

Force Diagrams

When trying to figure out how an object will move due to the forces acting on it we usually draw a diagram called a "Force Isolation Diagram"

One of the most important things to do is to decide what is the object you want to study. Draw this object.

Then draw each force acting on that object. You don't need to include forces acting inside the object itself.

Note that an action force is on one object and a reaction force is on a completely separate object.

The fan cart here is the object with a gravity force down and a contact force up.



The cart sits at rest so we know that by Newton's first law:

"An object at rest remains at rest an object in motion remains in motion with a constant velocity unless acted upon by a net force."

that the sum of these two forces must be zero, since there is no acceleration and no net force.

We can also use Newton's Third law to find out these forces are equal and opposite. For every action there is an equal and opposite reaction.

In this case the action force is the force of the cart on the ground that is equal to the weight of the object which is the force of gravity on the object. (Since we are drawing the forces on the fan cart and not the forces on the ground we do not show the action force in this diagram.)

The reaction force is shown above. It is the contact force of the ground on the cart.

We can then add a motor and propeller blowing air to the right.

