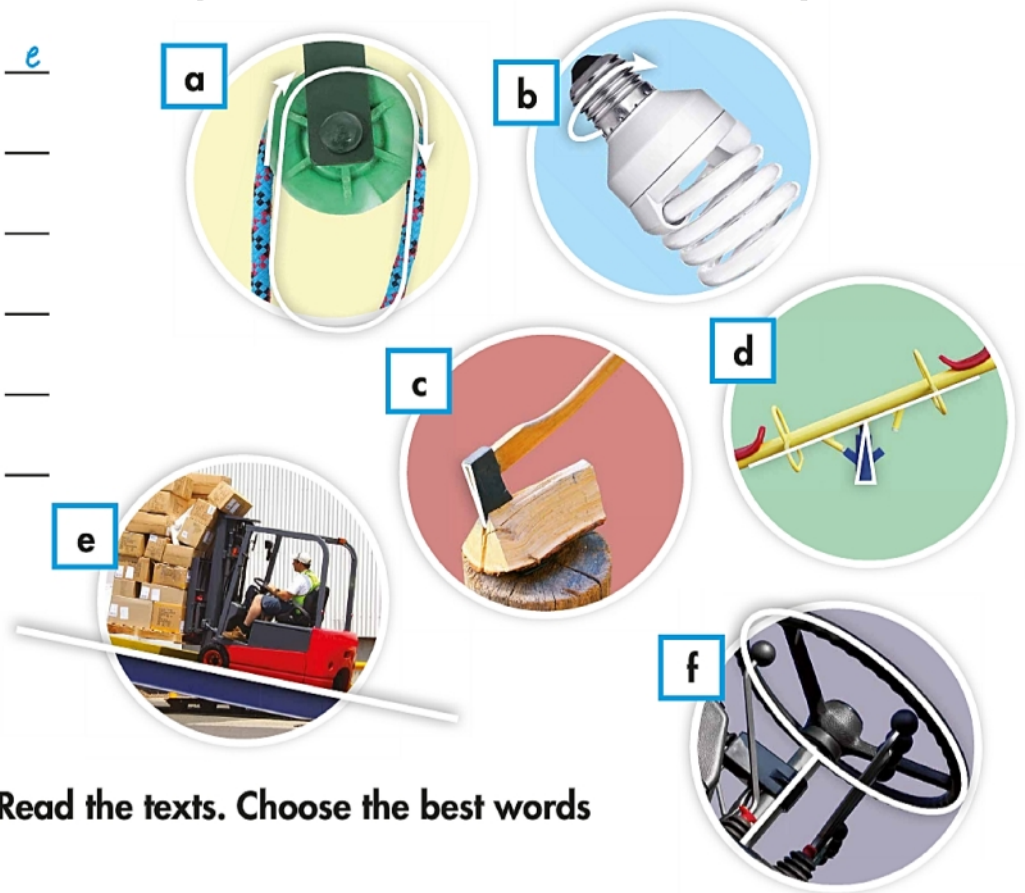
3 Machines we use. Read the text. Complete with words from the box.

complex design machines simple

Machines help us do things. The (1) _____ process is a series of steps that we follow to design new and better (2) _____. The objects in the photos in 4 are (3) _____ machines. We call them that because they have only one or two parts. When we put two or more of these machines together we make a bigger machine. We call these (4) _____ machines.

4 What are the names of these simple machines? Match the words to the photos.

- 1 inclined plane e
- 2 lever
- 3 pulley
- 4 screw
- 5 wheel and axle
- 6 wedge



5 Complex machines. Read the texts. Choose the best words to complete them.

Steering Wheel

A steering wheel in a car is an example of a wheel and axle. When the driver (1) **turns** / **lifts** the steering wheel, this (2) **causes** / **creates** the axle to turn.

The axle (3) **makes** / **moves** the wheels of the car on the road. The driver doesn't have to use much force to turn the steering wheel, so it makes driving easier.



Crane

A crane uses a (4) **pulley** / **wedge** to lift things off the ground. Because it has a long (5) **lever** / **wheel**, it can lift big or heavy objects without using much force. A wheel and (6) **axle** / **inclined plane** help the driver to turn the crane and move things from one place to another.



6 How do bicycles work? Put the phrases in order and make sentences about bicycles.

1 bicycles / Like / work easier. / make / all machines,

Like all machines, bicycles make work easier.

2 are / a bicycle, / to move / than when you / With / on foot. / less force / you need

3 and pulleys. / in a / The simple / wheels, / levers, / machines / bicycle are

4 and pulleys / to move / your feet / the wheels. / The levers / help

5 to stop / help / More levers / the bicycle. / the brakes



7 Can you recognize these simple and complex machines?

Write what we do with them.

1 doorstep = wedge → stop/door

A doorstep is a wedge. We use it to stop a door.

2 slide = ? → have fun



3 scissors = lever + ? → ?



4 wheelbarrow = ? + ? + lever → carry/things



Lesson 2 • What is the design process?

1 What a product designer does. What machine did the product designer design?



Reporter: Adam, what is the difference between a product designer and a design engineer?

Designer: Let me show you. Look at this coffee maker. I designed it. My job was to make it look beautiful and easy to use. Katrina, the design engineer, took my designs and applied the technology that made it work. Together, we tested the prototype, we evaluated the results, and redesigned it.

Reporter: So, product design is more about art, and design engineering is more about technology.

Designer: That's a very good way to put it.

Reporter: This coffee maker came first in the design awards last year! How did that make you feel?

Designer: Very happy!



2 True or false? Read the statements. Circle *T* (true) or *F* (false).

- 1 A product designer and a design engineer don't do the same job. **T** / F
- 2 The designer wasn't interested in making the coffee maker easy to use. T / **F**
- 3 A product designer and a design engineer cannot work together. T / **F**
- 4 If you want a product to look good, you go to a design engineer. T / **F**
- 5 A design engineer tests how the prototype's technology works. T / **F**
- 6 Adam got an award for the coffee maker he designed. T / **F**