

## FRICTION

- A force that opposes motion - slows something down
- If there isn't a lot of friction, gripping something will be harder (eg - a slippery surface)
- To increase friction you could use coarse/rough materials or textured materials



For many objects you can add friction to help grip.  
For example people add grip tape to skate boards to increase friction and be less likely to slip off of their boards.

## WHAT IS GRIP?

- Friction is essential in grip.
- Grip is all around us, we just don't notice it.

to take and keep a firm hold of something (eg holding a phone)

# GRIP

## WHERE IS GRIP?

- Grip is in every object or thing you hold.
- Although we don't think about the way we hold things, the people manufacturing the objects do.

## HOW DOES SHAPE AFFECT GRIP?

AFFECT GRIP?

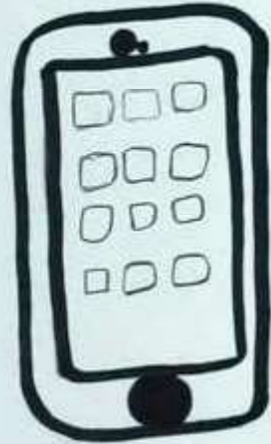
The shape of an object is an important step in manufacturing things. Objects with a universal grip are the most effective.

Most objects have a universal grip so most people can use them. Companies have to find the average hand size and hand shape to manufacture products with a universal grip.

## WHAT IS A UNIVERSAL GRIP?

A universal grip is a grip that works for every handshape and how big a hand may be.

## PHONE!!



## Shape

- A phone is a rectangular shape.
- The shape of the phone/object should fit the average hand size.

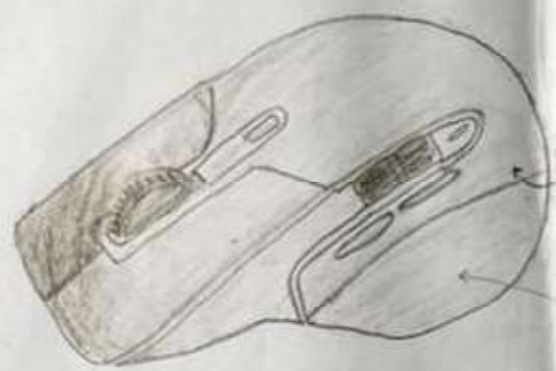
## HOW DOES IT AFFECT ITS GRIP?

- If a phone is bigger than the average hand can hold it wouldn't be universal.
- However if the phone were to be smaller it also would cause issues and not be universal.

# GRIP!

## ergonomics

- the study of people's efficiency in their working environment relating to or designed for efficiency and comfort in the working environment
- ergonomic mouses and keyboads are being used more frequently now that the studies of computer input have been created
- using these tools will help you minimize the movement of your hands through macro buttons and much more
- ergonomic offices have been on the uprise since 2019 with ergonomic stands, desks etc.
- ergonomics is now considered a large factor for people working from home and are looking to set up a home office during the pandemic



- mouse has ergonomic design to prevent carpal tunnel and give comfort to the user
- mouse is equipped with additional buttons to minimize movement of the hands
- synthetic rubber for extra grip and comfort.



handle is ergonomically shaped for the universal sized hand it is made of metal meaning it is strong and will not bend.



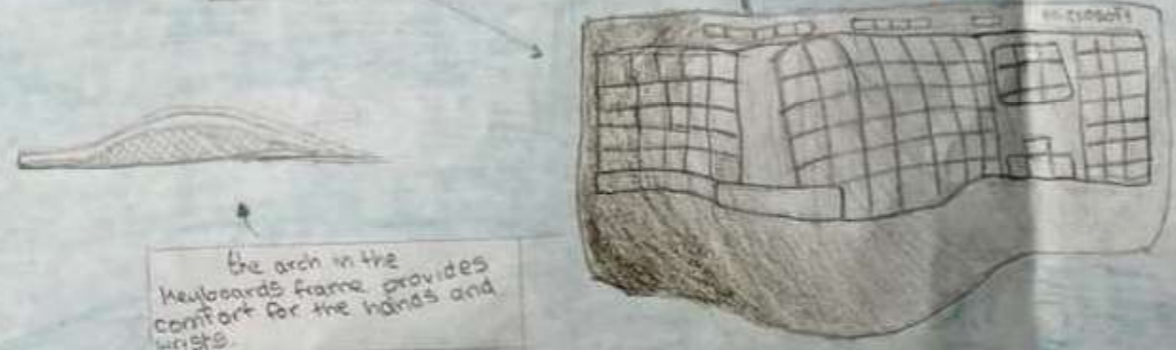
the ergonomic grip on some pens are designed to give comfort and grip to the user. It is made of rubber which provides grip.



the standard hurling grip is made of rubber and gives comfort and grip to the user in dry and wet conditions.

Elevation 2

Ergonomic keyboards



the arch in the keyboards frame provides comfort for the hands and wrists.

the unique layout grants the user comfort and less movement for their hands

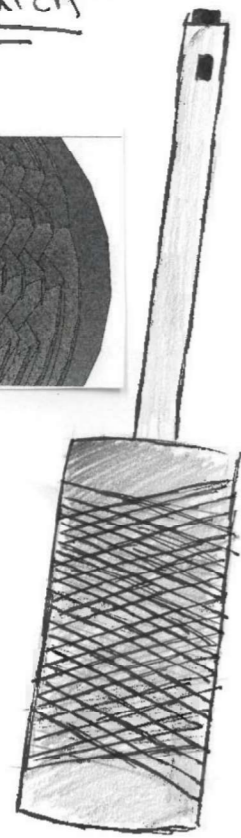
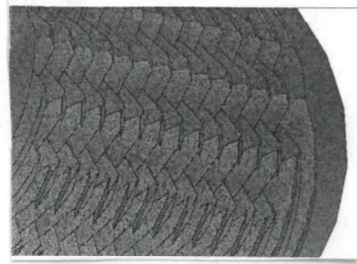


The standard sports bottle has grooves in the plastic that give your fingers grip.

# Primary Research

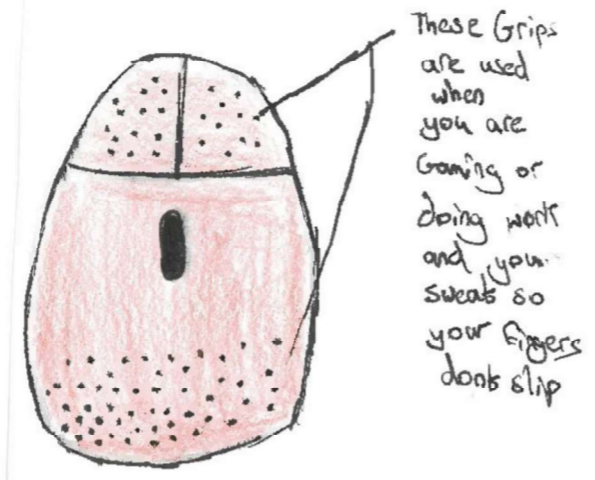
## Brainstorm

- Ergonomics
- Grip
- Rough
- Friction
- Material
- Surface
- Grip of Bike
- Gun handle
- Screwdriver
- Texture
- Cross Hatch
- Indent
- Knurl



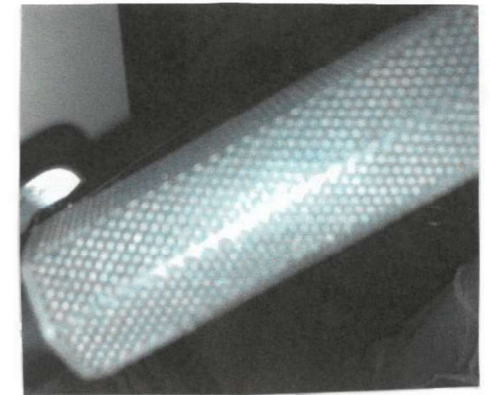
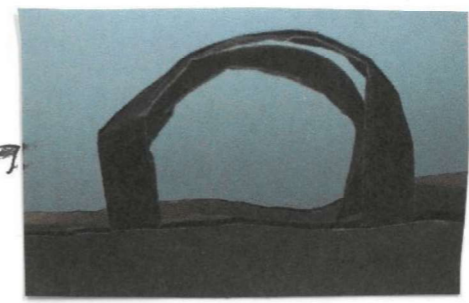
LIAM WALSH

# Grip



These Grips are used when you are working or doing work and you sweat so your fingers don't slip

Primary pictures →  
Secondary Research



## What is ergonomics

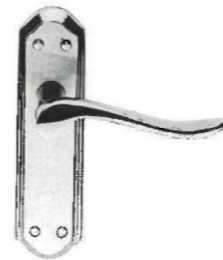
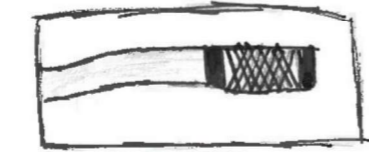
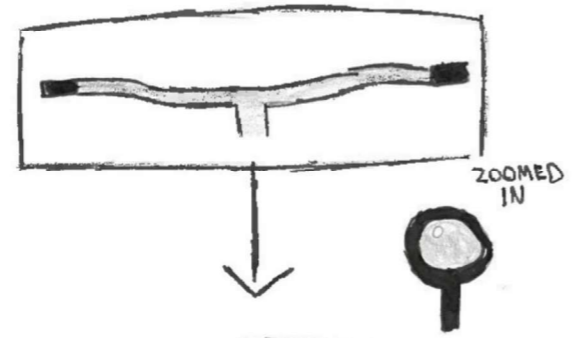
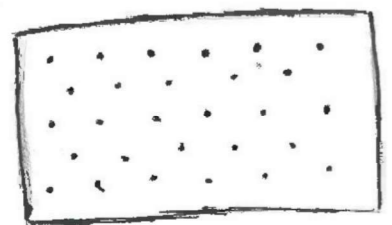
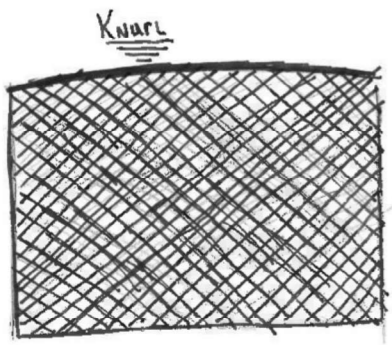
- Ergonomically design hand tools feature a **power grip**. This means that the operator aligns their fingers in a manner where they work in conjunction with each other to maximize the hand capacity.

## What is knurling

- There are knurling patterns that can be roughly categorized into straight, angled, and criss-cross.

## Science/Secondary research

The muscles of the right forefinger and thumb connect with the very powerful set of muscles that run along the outside of the right arm and elbow to the right shoulder. If you work the tips of the thumb and forefinger together and apply any considerable amount of pressure, you automatically activate those muscles of the right arm and shoulder-and those are not the muscles you want to use in the golf swing. Using them is what breeds so many golfers who never swing with both hands working together, who lurch back and then lurch into the ball, all right arm and right shoulder and all wrong

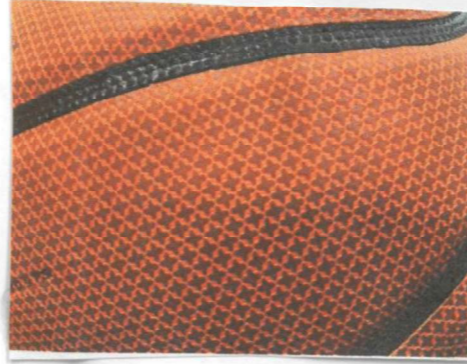
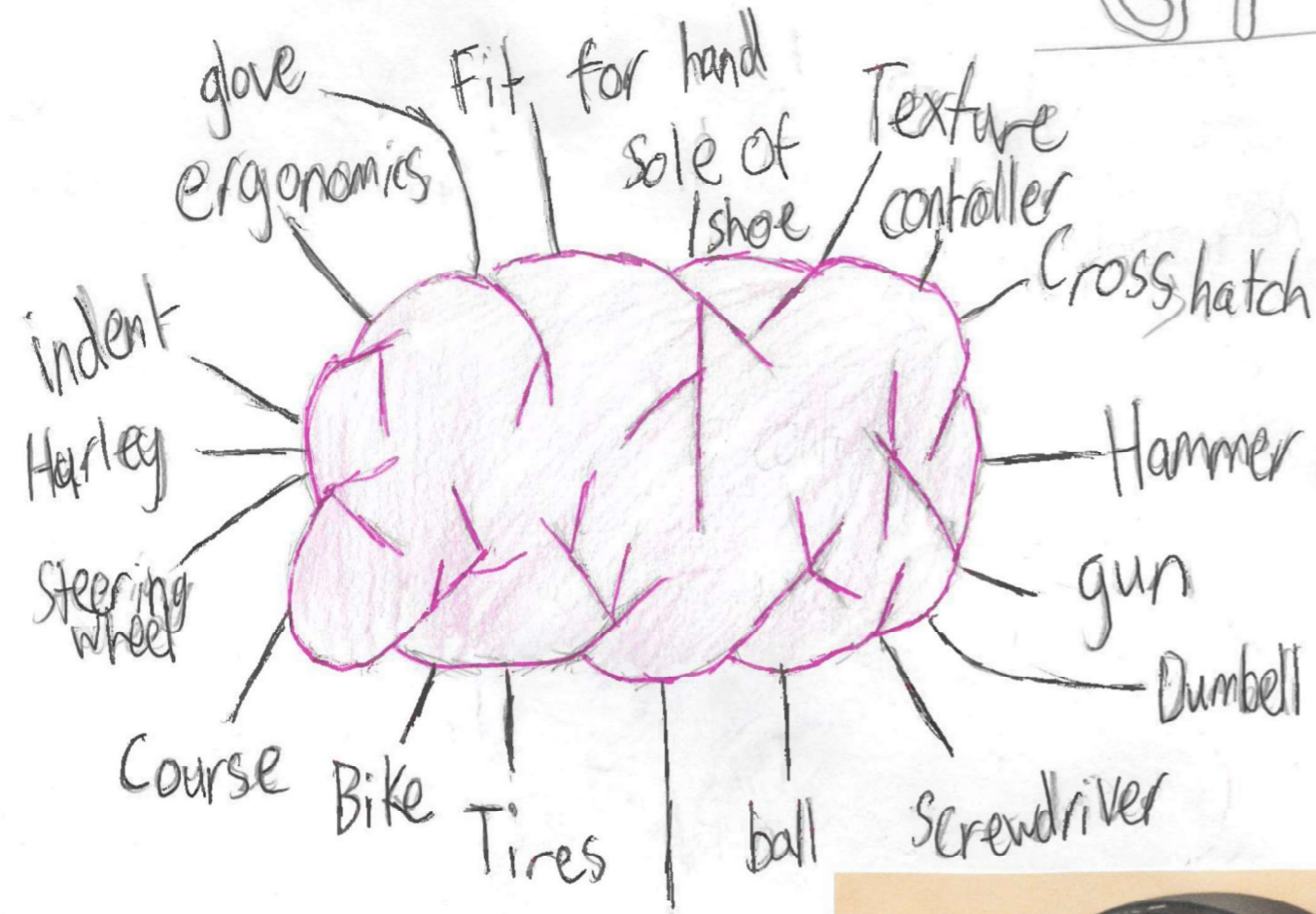


## Shape of objects to benefit grip

The study investigated the effect on grip size of grasping objects with different size contact surfaces between the finger and thumb. People use information about size and shape to form a grasp. Objects such as scissors and door handles are made for the average persons size hand and shape.

Primary research

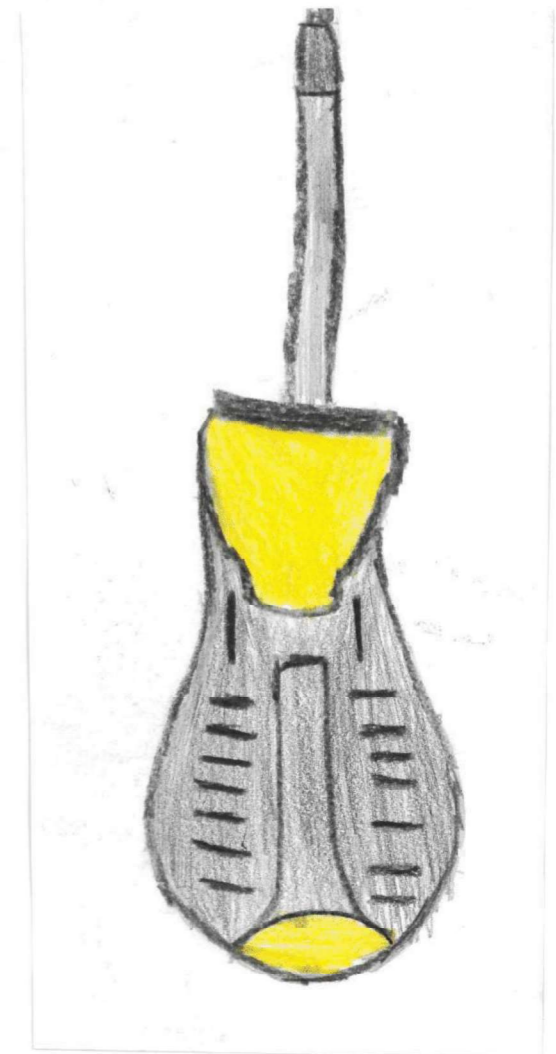
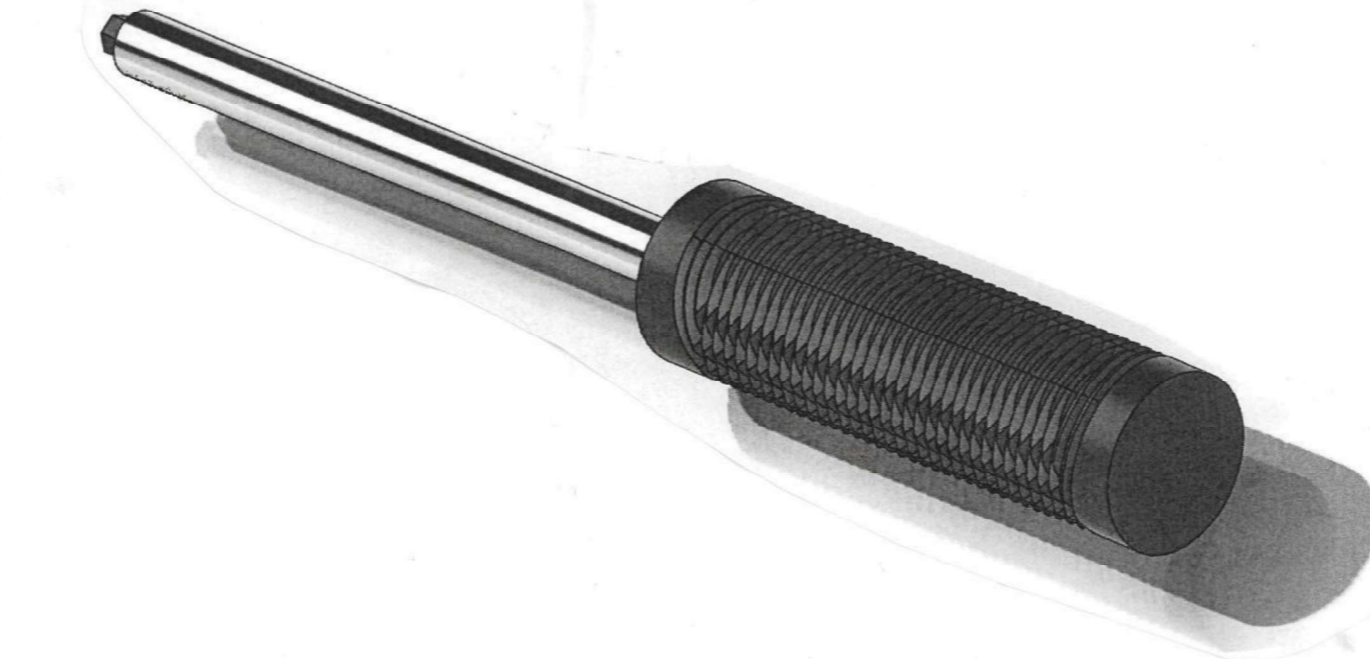
# Grip



Secondary research

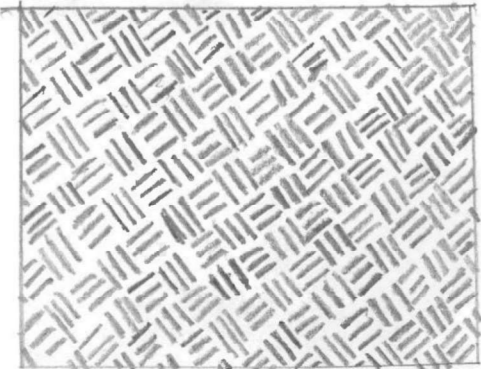
Ergonomically design hand tools. Feature a power grip. This means that the operator aligns their fingers in a manner where they work in conjunction with each other to maximise the hand capacity.

The texture on a surface makes a big difference to its grip. For example, if the material is rubber it would have more grip than metal as rubber is more rough.



cross-hatching grip on metal surface

Mouse



JACK COUGHLAN

# GRIP

Rónán Rogers

## PRIMARY RESEARCH

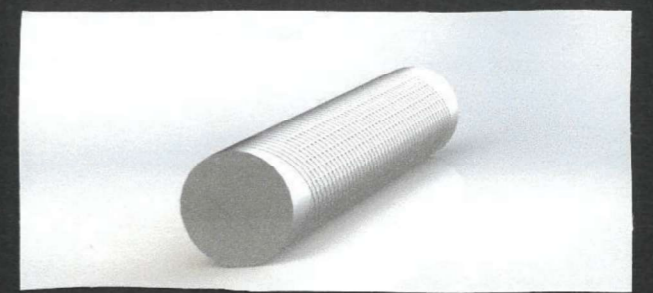


ERGONOMICALLY SHAPED COMPUTER MOUSE



KNURLED BICYCLE GRIP

Grips are anything that uses friction or compression to prevent something from slipping or moving. Grips are often used on handles of items such as dumbbells and on flat surfaces such as the decks of small sailboats.



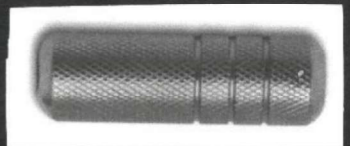
A VARIETY OF KNURLS IN SOLIDWORKS RENDERING SOFTWARE



KNURLED

ROUGH

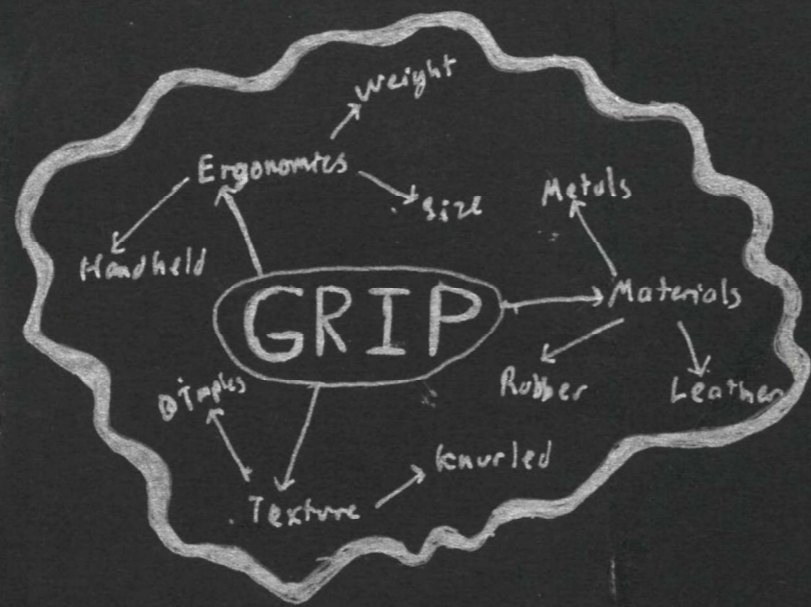
DIMPLED



GRIP ON A HANDGUN

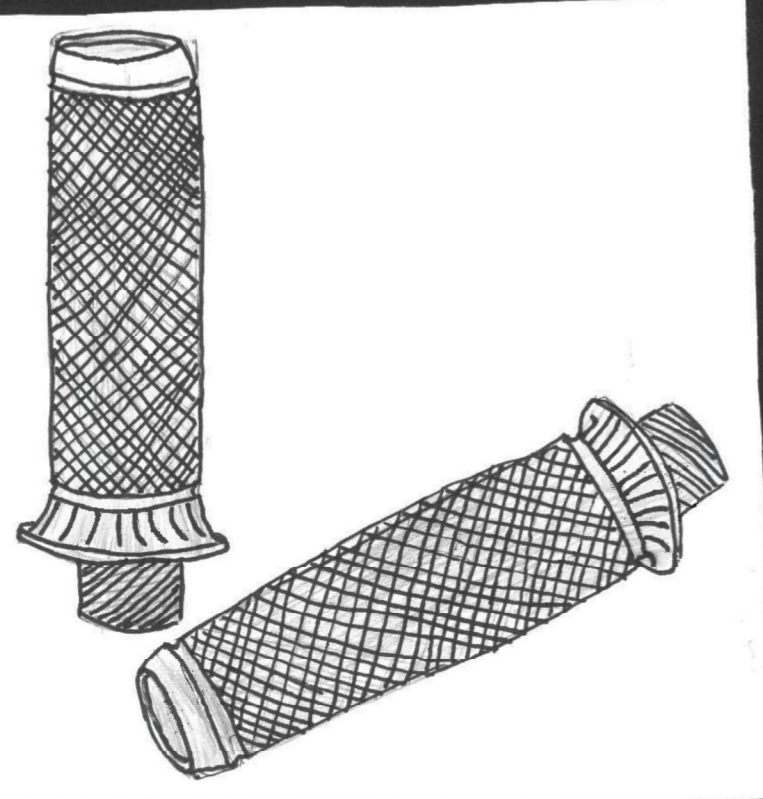


HAND

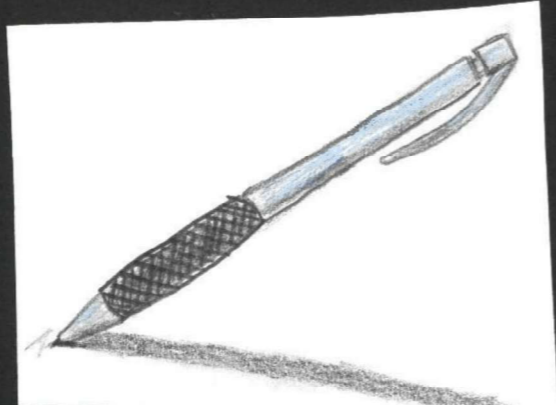


## SECONDARY RESEARCH

There are many types of grips used and three main factors influence a grip: ergonomics, texture and material. Ergonomics is designing something that will be comfortable for most people such as designing a chair that almost anyone will fit in. This can be seen in grips as some grips are simple cylinders and others are shaped to fit a hand, for example the grip of a gun. Texture is also important to grips as a smooth surface will not create friction and so the item will slip and could cause an accident. Common textures used in grips are dimples, small dents at regular intervals and knurl patterns, which are intersecting diagonal lines that create a very strong grip texture. The final factor of a grip is material, as many materials such as metal are naturally smooth which creates no friction. A good grip should be made of a high-friction material such as rubber on a bike handle.

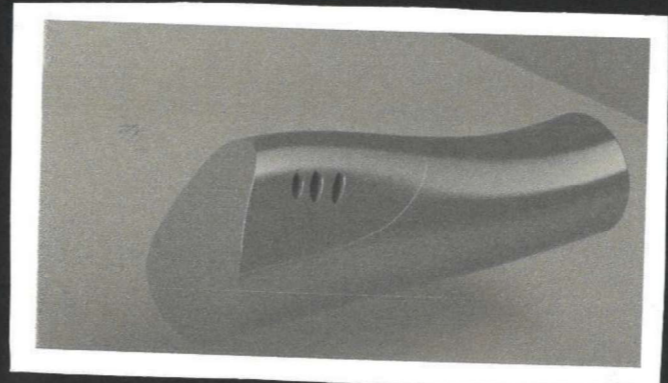


KNURLED GRIPS FOR A BICYCLE



A GRIP ON A PEN

AN ERGONOMICALLY SHAPED HANDLE IN SOLIDWORKS



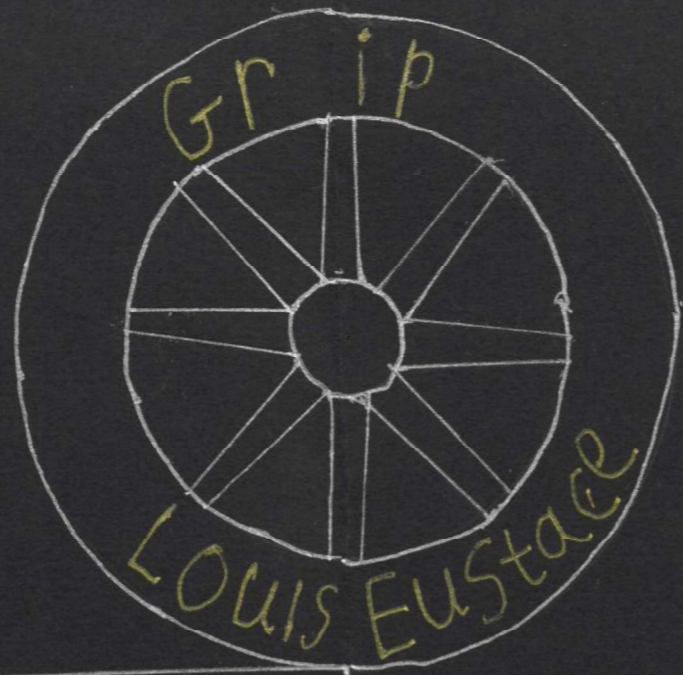
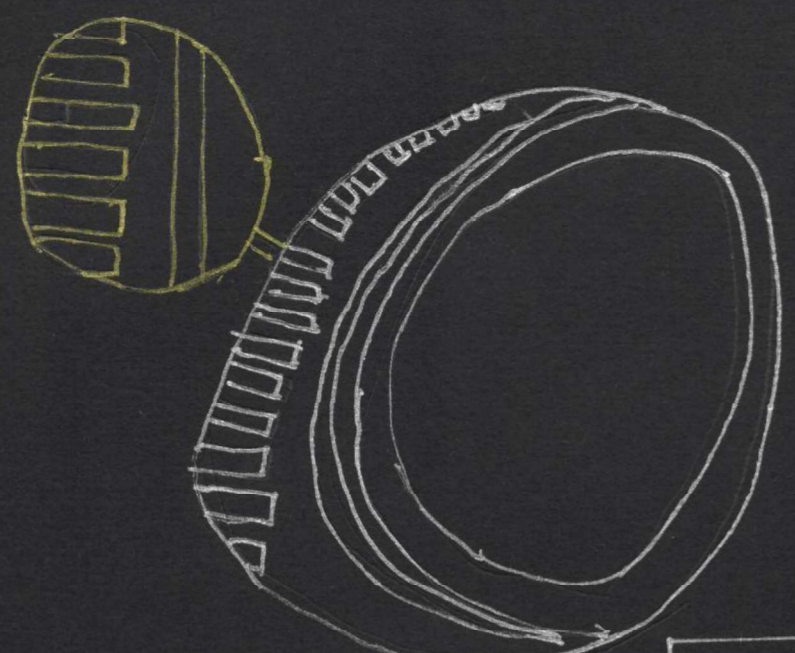
Ergonomic Knife Hilt

FREEHAND SKETCH OF A HANDGUN GRIP



RÓNÁN ROGERS

# Primary research



# Secondary research



Patterns  
tread patterns are the main piece of grip on tyres so different terrain needs different patterns so off road tyres use deep tread to get grip grip on loose terrain

Everyday Life

- Bike handlebars
- tyres
- Computer mice
- gloves

These are just some of the items that we use every day

tyres

Cars are highly dependent on grip from there tyres to make them safe different tyres use different tread patterns for different conditions for example F1 cars use slicks to get as much surface area in the track



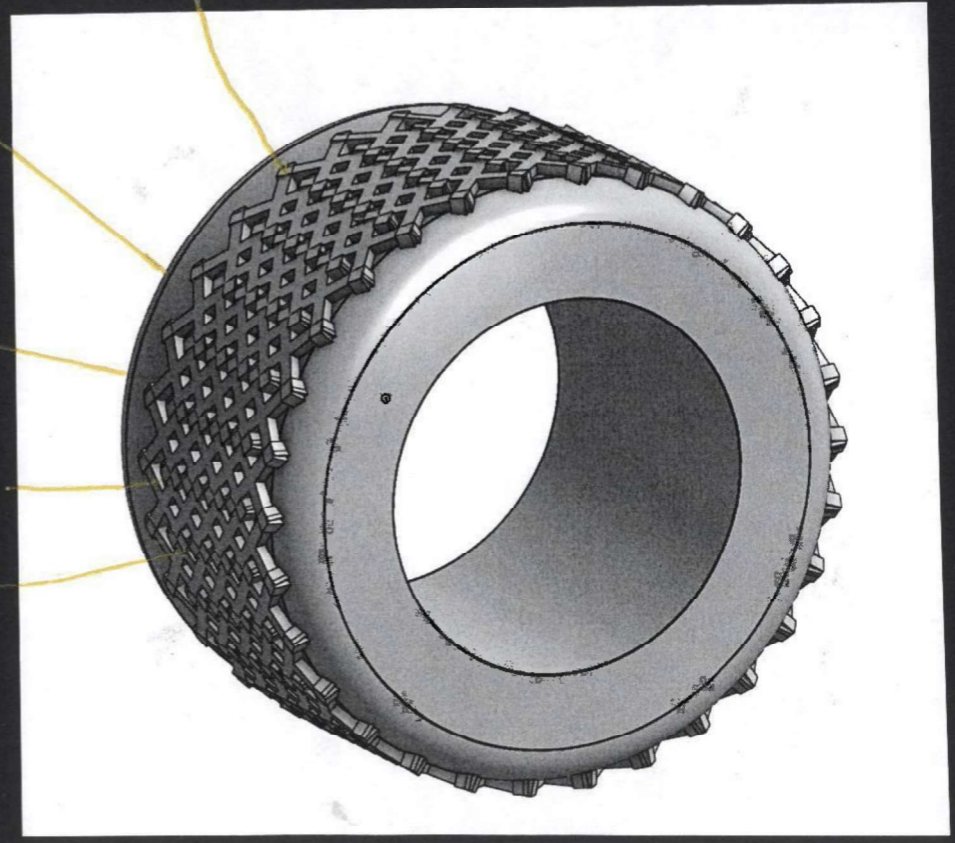
# extrusion

revolve

Linear pattern

Patterns

Shapes



# Grip

made out of rubber or latex  
Stick on finger.



Kitchen knife



Mug



- Easy to hold
- made out of Ceramic
- keeps the drink hot, but doesn't heat mug.

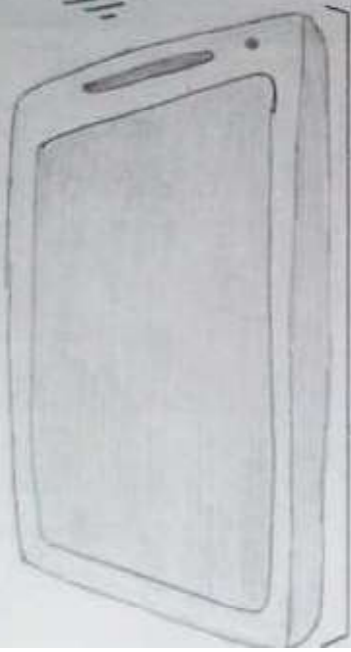
Fork



Knife



Phone

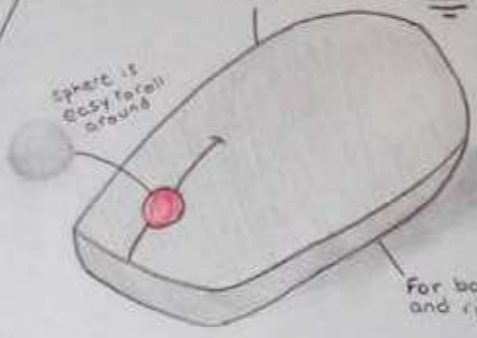


Big enough to fit hand.

Cuboid is easy to hold.

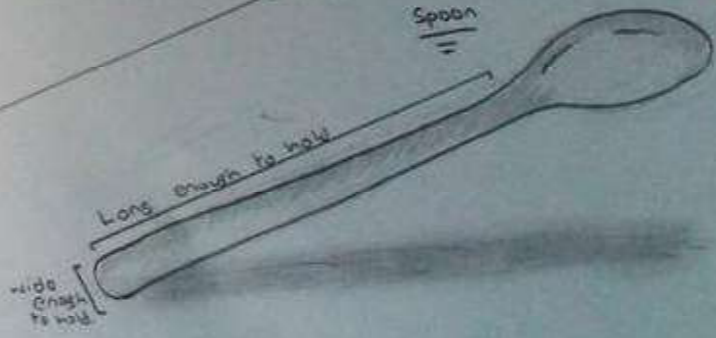
Easy to hold.

mouse



For both right and left handers.

Spoon



Grip with floor

Rubber: Gripping + light

Pattern adds grip

Different form of grip



ground vs. hand

Example: Shoe Sole

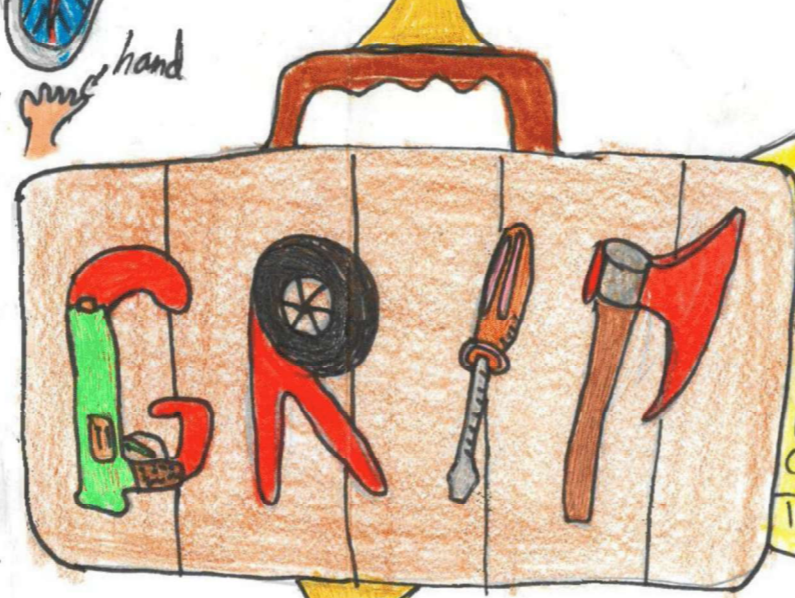
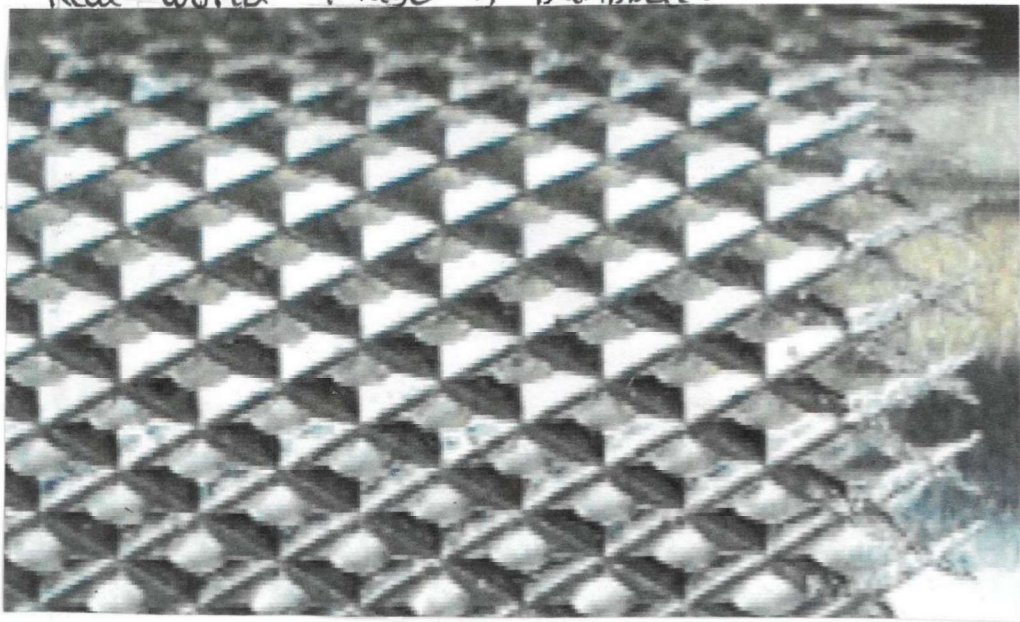


# PRIMARY RESEARCH

Real-World Image of Shoe Sole:



Real-World Image of Dumbbell:



**Grip:**  
GRIP IS THE ABILITY TO NOT SLIDE OR SLIP BECAUSE OF CREATED PATTERS FROM CERTAIN MATERIAL TO CAUSE FRICTION

Grip: Texture

Shapes/ Polygons Squares

Parallel Lines

Tessellation

Material

Example: Dumbbell



Ergonomics

GIRTH: FITS WELL IN PALM

TEXTURE CREATES GRIPPY SURFACE

NO BEND

CONTRIBUTES TO WEIGHT OF THE DUMBBELL

Metal

Knelling (CREATES TESSELLATION)

STRENGTH WON'T SNAP UNDER WEIGHT ON SIDES

DANIEL SMITH



The grips on screwdrivers are effective because your hand can go around it easily because it is round and the indents make your hand stay in place while you screw.



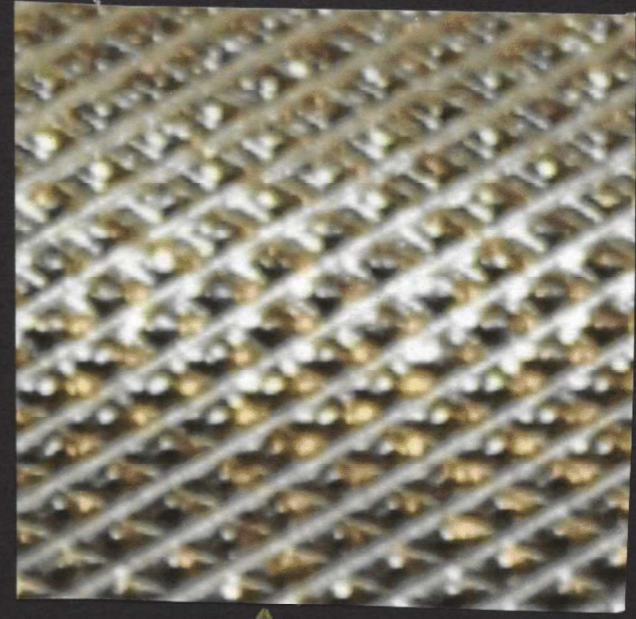
This type of grip on a camera works well because it is a rubber which already adds grip and including pattern this makes it very grippy so that it doesn't slip out of the users hands.



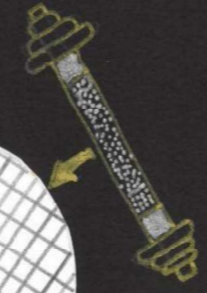
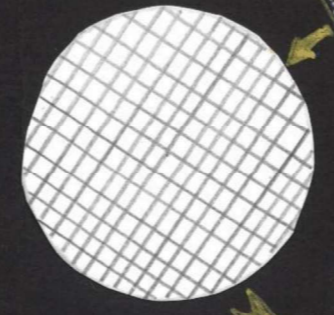
Tire

# GRIP

actual picture of weight



The grips on hockey sticks work well because of the pattern and material they use. Which is rubber sued. These materials prevent the users hands from slipping.



Tessellation is used on weights. This is a grip that is made by forcing 2 rollers with parallel lines into a bar to create a pattern of 2 parallel lines going diagonal to each other.

# GRIP

The plastic is durable and a cheap material to use

Relating to or designed for efficiency and comfort  
source: 9132



The grip is a cylinder with a smaller one cut out of the middle



Cardboard is used for the convex ring to keep the grip in place, as it is affordable and durable enough



is a hexagonal prism with a cone head



The wood provides a strong material to grip

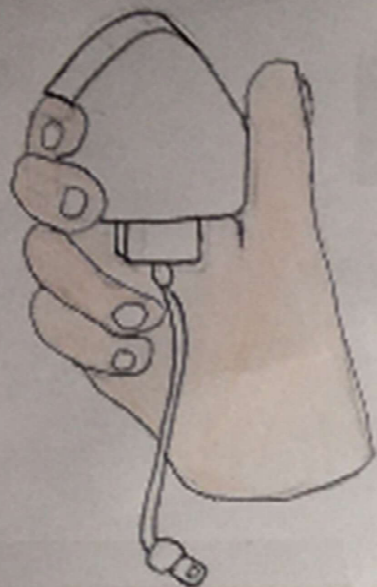
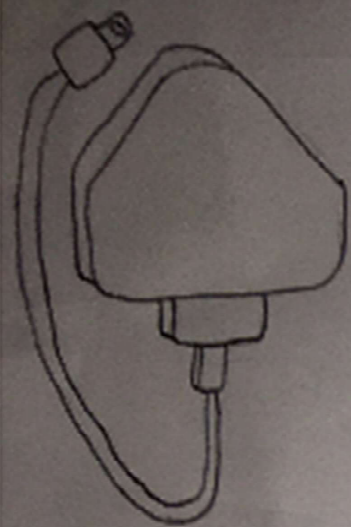
The bottle handle is coated in a rubber to keep the grip steady and keep a firm hold



The base is a large cylinder with a cylinder curved handle

# ERGONOMICS

Ergonomically designed hand tools that feature a power grip  
source: 9132

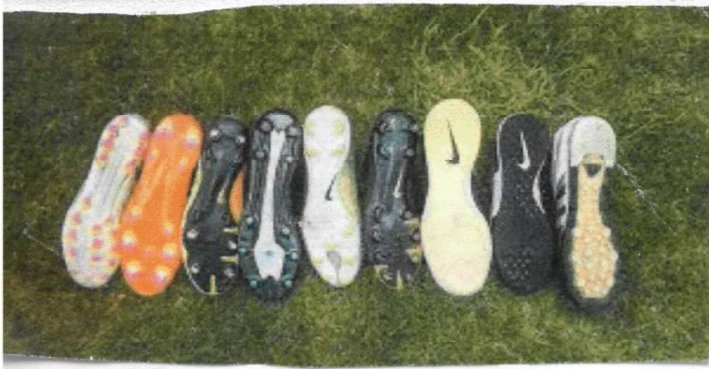


The base has two ridges in its side to allow the charge to have a comfortable grip

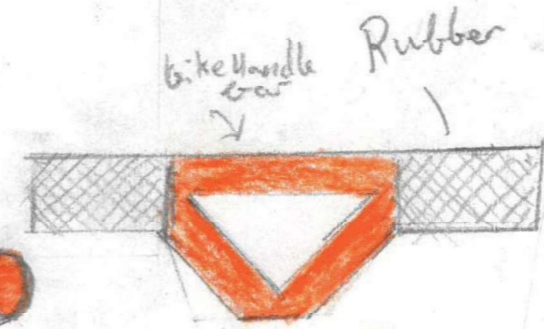


Constructed from metal, rubber and plastic

The rubber is strategically placed allowing the holes to provide a comfortable grip and to be as not slippery as possible



# Grip



## Secondary Research

### Materials

Certain materials perform better than others when used as a grip. Rubber is often used as a grip this is because of its favorable properties. Rubber has a rough texture which means it will cling on rather than slipping. Rubber resists water and grease this means the grip will be just as effective in all situations. Rubber is known to be hyper elastic meaning it will not deform or degrade making highly reliable.

### Ergonomics

Ergonomics is the study of designing an object to be the most efficient and safe for the average person. An example of this is when a chair is made. The chair will not fit for a person who is much smaller than the average height but will for someone who is around the average.

## Primary Research

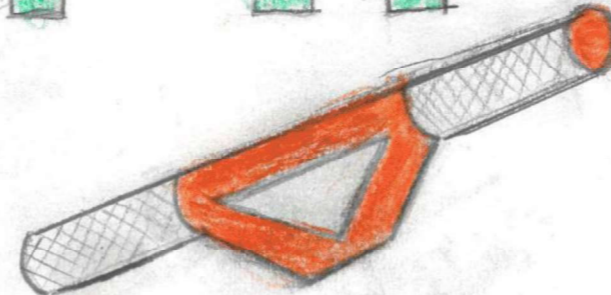
For primary research I collected images of grips. I did this to show I am aware of different types of grips

### What is Grip?

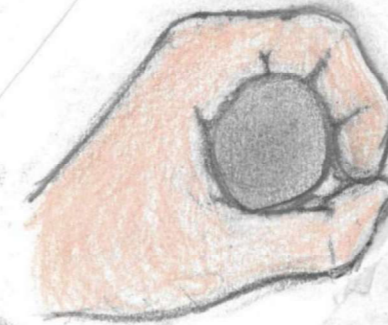
Grip is the action to hold or take something firmly not allowing to slip

### Where is grip used

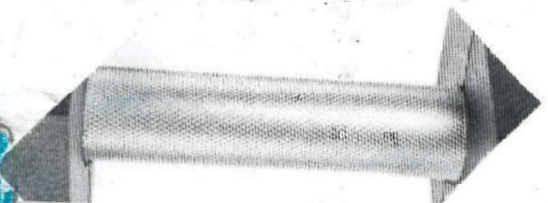
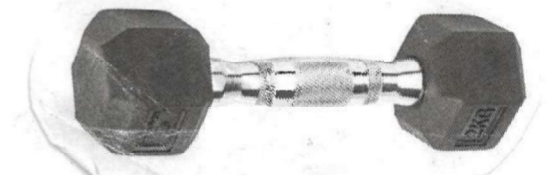
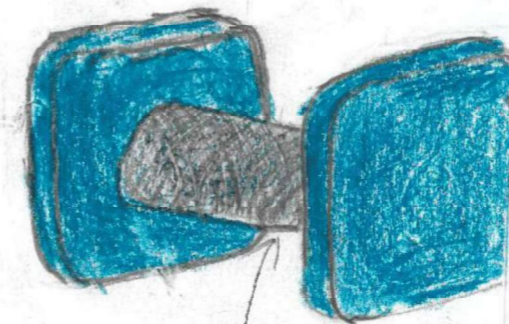
Grips are used in many daily tasks such as Cooking when using knives, Driving when using the steering wheel and sport when using a racket.



Mouse ergonomically designed to fit hand

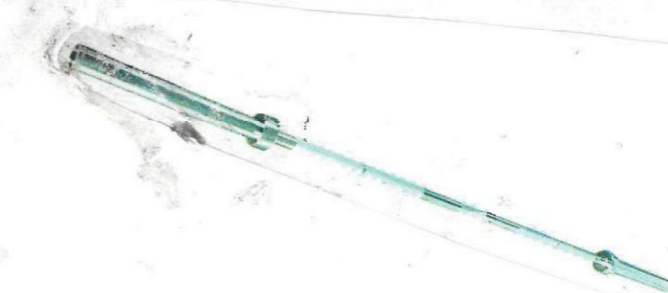
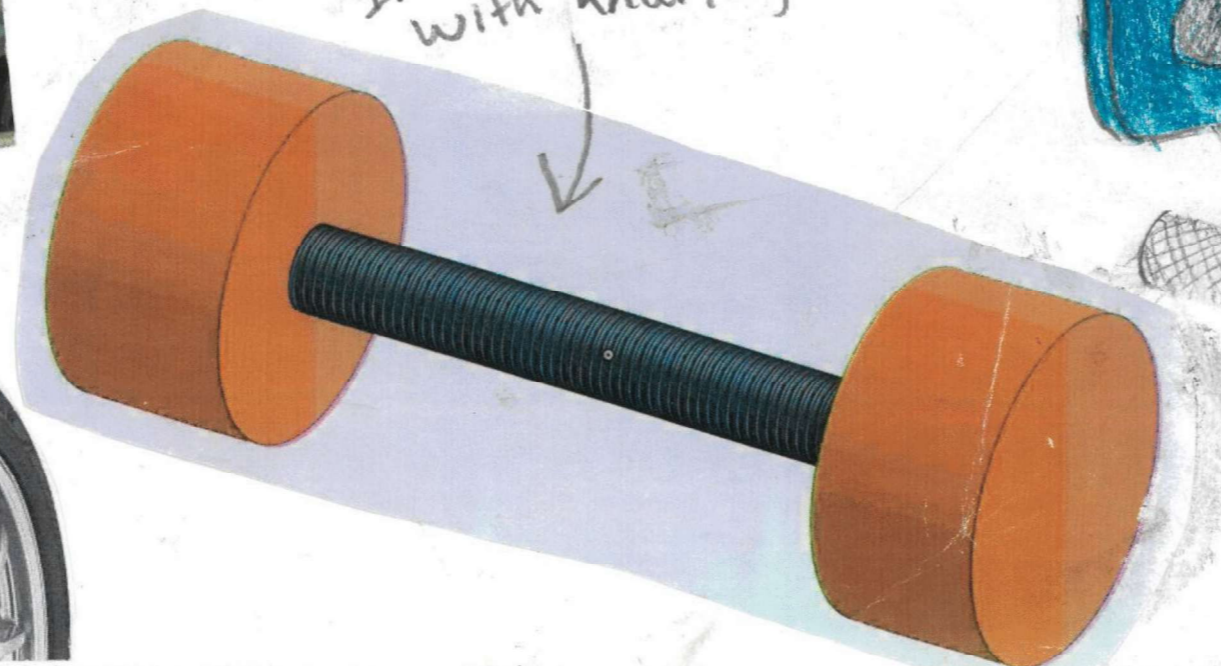


-Dumbbell created in on shape with knurling



### Knurling

Knurling is the crosshatch pattern on a dumbbell used to improve grip done by creatin a high level of friction between the hand and the bar



Alex Lea

# GRIP

WHAT IS GRIP NEEDED FOR?  
GRIP IS NEEDED FOR HOLDING ONTO THINGS, WE NEED TO HOLD ONTO MANY THINGS DURING OUR LIVES SUCH AS TOOLS, TOYS, EQUIPMENT, BAGS AND ALMOST ANY OTHER PRODUCT.

WHAT CREATES GRIP?  
FOR GOOD GRIP AN OBJECT NEEDS TO BE ROUNDED AS THE HUMAN HAND IS ROUND.  
TO GET A GOOD GRIP, THERE MUST BE ADEQUATE SURFACE AREA, IF THERE ISN'T ENOUGH THE OBJECT CAN SHIFT OR SLIP WHEN GRIPPED.  
TO GRIP OBJECTS THEY MUST BE THE CORRECT MATERIAL, THIS JUG IS STEEL, WHEN POLISHED, THIS JUG SLIP WHEN HELD, WHICH IS NOT OPTIMAL FOR GRIPPING.

WHY DO WE NEED A STRONG GRIP?  
WE NEED A STRONG GRIP WHEN HOLDING ONTO OBJECTS WHILE APPLYING PRESSURE. IF THERE ISN'T A STRONG GRIP THE OBJECT WILL SLIP OUT OF A PERSON'S HAND, MEANING THE OBJECT WILL NOT BE USABLE.



TESSALATING  
CREATING A PATTERN OF TESSALATING POLYGONS CAN CREATE AN EASY-TO-GRIP SURFACE, THEY ARE USED IN MANY RUBBER GRIPS, SUCH AS HANDLEBARS.

TYPES OF GRIPS  
THIS GRIP IS DESIGNED TO GRIP OBJECTS AND CUT THROUGH THEM WITH ITS SHARP TEETH  
THIS GRIP IS DESIGNED TO BE HELD BY A PERSON, APPLYING PRESSURE  
THIS GRIP WILL GRIP ONTO THE GROUND PROVIDING BALANCE AND SUPPORT TO THE WEARER OF THE SHOES  
THIS WILL GRIP A ROAD AND STOP A CAR FROM SLIPPING ON WATER OR OBJECTS ON THE ROAD