

Forces in Everyday Life Lesson

- Lesson
- Everyday Forces Reading Activity
- NO PREP - Just download and Go!

6th, 7th, 8th Grade



SCROLL
to take a look inside!

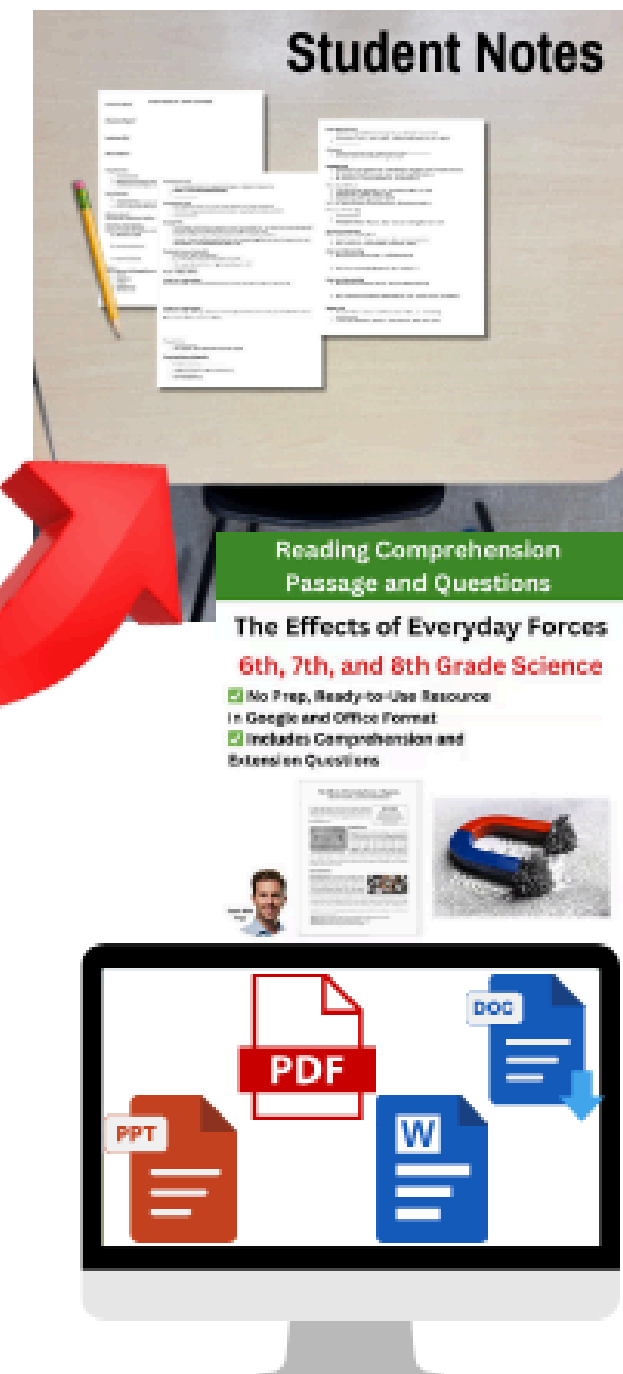


HOW THIS LESSON HELPS YOU

- **Saves Prep Time** - Everything is pre-made, ready to go, and fully editable.
- **Provides Built-In Assessments** - The Exit Ticket and Activities let you quickly check for understanding.
- **Provides Applicability** - the lesson includes multiple examples of real-life applications.

NO PREP

- ✓ **Simply Download and Teach/Upload** to your class site.
- ✓ **Assessment Included**
4 Question, Auto-Graded Exit Ticket + Reading Comprehension Activity
- ✓ **Interactive & Video-Enhanced Lesson**
- ✓ **Google, Office, & PDF**





**A Complete, Fully-
Editable Lesson &
Student Notes**



**Teacher and Student
Versions of your Lesson
with Embedded Videos**



**4 Question, Auto-
Graded Exit Ticket +
Reading
Comprehension Activity**

What You Get

FORCES IN EVERYDAY LIFE
TEACHER & STUDENT VERSION

Student Notes

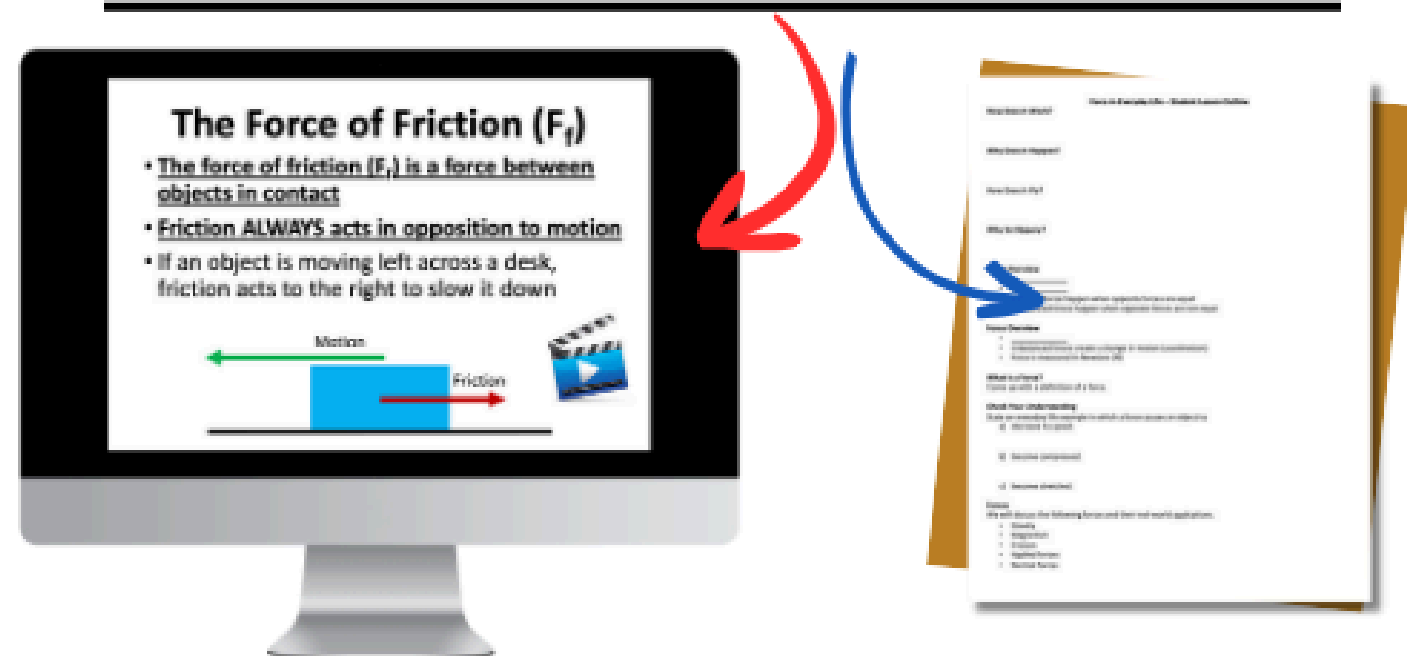
The Force of Friction (F_f)

- _____
- _____
- If an object is moving _____ across a desk, friction acts to the right to slow it down

Student version of the lesson includes blanks to fill in.

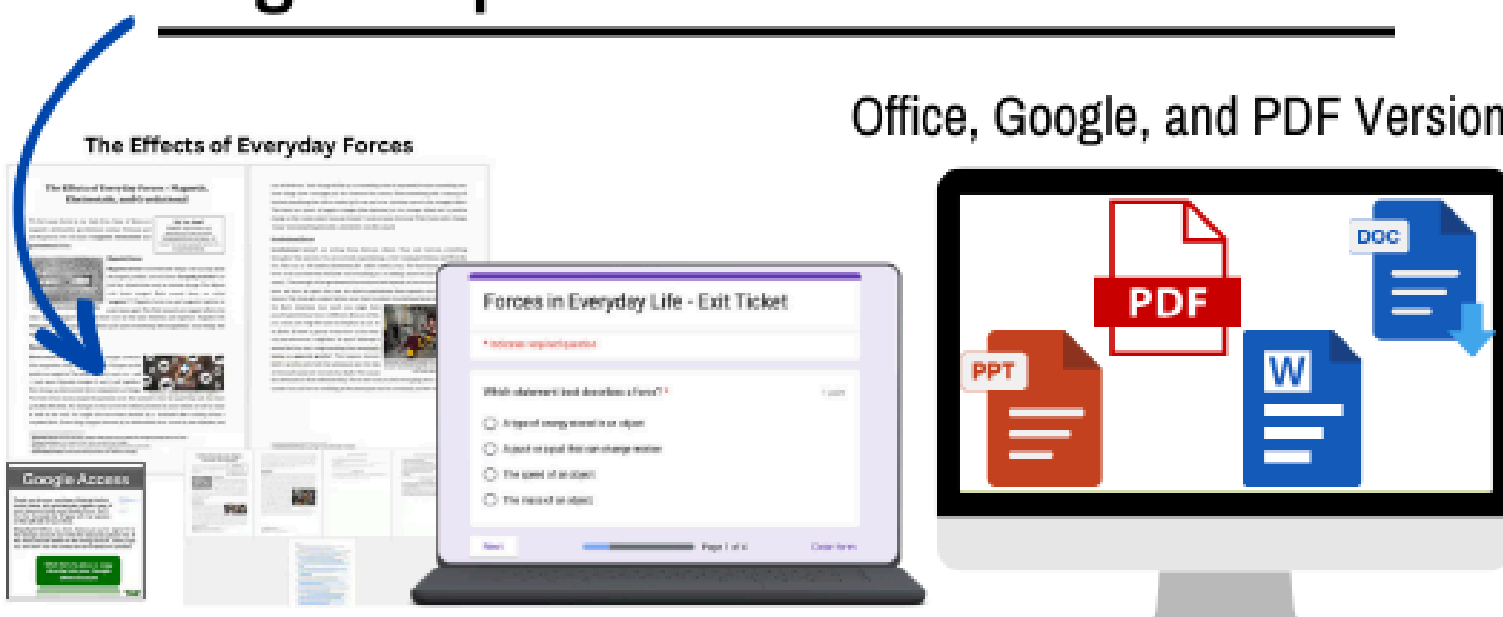
What Will Your Students Learn?

Videos Embedded & Student Notes



Reading Comprehension Article + Exit Ticket

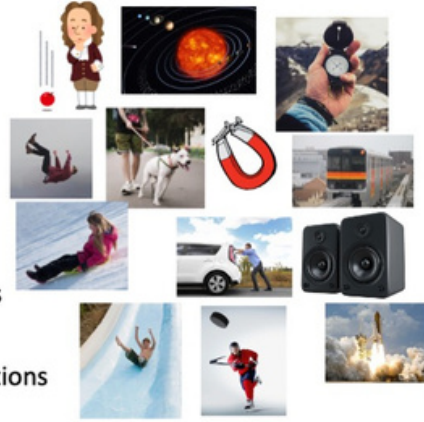
Office, Google, and PDF Versions



- ✓ What is a Force?
- ✓ Everyday Forces
- ✓ Gravity
- ✓ Magnetism
- ✓ Friction
- ✓ Applied forces
- ✓ Normal forces
- ✓ Free Body Diagrams
- ✓ Net Force
- ✓ Real-World Applications

Forces in Everyday Life

- What is a Force?
- Everyday Forces
- Gravity
- Magnetism
- Friction
- Applied forces
- Normal forces
- Free Body Diagrams
- Net Force
- Real-World Applications



How Does It Work?



How Does It Work?

- The rocket pushes fuel downwards
- The downward push of the fuel pushes back on the rocket
- This upward push causes the rocket to go upwards



Why Does It Happen?



Why Does It Happen?

The force of impact causes an object to change its velocity and/or direction.



How Does It Fly?



How Does It Fly?

For a plane to fly

- The upward **lift** must be greater than the downward **gravity**
- The forward **thrust** from the engines must be greater than the **drag** caused by wind resistance



Why So Slippery?



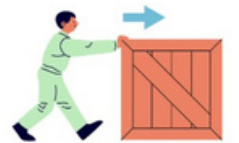
Why So Slippery?

- **Friction** works against **motion** which tries to slow the sled down
- The amount of friction between the sled and snow is much less than between the sled and grass
- This allows it to move faster down the hill



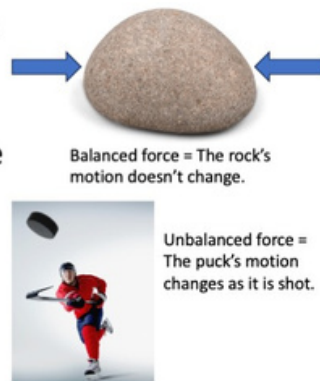
Force Overview

- **Forces act on almost everything**
- **Forces have a direction and are shown with an arrow**
- Balanced forces happen when opposite forces are equal
- Unbalanced forces happen when opposite forces are not equal



Force Overview

- **Balanced forces have no change in motion (no acceleration)**
- Unbalanced forces create a change in motion (acceleration)
- Force is measured in Newtons (N)



What is a Force?

Come up with a definition of a force.

What is a Force?

Come up with a definition of a force.

After watching the video, revise your definition.



What is a Force?

Answer: A force is a push or pull.



Check Your Understanding

State an everyday life example in which a force causes an object to

- decrease its speed.
- become compressed.
- become stretched.



Forces

We will discuss the following forces and their real-world applications.

- Gravity
- Magnetism
- Friction
- Applied forces
- Normal forces



Gravitational Force

- The force of attraction (not repulsion) between all objects in the universe
- Keeps us from floating away into space
- **Keeps all things in space in orbit around something else**



Gravitational Force

- Is a weak force unless one or both of the objects is very large like a planet
- Therefore, the gravitational attraction between two people is small but still there
- **Its range is infinite (works at any distance) but gets weaker as the distance increases**



Consider This

- You probably think the force of gravity is strong but consider this...Your hand and arm are being pulled towards the ground via gravity, but it isn't very difficult to raise them
- It takes very little energy to defy gravity because it is a relatively weak force
- Consider those amusement park rides that spin you quickly against a wall and think about how much more difficult it is to raise your hand while on one



Finding the Force of Gravity (F_g)

- Force (F_g) = Mass x Acceleration
- F_g = Mass (kg) x Acceleration (m/s^2) due to gravity
- The mass must ALWAYS be in kg and acceleration in m/s^2
- **Gravity on Earth is $9.8 m/s^2$**

$$F_g (N) = m (kg) \times 9.8 m/s^2$$

Check Your Understanding

If a person weighs 41.6 kg on Earth, what Force of Gravity (F_g) will he produce on the ground?

Some Applications of Magnetics

- **Maglev trains**
- Particle accelerators
- Magnetic resonance imaging (MRI) systems
- **Speakers in stereos, earphones, and televisions**
- Car horns and motors



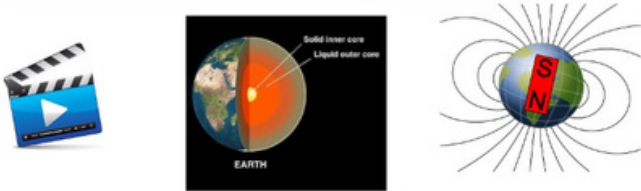
Check Your Understanding

If a person weighs 41.6 kg on Earth, what Force of Gravity (F_g) will he produce on the ground?

Answer: 408 N

Earth’s Magnetic Field

- Earth has a magnetic field due to its spinning core of molten iron and nickel
- As the core of the Earth spins, it creates a magnetic field around Earth like a magnet
- **Earth’s magnetic field protects us from the solar winds which are very harmful**



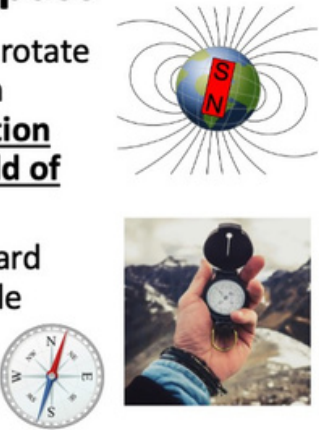
Check Your Understanding

A Hummer weighs 3018.0 kg, what Force of Gravity (F_g) will it direct towards the ground? What force will the ground direct up to the Hummer? Explain.



A Compass

- A pivoted magnet will rotate and point north–south **because of its interaction with the magnetic field of Earth**
- A compass points toward Earth’s magnetic N-pole



Check Your Understanding

A Hummer weighs 3018.0 kg, what Force of Gravity (F_g) will it direct towards the ground? What force will the ground direct up to the Hummer?



Answer: 29576 N. The ground will apply the same force up because the forces are balanced.

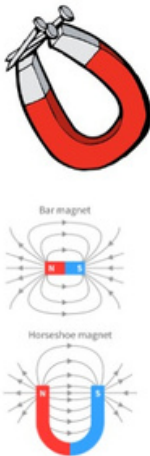
Monster Magnets



Magnetic Force

- **Magnetics create a magnetic field that create a force on other magnetic objects**

- The magnetic field is always on around the magnet



Everyday Forces

- In everyday life, we experience the result of the forces acting on us and the objects around us
- We have given these forces special names based on how they impact us
- We will discuss 3 – Friction, Applied Force, and Normal Force

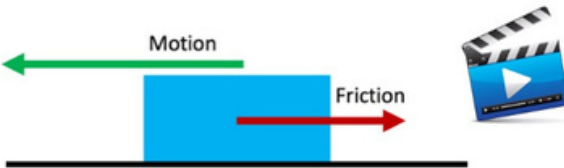
Think About It & Try It

1. If you give push an object that is on a desk, what will happen and why?
2. Does the type of materials matter? Why?
3. Does the mass of the object matter? Why?

Try it. Find objects that have different materials and different masses and try.

The Force of Friction (F_f)

- **The force of friction (F_f) is a force between objects in contact**
- **Friction ALWAYS acts in opposition to motion**
- If an object is moving left across a desk, friction acts to the right to slow it down



The Force of Friction (F_f)

Why couldn’t they separate the books?



The Force of Friction (F_f)

There are two types of friction forces

1. Kinetic Friction (F_k) – Friction where one object moves over another.
2. Static Friction (F_s) – Friction between two stationary objects.



Check Your Understanding

1. Which direction is friction acting in the following picture?
2. What kind of friction is acting assuming the car is stationary?



Check Your Understanding

1. Which direction is friction acting in the following picture?
2. What kind of friction is acting assuming the car is stationary?



Answer: 1. Backwards/Right 2. Static Friction because it is not moving

Check Your Understanding

1. Which direction and where is friction acting in the following picture?
2. What do people put on slides to make people slide faster? Why do you think this happens?



Check Your Understanding

1. Which direction and where is friction acting in the following picture?
2. What do people put on slides to make people slide faster? Why do you think this happens?



Answer: 1. Up the slide.
2. Water can be added to slides to reduce the friction and make you slide faster.

Applied Force

- An applied force is a push or a pull that a person or object puts on something
- **Applied forces can start motion, stop motion, or change how something moves**
- Friction is an applied force because it stops motion, but we still call it friction



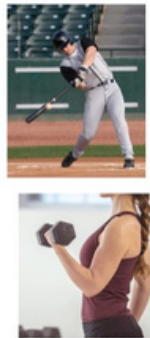
Applied Force in Real Life

Applied forces are used all around us:

- **Sports: Throwing, kicking, or hitting a ball**
- Transportation: Pushing pedals, steering, braking
- School: Opening lockers, carrying books, writing with a pencil
- Work: Moving furniture, using tools, lifting objects

Important to Remember:

Applied force always comes from contact

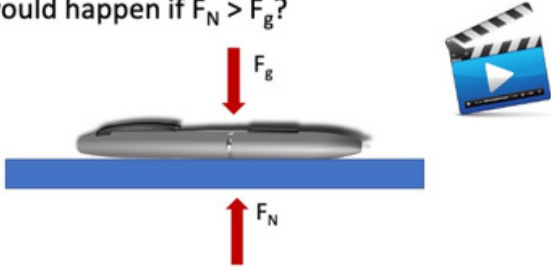


Think About It

If there is a downwards force of gravity (F_g) acting on a pen sitting on a desk, why isn't it falling towards the ground?

The Normal Force (F_N)

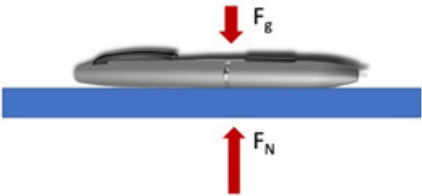
- The normal force is a force that acts perpendicular (90 degrees) to the surface the object is in contact with
- It is ALWAYS equal and OPPOSITE
- What would happen if $F_N > F_g$?



The Normal Force (F_N)

What would happen if $F_N > F_g$?

- There would be an unbalanced force and the pen's motion would change
- It would accelerate and move upwards

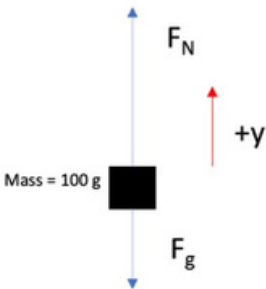


Check Your Understanding

You toss a 100 g ball vertically upward. Draw an FBD of the ball just before it leaves your hand.

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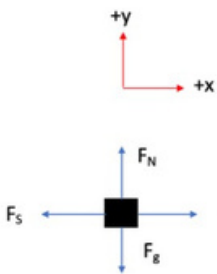


Check Your Understanding

A child is pushing with a horizontal force against a chair that remains stationary. Draw a FBD of the chair.

Check Your Understanding

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Check Your Understanding

An average male weighs approximately 84 kg. If the man is standing on one leg, what normal force is being produced by the ground upwards on the leg.

Answer: 820 N [upwards]

Net Force

- Net force is the total of all the forces acting and is written as F_{net}
- For example. If you have a 3 N force to the right and a 2 N force to the left, the net force = 1 N [right]

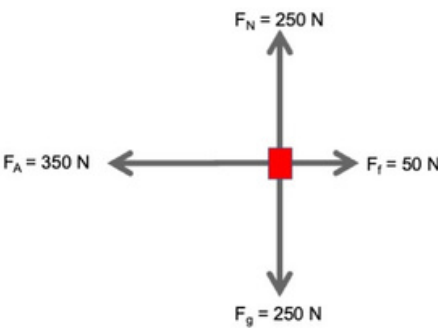
Team Red is pulling on the rope to the right with a force of 5 N and Team Blue is pulling to the left with a force of 7 N. What is the net force?

Check Your Understanding

Team Red is pulling on the rope to the right with a force of 5 N and Team Blue is pulling to the left with a force of 7 N. What is the net force?

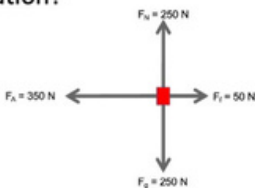
Check Your Understanding

What is the net force in this situation?



Check Your Understanding

What is the net force in this situation?



Answer: 300 N [left]

Answer: 2 N [Left]



Your Lesson

Force in Everyday Life – Student Lesson Outline

How Does It Work?

Why Does It Happen?

How Does It Fly?

Why So Slippery?

Force Overview

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Force Overview

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- Force is measured in Newtons (N)

What is a Force?
Come up with a definition of a force.

Check Your Understanding
State an everyday life example in which a force causes an object to

a) decrease its speed.

b) become compressed.

c) become stretched.

Forces
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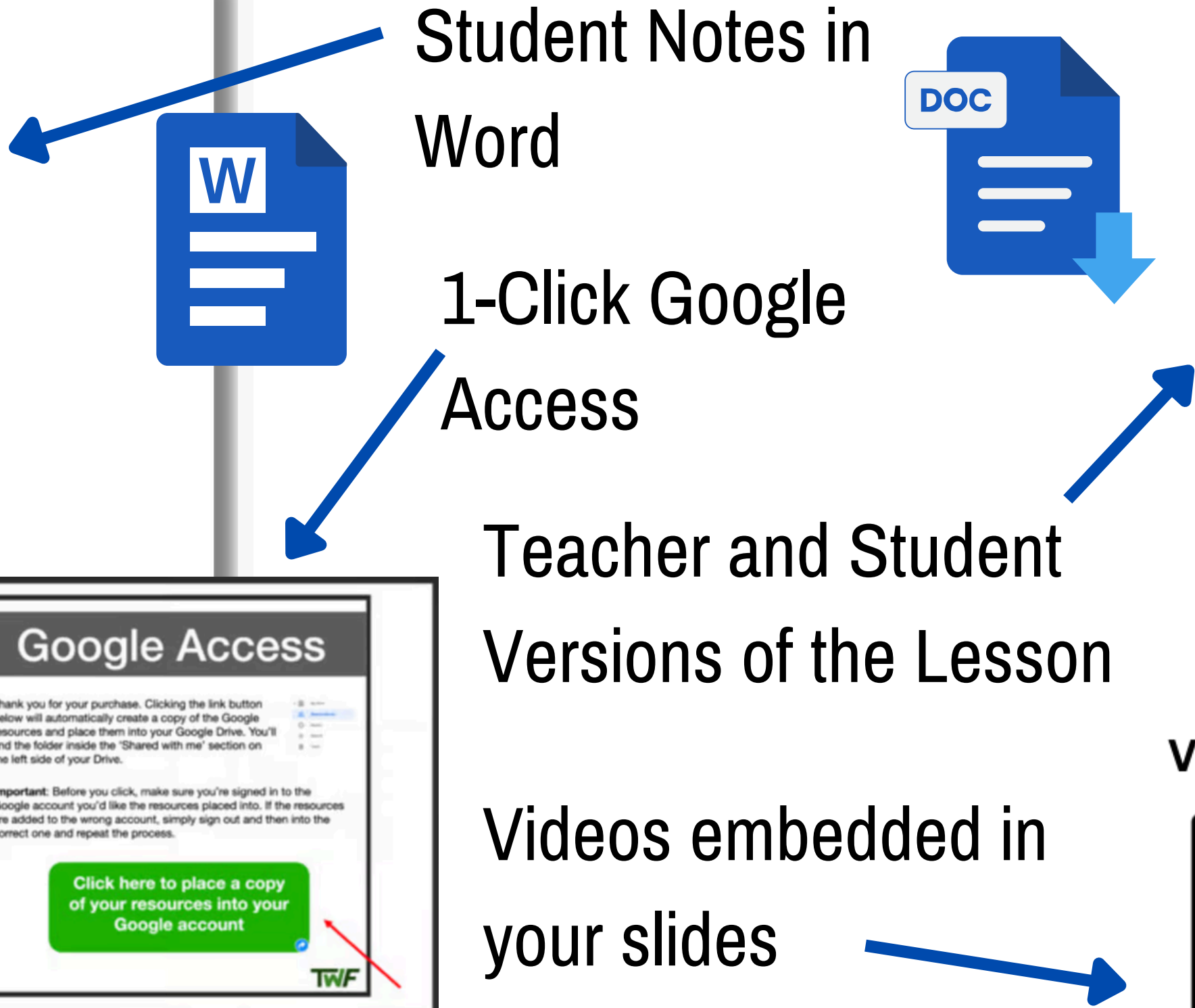
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FORCES IN EVERYDAY LIFE TEACHER & STUDENT VERSION

Student Notes

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Motion ← Friction →

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Videos Embedded & Student Notes

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Student Notes

As a special bonus, I want to send you a few resources that you can use in your classroom tomorrow. Completely free and geared towards what you teach!



Just  **and then choose what you teach!**

thanks
**for your interest
in this resource!**



 devon@teachwithfergy.com