

What do you plan to research for your project?

Problem:

Does a rougher surface have more friction than a smoother surface? Rough and smoother surface =Independent The amount of force it takes to move the object is the dependent variable.

Topics related to the problem:

- 1) *What is friction?*
- 2) *What is the difference between a smooth and a rough surface?*
- 3) *Does the mass of an object affect the surface friction?*
- 4) *Why does the mass and the surface area need to be the same while testing?*
- 5) *How do you measure the rougher and smoother surfaces?*

Star three topics you will research during research time

ONE MAIN IDEA I SHOULD RESEARCH IS... What is friction?

As stated from [britannica.com](https://www.britannica.com), 'friction, [force](#) that resists the sliding or rolling of one [solid](#) object over another. Frictional forces, such as the traction needed to walk without slipping, may be [beneficial](#), but they also present a great measure of opposition to [motion](#).'

Website Address (copy exactly):

<https://www.britannica.com/science/friction>

A SECOND MAIN IDEA I SHOULD RESEARCH IS... What is the difference between a smooth and a rough surface?

From IOPSpark, "Rough surfaces have more friction than smooth surfaces and liquids such as oil or water are sometimes used as lubricants to reduce the effect of friction." From the source blue-scientific "Roughness is a quantifiable measure of the surface's irregularities."

Website Address (copy exactly):

<https://spark.iop.org/friction> <https://blue-scientific.com/news/2024/01/how-do-different-surfaces-affect-friction/>

A THIRD MAIN IDEA I SHOULD RESEARCH IS... Does the mass of an object affect the surface friction?

The passage "teachengineering.org shows, "The effects of weight and contact area on friction are complicated because there are two major mechanisms of friction at work. The classical view of friction is that it is caused

solely by surface irregularities, called 'asperities', and that weight correlates directly with the amount of friction that occurs."

Website Address (copy exactly):

https://www.teachengineering.org/lessons/view/duk_friction_smary_less2

FIVE WORDS I NEED TO KNOW FROM MY RESEARCH ARE...

1)Word: Friction

Definition: The surface resistance to relative motion.

Website Address (copy URL from definition website exactly – No ‘Google Search’): As stated from [Dictionary.com](https://www.dictionary.com), "Physics., surface resistance to relative motion, as of a body sliding or rolling."

2)Word: Surface

Definition: A layer of something that is at rest, on the top of something.

Website Address (copy URL from definition website exactly – No ‘Google Search’): From the site [Dictionary.com](https://www.dictionary.com), "The outer face, outside, or exterior boundary of a thing; outermost or uppermost layer or area."

3)Word: Rough

Definition: An uneven surface that is not smooth. (The opposite of smooth:)

Website Address (copy URL from definition website exactly – No ‘Google Search’): From the source <https://www.merriam-webster.com/> "Marked by inequalities, ridges, or projections on the surface" : **coarse**

4)Word: Smooth

Definition: An even and regular surface/flat. (The opposite of Rough.)

Website Address (copy URL from definition website exactly – No ‘Google Search’): From the source <https://www.merriam-webster.com/> "having a continuous even surface"

5)Word: Mass

Definition: A body of matter that has no exact shape.

Website Address (copy URL from definition website exactly – No ‘Google Search’): As stated from [britannica.com](https://www.britannica.com) "**mass**, in [physics](#), quantitative [measure](#) of [inertia](#), a fundamental property of all [matter](#)."

Friction is everywhere in a human's daily life. From keeping things from falling and sliding, to letting people walk and drive our cars. Friction can occur in many different situations. Figuring out what friction is, and how it affects rough and smooth surfaces is a logical research topic.

Friction can be active when things are in motion. As stated from [britannica.com](https://www.britannica.com), "**friction**, force that resists the sliding or rolling of one solid object over another. Frictional forces, such as the traction needed to walk without slipping, may be beneficial, but they also present a great measure of opposition to motion." This is important because friction plays a big role in human life activities. Friction can cause objects to turn, and slide, but can a smoother or rougher surface affect the amount of friction? From the site [Dictionary.com](https://www.dictionary.com), "*Physics.*, surface resistance to relative motion, as of a body sliding or rolling." Friction can happen at many different times, but usually it happens when something is sliding or rolling on a surface. The surface is the layer of something that is at rest, or on top of something but is called the surface. Friction can be in a human's everyday life, either when two objects are sliding on top of each other, a brick, or even a blanket on the back of a couch the blanket does not slides off because there is a frictional force stopping the blanket from sliding against the fabric of the couch.Friction is everywhere.

Surface texture varies from smooth to rough. From <https://spark.iop.org/friction>, "Rough surfaces have more friction than smooth surfaces and liquids such as oil or water are sometimes used as lubricants to reduce the effect of friction." This is because lubricants create a smooth film between the two objects, so the two objects rub against the lubricant and not themselves. From the source <https://www.merriam-webster.com/>, "having a continuous even surface". This shows the definition of smooth, As stated from <https://www.merriam-webster.com/> "Marked by inequalities, ridges, or projections on the surface" : **coarse** , the exact definition of rough. The difference between a smooth and rough surface is that smooth surfaces are equal with no rough ridges, rough surfaces have bumps with no equal sides or any flat surfaces. Generally, rough surfaces tend to have an uneven surface that causes something to not slide as fast as a smooth surface would.

From the source, https://www.teachengineering.org/lessons/view/duk_friction_smary_less2 "The effects of weight and contact area on friction are complicated because there are two major mechanisms of friction at work. The classical view of friction is that it is caused solely by surface irregularities, called "asperities", and that weight correlates directly with the amount of friction that occurs." This says that the weight does affect the surface friction. The mass of an object is important because of the gravitational force acting on the objects. As stated from [britannica.com](https://www.britannica.com) "**mass**, in physics, quantitative measure of inertia, a fundamental property of all matter." The surface friction is what opposes motion when two surfaces are in contact with each other.

Three facts learned are: what friction is, what a smooth and a rough surface are, and why the mass of an object can affect the surface friction. There are three types of friction, sliding, rolling, and fluid. Sliding friction is friction that acts on other objects, when they are in contact with each other. The things that affect sliding friction are mass and surface texture.

Works Cited

1. "Factors Affecting Friction - Lesson." *TeachEngineering.org*,
www.teachengineering.org/lessons/view/duk_friction_smary_less2.
2. Institute of Physics. "Friction." *IOPSpark*, spark.iop.org/friction.
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blue-scientific.com/news/2024/01/how-do-different-surfaces-affect-friction/.
4. Zeidan, Adam. "Friction." *Encyclopædia Britannica*, 25 Jan. 2019,
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