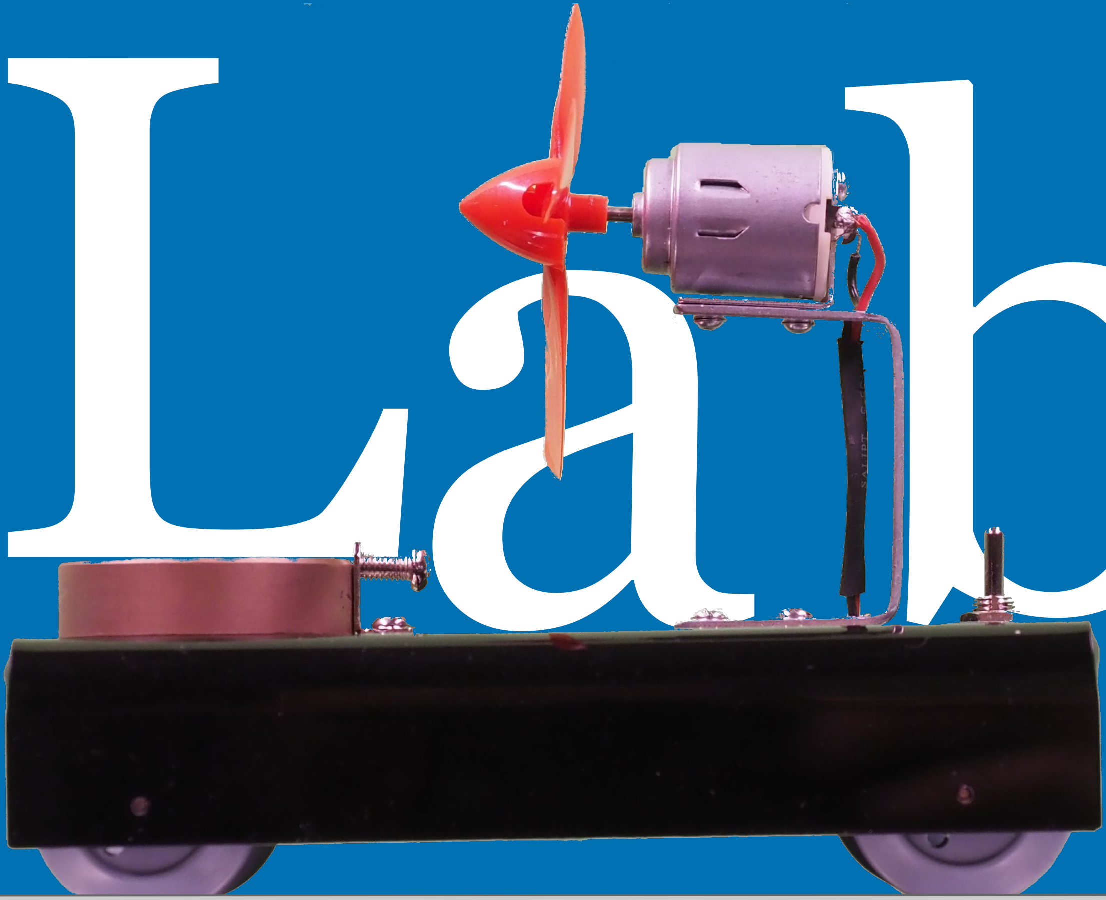
Acceleration Lab



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Variables that Affect Acceleration?

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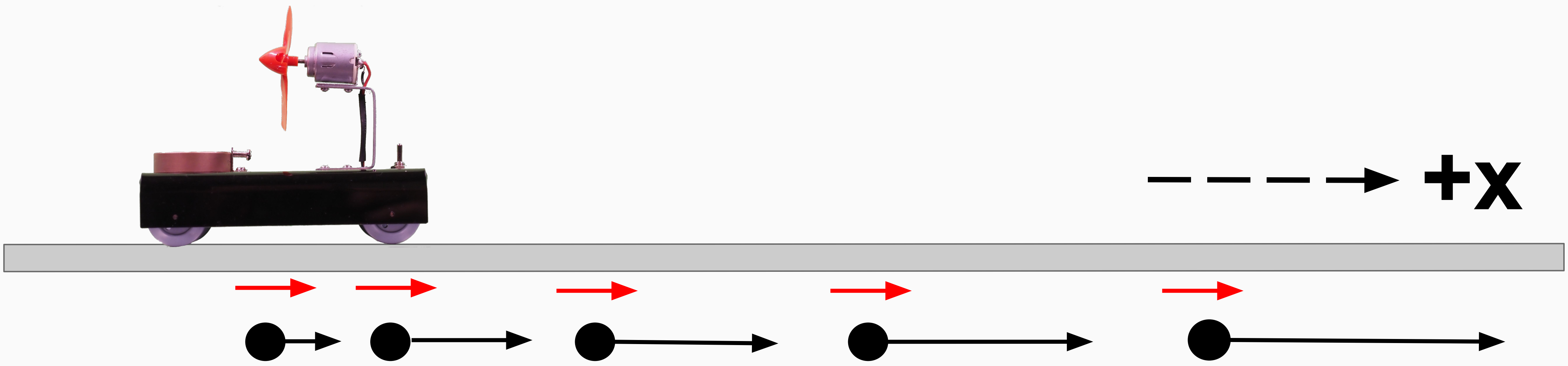
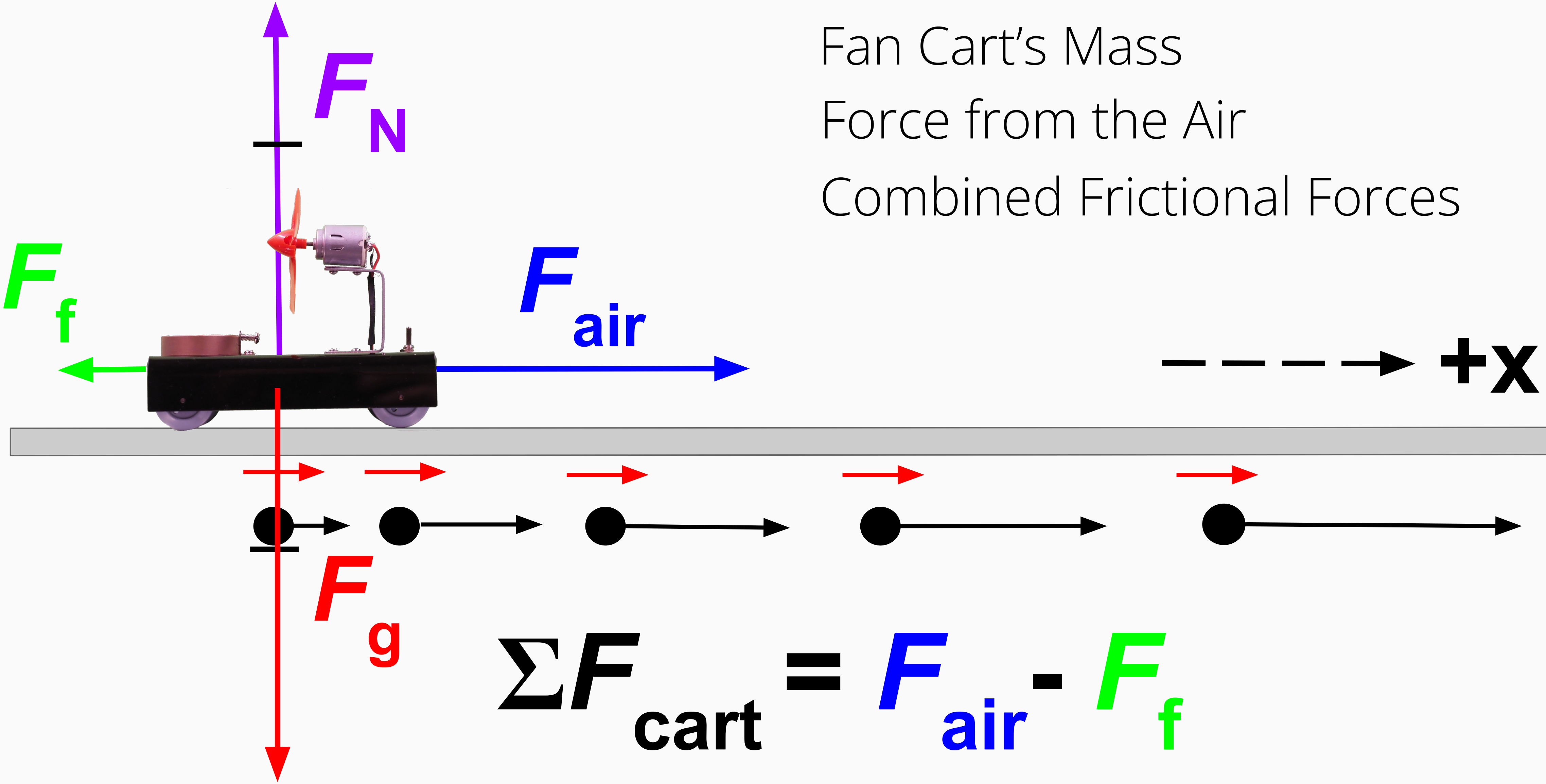


Variables that Affect Acceleration?

Fan Cart's Mass

Force from the Air

Combined Frictional Forces



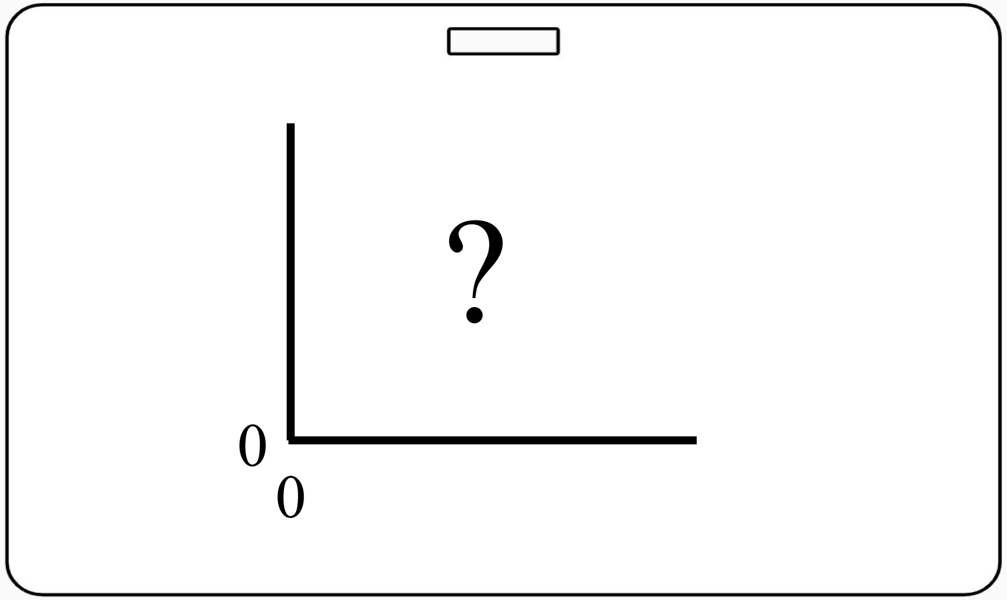
$$\Sigma F_{cart} = F_{air} - F_f$$

Title: Acceleration Lab

Purpose: To determine the relationship between

Data:

...	...



Title: Acceleration Lab

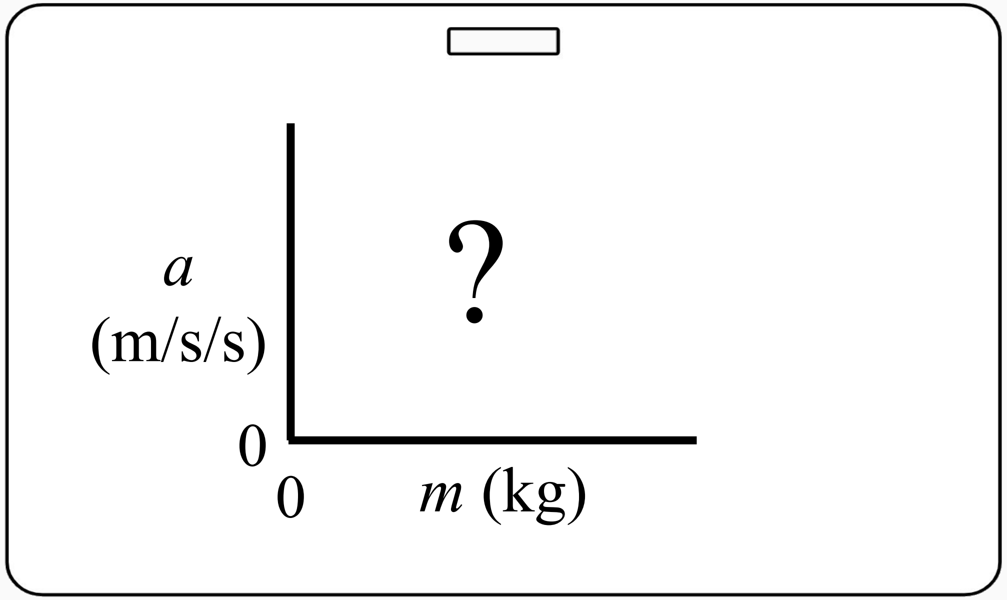
Purpose: To determine the relationship between an object's acceleration and its mass.

Data:

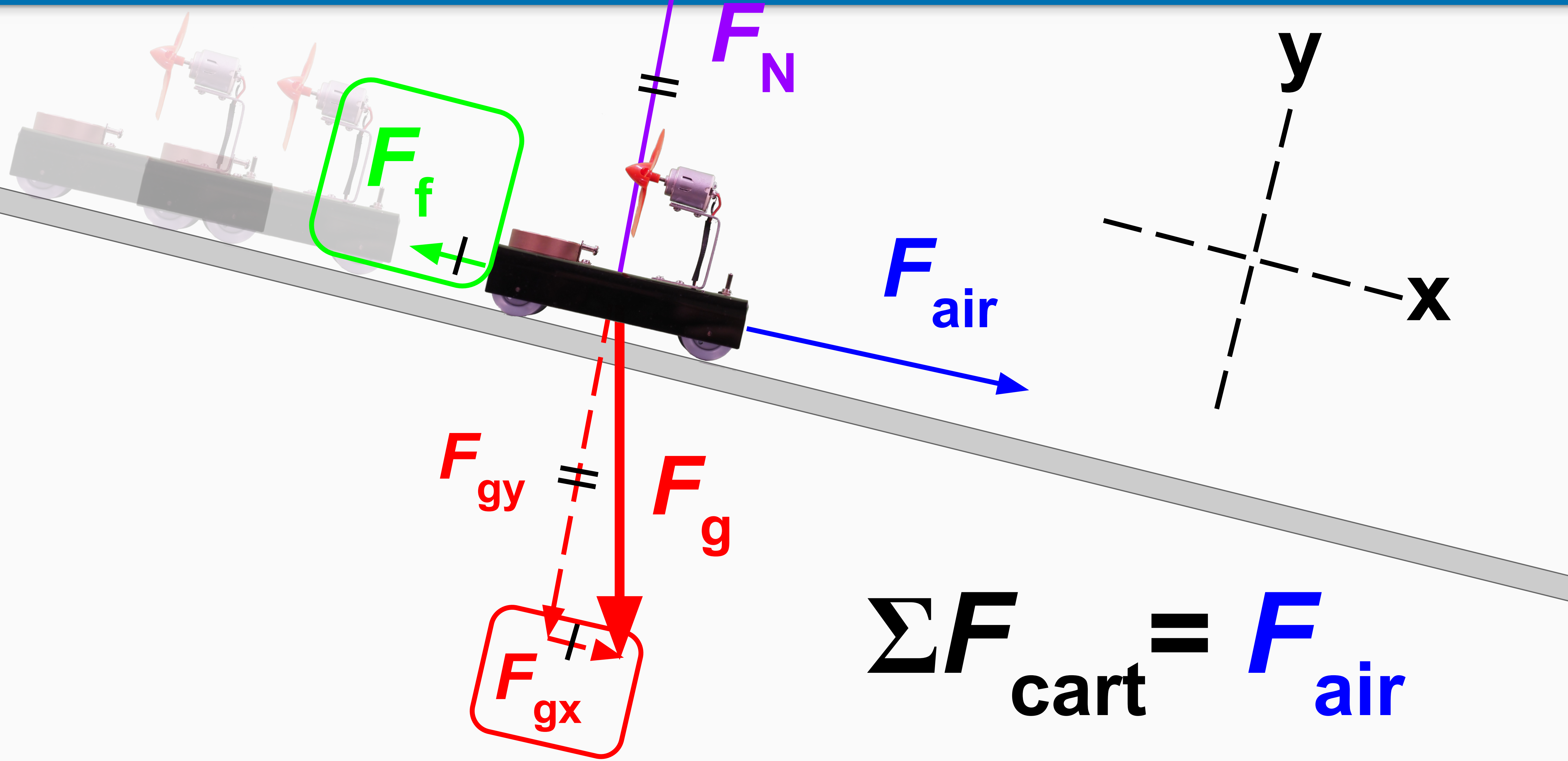
Dependent Variable

Independent Variable

Mass (kg)	Acceleration (m/s/s)
0.225	?
0.450	?
...	...

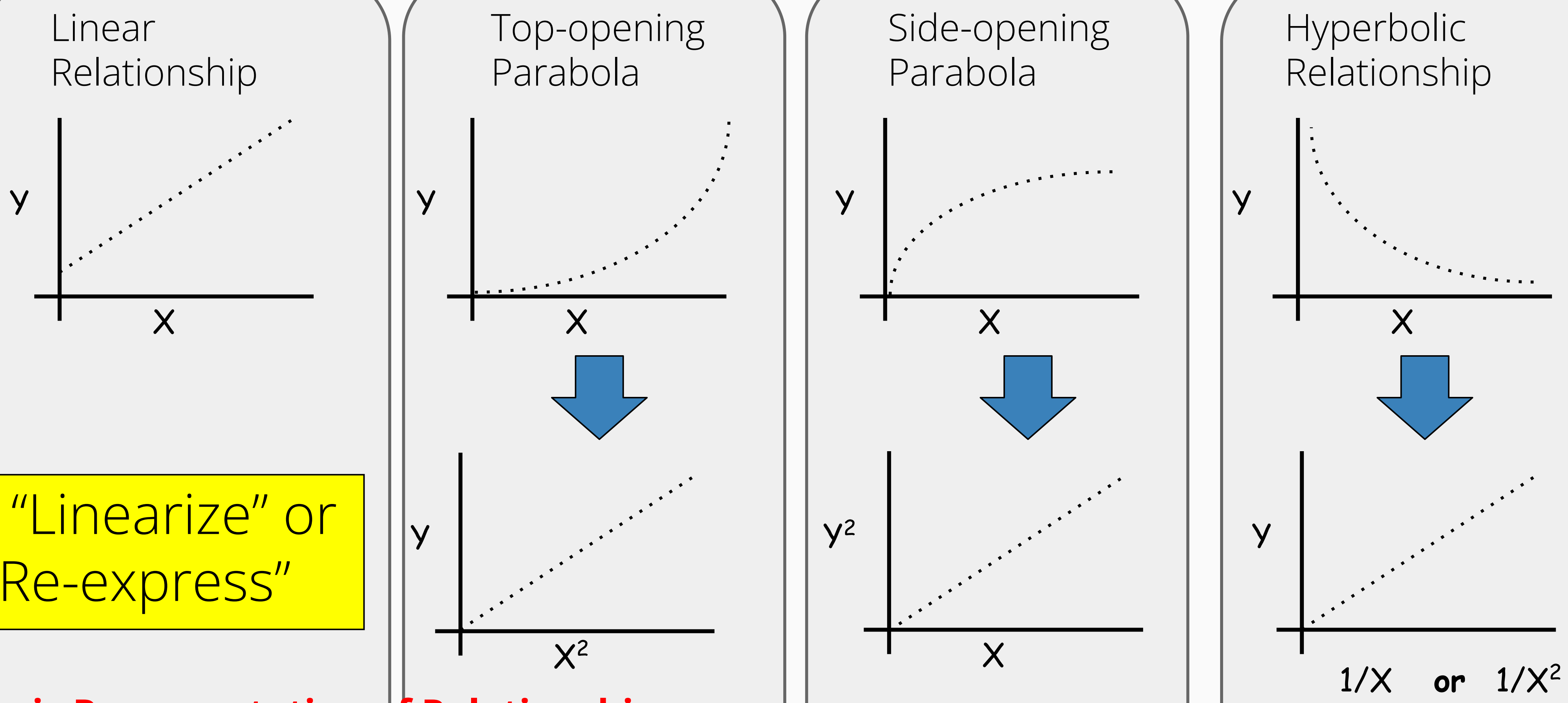


Minimizing Friction...



$$\Sigma F_{cart} = F_{air}$$

Patterns in Nature



To "Linearize" or "Re-express"

Algebraic Representation of Relationship

$y = mx + b$

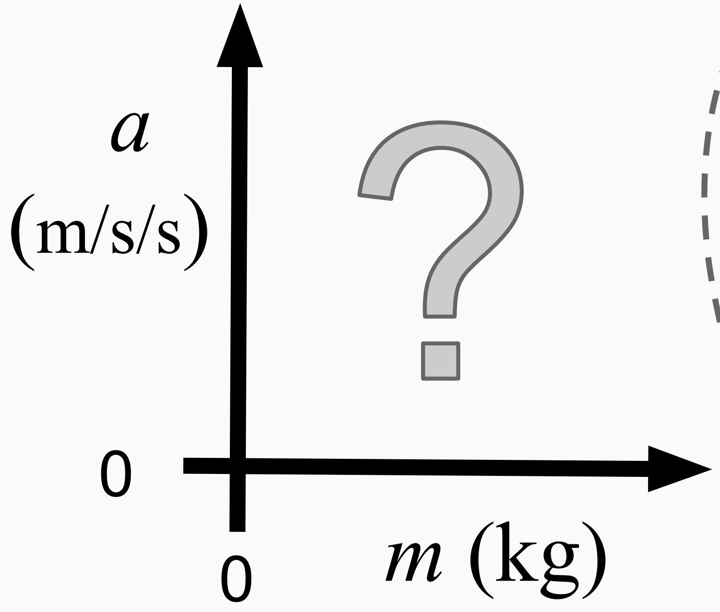
$y = mx^2 + b$

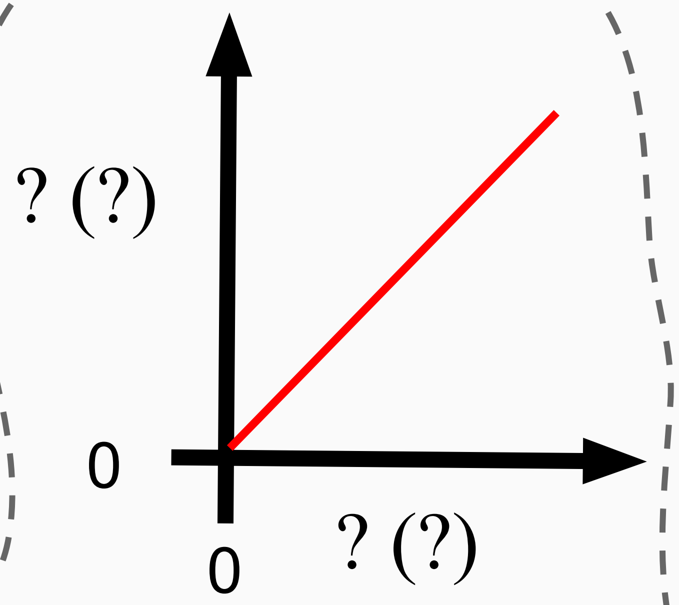
$y^2 = mx + b$

$y = m(1/x) + b$

$y = m(1/x^2) + b$

What to Whiteboard





Algebraic Representation:

$$y = (m)x + b \rightarrow ? = (?)?+?$$

- Show BOTH graphs. LABEL the variables and units on each axis.
- Write the equation for your "linearized" graph (y = mx + b)
- Be ready to discuss the meaning of the slope and y-intercept.

Y-Intercept Rules:

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5% Rule: If the y-intercept is less than 5% of the maximum y-value, then you can say that it is insignificant or zero.

Logic: If you can reason that the y-intercept should be zero. You can say its is zero.

$$a = (0.02\text{kg}*\ \text{m/s/s})\ 1/m - 0.02\text{m/s/s}$$

$a = (0.02\text{kg} * \text{m/s/s})\ 1/m$ - ~~0.02m/s/s~~

Insignificant

Slope = Sum of the Forces on the Cart

Symbol: ΣF **Units:** N

General Equation

$$a = (\Sigma F)\frac{1}{m} = \frac{\Sigma F}{m}$$

Newton's 2nd Law:

Indicates a "vector" quantity

$$\vec{a} = \frac{\Sigma \vec{F}}{m} = \frac{\vec{F}_{net}}{m}$$

Units: $\frac{N}{kg} = \frac{m/s}{s}$