

Calculating with Pressure

In our investigations, we use pressure calculations expressed in units of pounds per square inch. That is another way of saying that a certain weight (measured in pounds) is distributed over a certain area (measured in square inches) which helps us to assign a value to forces demonstrated in the videos. You and your students may find these exercises helpful.

Area of a rectangle = Length (in inches) X Width (in inches)

Area of a circle = $\pi \times (\text{radius})^2$, or $\pi \times (\text{diameter}/2)^2$

We will use 3.14 as the approximate value of π .

Standard air pressure is assumed to be 14.7 pounds per square inch of area.

These values allow us to do some basic computations related to pressure.

Example 1: What is the force of air upon one face of a rectangular metal plate measuring 9" X 5" ?

The plate's face has 9 X 5, or 45 square inches of surface. The weight of air exerting force on that face is 9" X 5" X 14.7# per square inch.

45 square inches X 14.7# per square inch yields about 661 pounds.

Example 2: What is the force of air acting upon one face of circular plate with a diameter of 6 inches?

If the diameter is 6 inches, then the radius is 3 inches.

Area of the circle is $\pi \times 3^2$ or about 3.14 X 9, which is about 28.26 square inches. 28.26 square inches X 14.7# per square inch gives us a weight of air of about 415 pounds.