

Mining Technology: Simple Machines

Welcome to the mining machine lab. Today, we're going to learn about some of the machines we use in mining, who uses them, what they do, and how they work!

Start by choosing a machine. Circle the one you want to learn more about:

- I. Drills
- II. Excavators
- III. Front-End Loaders
- IV. Haul Trucks
- V. Rock Trucks

Read over the one-pager about your machine.

1. How many simple machines can you see being used? _____
2. Can you name those simple machines? The options are screw, wheel and axle, inclined plane, wedge, pulley, and lever.

3. Draw a picture of your machine and label the simple machines in it.

Drill: drill bit is a screw, wheels use wheel and axle, the drill is moved and angled with levers

Excavator: the teeth of the bucket are wedges, the hinges and wheels are both wheel and axle, levers are used in the cab to move the arm

Front-End Loaders: The wheels and hinges are a wheel and axle, the teeth of the bucket are wedges, levers are used in the cab to move the parts. A grouser uses gears, which are a wheel and axle, an inclined plane to achieve better grip from the track, rollers which are a pulley system, and a spring, which is an additional type of simple machine.

Haul Trucks: levers are used to lift and angle the dumper, the wheels are on a wheel and axle, when the dumper is angled, it becomes an inclined plane.

Rock Trucks: same as the haul trucks.

4. Choose one simple machine that you see in the mine machine that you chose. Describe what the simple machine does in the machine that helps it do its job.

Answers will vary.

Levers help reduce the work needed to lift a load.

A wheel and axle reduces the work needed to produce movement or to move a load.

A pulley uses a wheel in a similar fashion – by turning a big wheel, smaller movement becomes easier.

An inclined plane downwards can use gravity to help move a load, and moving in smaller increments at an angle is less work than moving in large increments directly upwards.

A screw is an inclined plane around a cylinder which makes the digging of holes easier.

A wedge is a small inclined plane which makes separating two parts from each other easier.

5. What role does your machine play in a mine?

Answers will vary.

Drillers make holes for deepening drifts, planting explosives, and more.

Excavators move material around a mine site from one stationary place to another spot nearby, often directly into a truck.

Front-end loaders clear debris and move material over greater distances, but in small volumes.

Haul trucks move large amounts of material across a distance, especially off-road.

Rock trucks move large amounts of material off or on-road, in smaller or narrower spaces.