Weekly Question

Why do some building entrances have ramps?

If a building has stairs at the entrance, it probably has a long ramp leading to the door, too. That ramp is an example of an inclined plane. One end of an inclined plane is higher than the other. Inclined planes are everywhere. Ramps, playground slides, and ladders are examples of inclined planes. An inclined plane is a simple machine. Simple machines are tools that help you do work.

Vocabulary

inclined plane: in-KLINED playn a flat surface that is tilted at an angle

simple machine: SIM-pul muh-SHEEN a basic tool that makes work easier to do and has few or no moving parts

A. Complete the analogy.

Inclined plane is to simple machine as ______.

☐ ramp is to stairs  ☐ triangle is to shape  ☐ nails are to hammer

B. Which object in each pair is an inclined plane? Write the word or words.

1. a ramp or a table

2. a swing set or a slide

3. a ladder or a hammer

4. an escalator or an elevator

5. a trail up a hill or a flat sidewalk
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If simple machines help you do work, then what do we mean exactly when we say "work"? Scientists say that work is the force applied to an object to move it a certain distance. When you walk up stairs or along a ramp, you are doing work. You are applying force to move yourself a distance. Scientists don't measure work just by how much force you use or how far a distance you travel. They look at the end result. So whether you use stairs or a ramp to reach the entrance, the amount of work you are doing is the same. You are using less force over a greater distance or more force over a shorter distance.

A. Check the box next to the caption that correctly describes what is happening in the picture.

☐ The person using the stairs is doing more work.
☐ Both people are doing the same amount of work.
☐ The person using the ramp is doing more work.

B. Use the vocabulary words to complete the sentences.

1. Lifting and tugging are examples of ____________ being applied.

2. The ________________ between two places can be measured in inches, feet, or miles.

3. An inclined plane makes it easier for you to do _____________.

Vocabulary

distance
DIS-tinss
the amount of space between two points

force
forss
a push or pull that can change the position of an object

work
werk
the use of force to move something over a distance
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An inclined plane makes work easier to accomplish by reducing the amount of force you must use to move something. But there’s a trade-off. When you use less force to do work, you have to increase the distance. If you lift a heavy box up to a shelf five feet in the air, the distance is five feet. If you push a box up a ten-foot ramp to the same shelf, the distance is ten feet. The box ends up in the same place. But when you push the box up the ramp, you are using less force over a longer distance. The force you exert is smaller.

A. Read the sentences. Then answer the questions.

Marco lifts his bowling ball up to a shelf that is three feet high. His sister, Maria, uses an inclined plane that is five feet long to roll her bowling ball up to the same shelf.

1. Who used more force? ________________

2. Who moved the ball a longer distance? ________________

B. Look at the two inclined planes below. Check the box next to the ramp that requires more force to move things up it. Explain your answer.

[Diagram of two ramps]
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Because they are inclined planes, ramps in front of building entrances require less force to go up than stairs do. This means that people in wheelchairs or people who have difficulty walking can use the ramps to get into buildings. People can also push or carry heavy objects into buildings more easily. Ramps are important because they give everyone access to places such as schools, restaurants, and other public buildings.

A. Name four places you have been to that have a ramp in front of them.

1. 

2. 

3. 

4. 

B. Look at the drawing of a slide. Circle the two inclined planes in the picture. Then answer the questions.

1. Which inclined plane requires you to use force?

2. Which inclined plane uses the force of gravity to do work?