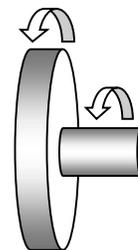


Wheels!

The wheel and axle is a simple machine made up of a large wheel connected to a smaller axle. When the wheel turns, the axle turns too. One full turn of the wheel causes one full turn of the axle, or vice versa. If the wheel turns and the axle *doesn't* turn, it is not a simple machine; it's just a wheel.



See if you can figure out whether each item listed below is a simple machine or just a wheel. Circle the correct answer.

- | | | |
|--------------------------------|----------------|--------------|
| 1. The steering wheel of a car | Simple machine | Just a wheel |
| 2. The wheel on a roller blade | Simple machine | Just a wheel |
| 3. The gears on a bicycle | Simple machine | Just a wheel |
| 4. A doorknob | Simple machine | Just a wheel |

Wheels and axles are used to magnify a force, to increase the distance something travels, or to increase its speed. If you want to **magnify the force**, you turn the wheel and the axle will turn with a greater force. If you want to **increase distance or speed**, you turn the axle and the wheel goes farther, faster.

Machine Challenge!

We've learned about three simple machines so far:
 → Lever
 → Wheel and axle
 → Pulley

Look around your house for five examples of each of one. You'll get one point for each example you find. Plus, you'll get a bonus point if you write down whether each lever is a 1st, 2nd or 3rd class lever.

Lever	Wheel and Axle	Pulley
1. _____ 1 st 2 nd 3 rd	1. _____	1. _____
2. _____ 1 st 2 nd 3 rd	2. _____	2. _____
3. _____ 1 st 2 nd 3 rd	3. _____	3. _____
4. _____ 1 st 2 nd 3 rd	4. _____	4. _____
5. _____ 1 st 2 nd 3 rd	5. _____	5. _____

Total Points = _____!

Enrichment 2:

Circles and Pi

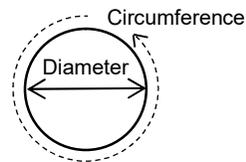


In math, there are a few numbers that have special names. One of the most famous numbers is **pi** (pronounced “pie”, like an apple pie). Pi gets its name from a Greek letter that looks like this π . That is the symbol for pi you will use in math.

Pi is a number that is always used with circles. You use it to find the area of the circle and the circumferences or distance around the outside of the circle. Pi is a decimal number that never ends, so usually when we use it in math problems, we just round it off to the first few digits. You can use **3.14** when you need to find an answer with pi.

Imagine taking a piece of chalk and putting a mark at the bottom of a wheel. Then you roll the wheel forward until the mark is back at the bottom. If you measure the distance the wheel rolled forward, it would be equal to the distance around the edge of the wheel or its **circumference**. To calculate the circumference of a circle, multiply its diameter times pi.

$$\text{Circumference} = \text{Diameter} \times \text{Pi}$$



For example, say your bicycle wheel has a 25-inch diameter. If you took a measuring tape and measured all the way around the edge of the tire, it would equal 25 inches times 3.14 = 78.5 inches. That’s also how far your wheel would move forward in one turn.

PRACTICE: Try to figure these out.

1. A bulldozer has tires that have a 50-inch diameter. When the wheels turn around one time, how far does the bulldozer move?
2. An ancient chariot made by the Romans has a 2-inch diameter axle and 30-inch diameter wheels. When the wheel turns around one time, how far around does the axle turn?
3. A Big Wheel toy has a wheel with a diameter of 20 inches and an axle with a 1-inch diameter. The pedals on the Big Wheel are connected to the axle. If you pedal around 5 times, how far will you make the Big Wheel go?