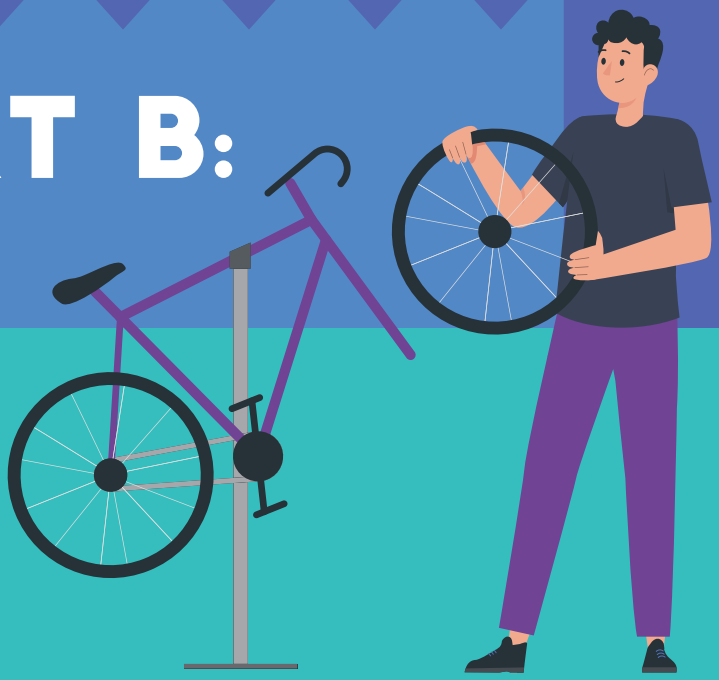
The Art of Cycling

PART B:



HOW TO DISASSEMBLE AND ASSEMBLE THE BICYCLE FOR RESTORATION AND CUSTOMISATION

Erasmus+
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» Summary «

Introduction to PART B

The aim of **'The Art of Cycling - opening possibilities for adult cyclists and artists'** curriculum is to encourage adults to choose a more sustainable and environment friendly way of life, in particular by favouring the use of the bicycle as means of transport. In PART A, we presented about how to prepare for cycling, the parts of the bicycle, some maintenance and cycling tips, as well as the rules of the roads. PART B looks at the bicycle from a different perspective, the one of art. Indeed, PART B has been developed targeting artists that want to acquire knowledge on how to disassemble and assemble the bicycle for restoration and customisation. In this way, will be able to propose a new service to their customers and will be able also to expand their activities and source of income.

Image: Source

PART B is divided into five chapters:

1. *Disassembling the bicycle and tools needed*
2. *Preparing the frame*
3. *Different painting techniques*
4. *Assembling the bicycle and adding new elements*
5. *How to propose your service to customers*

PART B accompanies the artist and everyone that is interested in a detailed course that starts from the assessment of an old bicycle and ends with a perfectly functioning and customised bicycle, offering different possibilities for painting the bicycle and adding elements on it.

Chapter 1: Disassembling the bicycle and tools needed

1.1 Introduction

Before starting any type of work on the bicycle it is better to assess its level of functionality/damage and do a *preliminary assessment* of the parts that are functioning and those that need to be replaced.

→ It is important to have always available labels, transparent bags, and boxes to order and name bicycle parts, in particular the small ones!

For the preliminary assessment, use the M-check method link to M-check in Chapter 2.4.

Make a list of the parts that need to be replaced and those that need to be restored.

→ **Alert for the artists:** before engaging in the disassembling of the bicycle, be aware of the fact that it is a complex and time-consuming process. If you do not feel confident in proceeding with it, be aware that bicycle shops can disassemble and assemble the bicycle for you and you can focus on the customization part. The price for this service varies based on the shops and place you live.

If you decide to do it yourself, continue reading this chapter and the tools needed for disassembling and assembling the bicycle!

1.2 Tools and materials needed

Following there is a list of essential tools needed for disassembling and assembling the bicycle. Make sure to have them available before starting to work on the bicycle.

• **Pliers:** They can be useful for forcing parts that are stuck and rusted. Pliers are specially used to hold, position, tighten, untie, and cut certain metal elements.

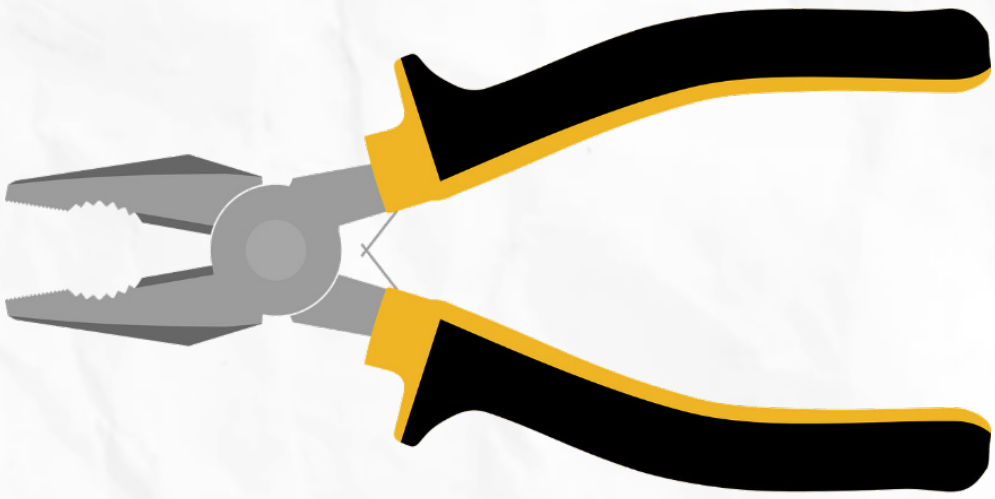

Image: Source

• **Side cutters:** the side cutters are the size of electronic pliers except that they can be opened very wide. They can be useful when cutting wires as old brake wires.

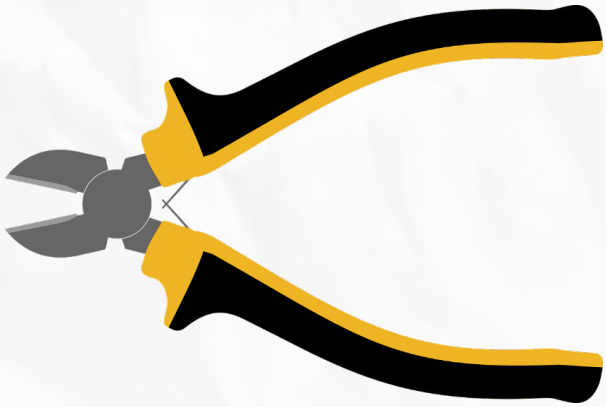

Image: Source

• **Hammer:** it can be useful for helping removing stuck or rusted parts – but see it carefully!

Image: Source

• **Allen key set:** the Allen key set is fundamental for screwing and unscrewing the Allen screws (hexagonal screws)

Image: Source

• Screwdrivers of various sizes

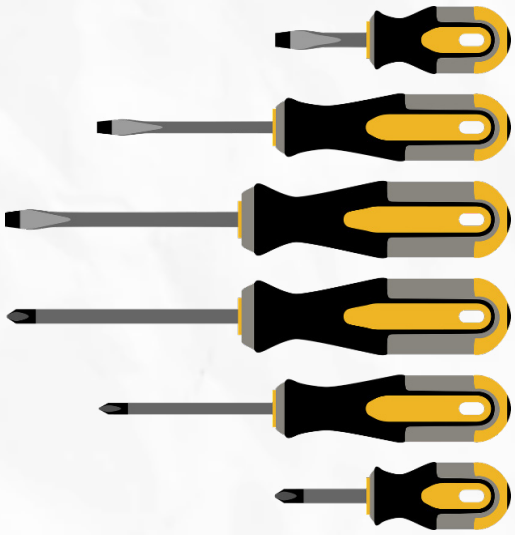

Image: Source

• **Wrench set:** it is used to screw the bolts

• **Bike stand:** the bike stand helps to keep the bicycle steel and in operating on the bicycle. It is also useful when painting the frame.

• **Bicycle pedal Allen key:** to remove the pedals, a simple wrench key might not be enough and you might need a specific bicycle pedal key of 15mm.

• **Socket spanner:** the socket spanner is useful when removing and placing back the crank. It might be useful to have a set with different diameters.

Image: Source

• **Crank-pulling tool:** this tool is necessary for removing and placing back the crank

• **Bottom bracket puller:** this tool is needed to remove the bicycle bottom bracket. However, there are different bottom bracket puller, you have to choose the one suitable for your bike.

• **Bike chain breaker:** this tool helps in removing the bicycle chain

• **Chain-link tool:** this tool is useful when disconnecting and connecting the bicycle chain

• **Tyre lever:** this tool is necessary for removing the bicycle tyre from the wheel

• **Grease:** grease consists of a lubricating oil mixed with a 'soap' (e.g. lithium or calcium soap) which helps to make it viscous and sticky. Without grease, water causes parts to seize, bearings run roughly and wear rapidly. [1]

• **Lubricating fluid:** lubrication protects moving parts from excessive wear caused by friction, prevents them from "freezing up," and helps keep rust and corrosion at bay.

• Tyre kit repair

List of possible tools and materials for painting

After having prepared the necessary tools for disassembling and assembling the bicycle, you can prepare the materials that you will need for painting the frame and other parts. This is a list of basic materials. Other materials can be added depending on the art you will perform on the bicycle.

Image: Source

• White spirit

• Metal tin, toothbrush and paintbrush

• Vanish remover

• Aluminium oxide paper

• Wet & Dry paper

• Spray paint

• Anti-rust primer

• Masking tape

• Good quality mask for when working with paint or chemicals

1 https://www.cyclinguk.org/cycle-magazine/what-grease-should-i-use-my-bike-and-why

1.3 Disassembling the city bicycle (step-by-step)

All the steps presented in this paragraph will guide you through the disassembling of a city bike. Other models of bicycles can be slightly different from the one presented. Nevertheless, these steps will help you disassemble every type of bike.

Image: Source

Step 1: Positioning the bicycle on the stand

If you possess a bike stand, position the bicycle firmly on it before starting the disassembling procedure. If you do not possess a stand, put the bicycle simply upside down and make sure that the structure is stable and steady.

Step 2: Removing the pedals

To remove the pedals, use a wrench of 15mm. If you cannot succeed with a normal wrench, the use of a specific pedal Allen wrench is recommended. Use the wrench anticlockwise on the right pedal, while on the left side pedal, use it clockwise. Put the pedals aside.

Step 3: Removing the rear wheel

First remove the gear wire, then untight the bolts of the wheel with a 15mm wrench or use the quick release. Remember to label and put the bolts aside.

Step 4: Removing the chain

If the bicycle has a carter to protect the chain, remove it first. Usually, the carter is held by only three screws. Remove the screws and put them and the carter aside. With the bike chain breaker, untight the chain until it is open (as shown in the pictures).

Step 5: Disassembling the gearbox

With a 9mm wrench, remove the bolt that keeps the gear wire. Then, with a plier, remove the wire end and remove all the gear wire. With a 5 mm Allen key, remove the hexagonal screw that holds the gearbox (as shown in the pictures)

Step 6: Disassembling the crank

Using a socket spanner remove the bolt that holds the crank anticlockwise. This has to be done for both sides and bolts. Using the crank-pulling tool, first tighten the first part of the tool, then the second one, the puller. When you feel that the crank is loose, untight the tool and remove the crank. The same has to be done on both sides.

Step 7: Removing the bottom bracket

With the bottom bracket puller, remove the bottom bracket untightening it first on the left (anticlockwise) and then on the right side (clockwise). Take in to mind that there are several types of bottom bracket (English, French, Italian) not all of them are with same untightening.

Step 8: Disassembling the V-brake

Unscrew the screw that holds the V-brake with a 5mm Allen key. Unscrew then the screw that holds the brake wire. Do it on both sides and then remove the V-brake structure.

Step 9: Removing the carrier (if present), mudguards and water bottle holder

If the bicycle has a carrier, remove it by unscrewing the bolts that hold it with a wrench key. Do the same if the bicycle has a mudguard. To remove the bottle holder, use a 5mm Allex key.

Step 10: Removing the saddle

If the saddle is locked by a hexagonal bolt, remove it using a wrench key then pull out the saddle.

Step 11: Disassembling the gear shift control, knobs, front brake and handlebar

If the knobs present a little hole, some air fired with the compressor inside the knobs

will be enough to remove them. If they do not have the hole, it is likely that you have to cut them to remove them. In this way, you will have to replace them later.

The gear shift control is held by different screws. Unscrew them with the Allen keys and screwdrivers and remove the gear shift.

Now, unscrew the screws that hold the front brake as you did for the rear V-brake and remove it. Then untight a bit the bolt that holds the handlebar and remove it.

Step 12: Disassembling the headset and the front wheel

Unitight with an Allen key the steering headset and then remove it. Remove also the base of the steering headset with a 32mm wrench key. Extract all the cap that is holding the frame and the fork together (there will be a ring with a single tooth, a metal ring with bearings and a big nut and a smaller nut). Now you can remove the frame from the fork. Remove the fork from the front wheel. There is now a metal round with bearings that is free around the fork tube. Remove it and save it.

After the complete disassembling, check the components that need to be treated with anti-rust or need to be replaced.

Note: *There are different types of bicycle parts (e.g. there are more types of bottom bracket, more types of headsets, different assemble/disassemble methods for gearbox etc..), you have to choose the one suitable for your bike.*

ACTIVITY PLAN 1

Activity Title 1.1: Introducing tools and materials needed to disassemble a bicycle

Learning outcomes
By the end of this **activity,** the participants will be able to:
• Learn about different tools that will be use for the disassembling the bicycle
• gain knowledge about which tool to use to disassemble the different part of bicycle in a correct way.

Duration: 15minutes

Target ages: N/A

Type of activity: Indoor

Preparation of the activity (before the activity):

Choose different tool and materials that are needed to disassemble the bicycle, such as;
• pliers
• side cutter
• hammer
• allen key set
• screwdrivers set in different sizes
• wrench set
• bicycle pedal allen key
• socket spanner
• crank pulling tool
• bike chain breaker
• etc.

Image: Source

Delivery of the activity:
• Gather all the available tools on the table so, participants can see them clearly while presenting
• start with the presentation of each tool and their use

Conclusion:
• Participants will be able to know the name of the tools and how to use them

Tips and tricks

• If some tools are not available, you can even print the picture in order to show the participants
• if you have a possession of a bicycle, you can also let participants to dissemble the bike using the tools while presenting (in this case more time is required)

Useful links:

• Video #1 from part B - https://www.youtube.com/watch?v=nbfy7sxH4Jg

Activity Title 1.2: Disassembling the city bicycle

Learning outcomes

By the end of this **activity**, the participants will be able to:

- Know different types of bicycle
- learn how to disassemble the city bicycle in a correct way
- learn different part of the bicycle and their use

Duration: 60 minutes

Target ages: N/A

Type of activity: Indoor

Guidelines

Preparation of the activity (before the activity):

• Prepare the tools and materials that are required to disassemble the bicycle. For example; (pliers, side cutter, hammer, allen key set, screwdrivers set in different sizes, wrench set, bicycle pedal allen key, socket spanner, crank pulling tool, bike chain breaker etc.)

• you need to have city bicycle

• enough indoor space to stand the bike and put the disassembled parts

Delivery of the activity:

• Start with the presentation of each tool and their use to disassemble the bicycle

• explain about the characteristic of the city bike, what are the different from the other types of bicycle.

Follow these steps to disassemble the bicycle (see the part B, chapter one for more details)

• Position the bicycle on the stand

• remove the pedals

• remove the rear wheel

• remove the chain

• disassemble the gearbox

• disassemble the crank

• remove the bottom bracket

• disassemble the v-brake

• remove the saddle

• remove the gear shift control, knobs, front brake and handlebar

• disassembling the headset and the front wheel

Conclusion:

- It’s important to explain participants while removing each part
- For assemble the bike you can follow the activities from PART B, chapter four.

Tips and tricks:

- Make sure that all the parts are kept in order and keep all the parts safely
- give opportunity for participants to participate actively to remove some parts so, they can also practice with you.

Useful links:

- Video #1 from part B - https://www.youtube.com/watch?v=nbfy7sxH4Jg

Activity Title 1.3: Removing a crank in a city bicycle

Learning outcomes

By the end of this **activity**, the participants will be able to know:

- How to remove a crank in a city bicycle
- they will know how to properly maintained to keep your bike operational

Duration: 30 minutes

Target ages: N/A

Type of activity: Indoor

Guidelines

Preparation of the activity (before the activity):

- Prepare the tools and materials needed to remove the Crank (Allen key, wrench set, socket spanner, crank-pulling tool, grease)
- a city bicycle (an old bicycle is also ok)
- a stand for the bicycle

Delivery of the activity:

- Start with the presentation of each tool and their use for the disassemble the crank
- stand the bike in a correct position

Follow the following steps to remove a crank from the bicycle[2]:

- Position the bicycle on the stand
- separate the right pedal from the crank arm with a 15mm wrench
- when the pedal is loosened it should freely rotate on the crank's bolt
- rotate the crank arm clockwise to remove the pedal (it may take 10-30 full rotations of the crank to remove the pedal)
- repeat the process on the left pedal
- remove the cap from the centre of the crank, if it has one (the crank bolt will be in the center of the crank and looks like a hexagon)
- loosen the pinch bolts with an allen key, if the crank has them
- insert an allen key into the crank bolt and turn it counter clockwise
- slide the crank off the spindle if you have self-extracting cranks
- loosen the cranks with a crank extractor for non-extracting cranks.

2 https://www.wikihow.com/Change-a-Crank

Conclusion:

• It’s important to explain for each part that you remove

Tips and tricks

• Make sure that all the parts are in order and keep all the parts safely

• give opportunity for participants to remove the some of the easy parts of the bicycle so they can also practice with you

• participants can also bring their bicycle and practice with to disassemble with you.

Useful links:

- Video #1 from part B - https://www.youtube.com/watch?v=nbfy7sxH4Jg

Chapter 2: Preparing the Frame

After having disassembled the bicycle, the frame and other components of the bicycle such as the handlebar can be modified and restored with new painting.

Before applying the painting, (different painting techniques will be presented in Chapter 3) the bicycle parts should be prepared in two ways:

- by removing the existing painting;
- without removing the existing painting;

2.1 By removing the existing painting;

this method is undoubtedly time consuming but ensures a better final result. Before start painting, everything that's attached to the frame needs to be removed. Such as: the seat, wheels, chain, derailleur etc...

If you're doing this for the first time, pay attention to all the parts you pull off from your bike you'll need to put them back on later. Also, make sure to carefully store all of the pieces away. It's easy to lose a couple tiny pieces along the way[3].

3 https://www.instructables.com/Paint-a-bike-frame/

To apply this method, you need:

- a strong paint stripper for iron
- a brush
- an iron brush
- masking tape
- sand paper
- rustproof

Once you have prepared your materials, make sure that you have **covered with the masking tape all the delicate parts** of the bicycle that should not enter in contact with chemicals or painting. Make sure also that the **frame is still**, using the bicycle stand or a clamp.

Before applying the paint stripper, **remove all the existing stickers**. It would be useful to use a hairdryer to ease the procedure. You can remove the remaining glue with olive oil or polish remover.

At this stage, use gloves and a protective face mask.

With the brush, apply the paint stripper and let it work for some minutes. Then, remove it together with the painting with an iron brush. All this procedure takes a while.

Apply now rustproof to all the frame's surface.

Check also all the other parts that you have disassembled and take those that need to be restored. To remove rust, clean and smooth all the parts, use steel wool. After having cleaned and smoothened the surfaces, you can apply a brilliant chrome polish to finish the work.

2.2 Without removing the existing painting

Alternatively, you can paint on the frame without removing the existing painting. This is the easy method; it doesn't require to have a lot of instruments like previous method and you can do it in very short amount of time. Although you are not removing the paint, since the frame's surface to be re-painted, it needs to be carefully smoothed. Therefore, remove all the existing stickers. Moreover, level the surface and remove the rust with an iron brush, sandpaper or iron wool. This process is called sanding. Once the surface is completely smooth, is ready for the rustproof and the primer.

ACTIVITY PLAN 2

Activity title 2.1: Introducing different tools to remove the existing painting

Learning outcomes:

By the end of this **activity**, the participants will be able to:

- Learn different tools to remove the painting
- know how to properly maintained to keep the bike operational.

Duration: 15 minutes

Target ages: N/A

Type of activity: Indoor

Guidelines

Preparation of the activity (before the activity):

Prepare the tools and materials that needed to remove the paint (a strong paint stripper for iron, a brush, an iron brush, masking tape, sandpaper, rustproof).

Delivery of the activity:

Start with the presentation of following materials/tools and their use for removing the existing paints from the bicycle.

- a strong paint stripper for iron
- a brush
- an iron brush
- masking tape
- sandpaper
- rustproof

Once you present the materials, at this stage, you can show the following video on removing the spray paint from a bike frame without damaging the original factory paint.

https://www.youtube.com/watch?v=FuECqkK1nnk

Tips and tricks

It's important to mention that you have **covered with the masking tape all the delicate parts** of the bicycle that should not enter in contact with chemicals or painting.

Useful links/Further reading

Useful links:

- Video #2 from part B - https://www.youtube.com/watch?v=cGVy_DVuhEM

Activity title 2.2: Types of bike frame materials

By the end of this **activity**, the participants will be able to:

- Know different types of bike frame materials
- Learn how to open different part of the bike

Duration: 15 minutes

Target ages: N/A

Type of activity: indoor

Guidelines

Preparation of the activity (before the activity):

Most commonly, there are four types of bike frame materials; aluminum, carbon fiber, titanium, and steel.

Delivery of the activity: (presentation of different types of bike frame materials)[4]

• **Aluminum; is the most common** bike frame material, which is very resistant, not much heavy and has a high strength-to-weight ratio. Aluminum bike frame is not expensive, making it a popular choice for riders and racers on a budget. Take into mind that it's not ideal for those are going to be ridden on dirt roads or long-distance touring, where comfort is of prominent importance.

• **Carbon Fiber;** carbon fibre is a composite of carbon sheets that are bonded together in a mild using resin. These are the most commonly used bike frame material for higher-end mountain and road bikes. Carbon fibre is significantly lighter than aluminium, steel, or titanium and it can be formed into complex shapes, giving bike makers greater creative design latitude.

• **Titanium;** titanium has many of the same characterises of steel, but has a greater resistance to corrosion and fatigue. That means you can build long lasting, lightweight frames. It's easier to repair than aluminium or carbon fibre, so if it ever does break, it can be fixed easily in less costs.

• **Steel;** steel used to be the most common materials to build the bike. Lately it's less used because it's heavier than both aluminium and carbon fibre, making it less desirable for high-end bikes. However, steel is considered cheap compared to other materials and it is very durable, highly resistant to fatigue, and unlike carbon fibber and aluminium, can easily be repaired.

4 https://www.bicycling.com/bikes-gear/a21784287/bike-frame-materials-explained/

Activity title 2.3: Removing the paint from an aluminum bike frame

Learning outcomes

By the end of this **activity**, the participants will be able to:

- Know how to strip the pain from an aluminum bile frame by using the paint stripper

Duration: 40-60 minutes

Target ages: N/A

Type of activity: indoor/outdoor

Guidelines

Preparation of the activity (before the activity):[5]
Paint stripper is a chemical material which is designed to remove existing paint and also to clean the underlying surface.

Image: Source

Delivery of the activity:

Gather the following materials;

- heavy-duty work gloves
- paint brushes
- something to protect your work surface (such as a tarp)
- sandpaper or another abrasive scrubbing instrument
- small container for the stripper

• **Test the paint stripper;** before starting its important to test the paint stripper to make sure it will work properly on your bike. You can test it in the less vital part of the frame, so if it doesn't work, you don't destroy your bike.

5 https://pedalstreet.com/how-to-remove-paint-from-an-aluminum-bike-frame/

• **Strip the paint;** there are different method of applying this method, it can be depending on the product you use, so it's recommended to read the instruction from the manufacturer before starting it.

Image: Source

- be sure to wear protective gloves
- soak the aluminium frame in the stripper. Most likely, you'll need to work in small sections by brushing the paint stripper onto the frame using the paint brushes. In some cases, you can use a rag
- gently remove the paint using sandpaper or another scraping tool. Keep in mind that sanding too hard might scratch the aluminium underneath.

Conclusion:

• You can use an old bike to see the results

• you can practice the activity together with participants

Tips and tricks

• You can repeat the process until it's done.

Useful links/Further reading

Useful links:

• Video #2 from part B - https://www.youtube.com/watch?v=cGVy_DVuhEM

Chapter 3: Different Painting Techniques

In this chapter, you will learn different painting techniques that you can apply for your bike to give it a brand-new look without paying to a professional to renovate your bike. With the right tools and methods, you can paint a bike that will turn out looking elegant and custom made.

Here are some methods that can be used for the painting of your bike;

3.1 Airbrush Painting

Airbrushing is a painting technique which uses an airbrush to give an even and consistent surface, often used to create a high level of realism. Airbrushing has become an extremely popular hobby in recent years, it can be used with metal, textiles, food etc... It's a small, hand-held instrument connected to a can of compressed air that you can spray paint (with the colour you prefer) in a controlled way giving an even and consistent surface. It also features a clever rotational seal design that allows you to use a gravity feed or tap feed system. This airbrush is much durable compare to others, well-built, an easily atomised and able to produce well details.

Required instruments;[6]

- airbrush gun
- a suitable compressor
- thinned paint
- cleaning set

Steps;

- disassemble the bike (see the chapter one to learn how to disassemble the bike)
- remove all stickers
- sand off the old paint
- degrease the substrate
- masking and tape
- hang the bicycle frame or use a bicycle mounting rack
- use the primer
- start painting (before you start painting, remember to put on your protective clothing (goggles, gloves, respirator)
- wet sand the painted frame
- apply design (optional)
- apply a clear coat (if necessary)

6 https://resin-expert.com/en/guide/how-to-paint-a-bike

An airbrush will spray a very fine mist of paint, which means that several layers are needed in order to get the perfect finish. In addition, the spray distance from the bicycle frame should be about 25 cm, so that the risk of paint noses is kept to a minimum.[7]

3.2 Brush Painting

This technique is common cause it doesn't take much tools, the most basic things which involves sandpaper, brushes, paint, and some effort. Painting Art on the bicycles also involves combinations of stencils, various markers and pens. Long before the advent of cellulose paint and spray painting, we relied on the technique of coach painting with brushes to protect the metal and timber surfaces of locomotives, early motorcars and horse drawn carriages etc.[8] The brush painting requires a certain amount of time and patience to achieve a good finish.

Image: Source

Required instruments

- natural bristle brush
- paint (see below for some suggestions of the paint)
- cleaning set

For this method, you have to choose a good quality natural bristle brush. They are not cheap but they should look after with great care and they can be used consistently without peeling spikes at a critical moment. Secondly, you must *choice of paint, which* needs to be specified for brushing slow-drying (long 'open-time'). An example, not car cellulose paints or similar.

Once you choose these, dry brush on some clean fabric usually serves to remove any loose filaments. Brush cleanliness is essential if you want a decent finish, so wash them out after use in the appropriate brush cleaner, then with plenty of washing up

7 https://resin-expert.com/en/guide/how-to-paint-a-bike
8 http://www.da7c.co.uk/technical_torque_articles/brush_painting.htm

liquid and hot water.

Steps

- disassemble the bike
- frame preparation
- clean it up
- cover up anything you don't want to paint
- painting

Cleanliness is the biggest challenge facing the coach painter is avoiding dust contamination of the finished work. If dust is still a problem, you can create a decent paint booth inside your garage by chains up several shower curtains to form a workspace.

Here are some suggestions of paintings that you can use; [9]

- **Plasticote Enamel Paint** – It is an oil-based paint that leaves no signs of brush marks. The Plasticote creates a hard gloss finish after coating your bike. The paint is very easy and quick to dry, requiring you to speed up the painting process.

- **Humbrol Enamel Paint** – Another paint brand you can consider is Humbrol enamel paint. Like the Plasticote, it is oil-based brush pain. It is a thick substance leaving you a bumpy surface when applied very thickly.

- **Johnstone's Professional Undercoat** – This undercoat is an oil-based chemical ideal for a white topcoat for your bike frames. It requires sanding because the paint can leave brush marks upon application.

- **Household gloss paint** – The paint is very thick to apply and slow to dry. It requires you to wait for two weeks or more to finally sand your bike after coating. When applied in a gradual manner, it can still give excellent results.

- **Hammerite** – This type of paint can be used as a base coat. It comes in a very thick consistency, making it a hard material to work on your bike. It is marketed as paint and primer in one, but it gets hard using a paintbrush.

9 https://biketoworkday.us/kind-of-paint-to-use-on-a-bike/#Brush_paints

3.3 Spray-Can Painting

A spray can contains the manufactured paint mixture in the desired shade and is equipped with a spray head. [10]An obvious way to make the paint application as even as possible is, of course, to work with a paint spray can. It's important to maintained the correct distance between the spray and the bicycle frame and the paint should be applied in several thin layers, so it can last longer. Many experts suggest that, during the spraying process, the spray can must always be held vertically to create an optimal spray design.

Another recommendation is to disassemble your bike before you start painting (please follow the instruction on chapter 1 for the disassemble process).

Image: Source

Spray Can Tips[11]:

• **Disassemble the bike if you can:** if you can take it apart without too much trouble, it is better to disassemble the bike before painting. This way, you will have much better luck getting even coverage, seeing what you're doing and avoiding runs.

• **Read the directions:** it is highly recommended to read carefully the instruction from the manufacture company before using the paint.

• **Apply Wools in different directions:** to achieve the most even coverage of the paint on your bike, it's a good idea to put on subsequent coats in different directions. Changing directions will help you get into all those corners and cracks and reduce the chance of zebra stripes.

• **Always clean out the nozzle:** in order to avoid that the nozzle could end up with completely blocked with dried pain or partial block that can affect for the next use of the paint, its recommended to put on subsequent coats in different directions. Changing directions will also help you get into all those corners and cracks and reduce the chance of zebra stripes.

• **Start with a tack coat:** a tack coat is a light steam that allow to set for five minutes, the texture of the tack coat will help hold the paint in place and reduce runs. If you are spraying a vertical surface, it's always recommended to apply a tack coat before applying the first full coat.

10 https://airbrush-expert.com/en/how-to-paint-a-bike/#
11 https://www.familyhandyman.com/list/12-tips-for-perfect-spray-paint/

3.4 Hydro Dipping Method

Hydro dipping, also known as water transfer printing, immersion printing, water transfer imaging, water marbling is a method of applying printed designs to three-dimensional surfaces. The resulting combinations may be considered artistic work. This process can be used on metal, plastic, glass, hard woods, and various other materials[12].

Required instruments:

- Acrylic paints
- Long rubber gloves
- A large waterproof container
- Cardboard or paper to lay the painted pieces on after dipping

Steps[13]

- wash the bike
- choose the colours
- remove the seat and plastics parts
- base coat
- gather your supplies
- fill up the pot with water
- spray the paint
- dipping the stuff
- clear coat & assemble the parts

Suggested video with full instruction;

https://www.youtube.com/watch?v=KcskAs_xKDU

12 https://3dinsider.com/hydro-dipping/
13 https://www.instructables.com/Hydro-Dipped-Dirt-Bike/

ACTIVITY PLAN 3

Activity Title 3.1: Activity with Airbrush Painting Method

Learning outcomes:

By the end of this **activity**, the participants will be able to:

- Know how to correctly assemble the bicycle
- learn different part of the bicycle and their use

Duration: 60-90 minutes

Target ages: N/A

Type of activity: Indoor activity

Guidelines

Preparation of the activity (before the activity):

- Prepare required tools to deliver the activity (airbrush gun, a suitable compressor, thinned paint, cleaning set)

Delivery of the activity:

- disassemble the bike (see the Part B, chapter 1 to learn how to disassemble the bike)
- remove all stickers
- sand off the old paint
- degrease the substrate
- masking and tape
- hang the bicycle frame or use a bicycle mounting rack
- use the primer
- start painting (before you start painting, remember to put on your protective clothing (goggles, gloves, respirator)
- wet sand the painted frame
- apply design (optional)
- apply a clear coat (if necessary)

Tips and tricks

- You can let participants to choose which part of the bicycle they want to paint. It's not necessary to paint the whole bike.
- An airbrush will spray a very fine mist of paint, which means that several layers are needed in order to get the perfect finish.
- In addition, the spray distance from the bicycle frame should be about 25 cm, so that the risk of paint noses is kept to a minimum14.

Useful links/Further reading

Useful links:

- Video #3 from part B - https://www.youtube.com/watch?v=TlUy-FXMw3w

14 https://resin-expert.com/en/guide/how-to-paint-a-bike

Activity Title 3.2: Activity with Hydro Dipping Method

Module Title: Different Painting Techniques
Learning outcomes By the end of this **activity**, the participants will be able to: • Know how to correctly assemble the bicycle • learn different part of the bicycle and their use
Duration: 40 - 60 minutes
Target ages: N/A
Type of activity: Indoor activity
Guidelines
Preparation of the activity (before the activity): • Prepare required tools to deliver the activity (acrylic paints, long rubber gloves, large waterproof container, cardboard or paper to lay the painted pieces on after dipping) **Delivery of the activity:** • disassemble the bike (see the Part B, chapter 1 to learn how to disassemble the bike) • wash the bike • choose the colors • remove the seat and plastics parts • base coat • gather your supplies • fill up the pot with water • spray the paint • dipping the stuff • clear coat & assemble the parts
Tips and tricks
Allow the pieces to thoroughly dry before beginning to dip.

Activity Plan 3.3: Activity with Spray-Can Painting

Module Title: Different Painting Techniques

Learning outcomes

By the end of this **activity**, the participants will be able to:

- help you understand how to spray paint a bike correctly
- can help you save a lot of money on repairs and maintenance

Duration: 40 minutes

Target ages: N/A

Type of activity: Indoor activity

Guidelines

Preparation of the activity (before the activity):

- Prepare required tools to deliver the activity (acrylic paints, long rubber gloves, large waterproof container, cardboard or paper to lay the painted pieces on after dipping)

Delivery of the activity:

- disassemble the bike (see the Part B, chapter 1 to learn how to disassemble the bike)
- clean the bike and remove signs of wear and damage
- use sandpaper to remove the old paint
- remove any rust and signs of corrosion
- wash and dry the bike
- apply a primer to the components
- read the instruction form the paint
- apply a spray paint coating in your preferred colour (one coat at a time)

Tips and tricks

- During the spraying process, the spray can must always be held vertically to create an optimal spray design
- it is recommended to disassemble your bike before you start painting (you can see the Part B, chapter 1 for disassemble process)
- its highly recommended to read carefully the instruction from the manufacture company before using the paint.

Chapter 4: Assembling the Bicycle and Adding Elements

After having painted the frame and bicycle parts, it is now time to assemble it. Assembling takes more time than disassembling, because all parts have to be crossed checked for their correct functioning.

For some specific parts, you may need to use the lithium grease that does not vanish with rain.

4.1 Step-by-step assembling the bicycle

Step 1: Assembling the fork

Before assembling the fork, it is necessary to grease the internal tube of the headset and the metal ring with bearings (remove before the existing grease on the ring). Once these parts are greased, put the metal ring in the fork tube (the part with the bearings has to face up) and then insert the fork tube in the headset.

Place the other metal ring with bearings with the bearing facing down (remember to grease even this one!). Now you can tighten the big nut that holds the fork and the headset together. Place now the ring with the single tooth. You can tighten the last element, the small nut that holds everything together.

Step 2: Assembling the handlebar

Before assembling the handlebar, check the base of the steering headset. Clean it if it is rusted and grease it with the lithium grease. Place it in the headset and tighten it with the Allen key. Now you can insert the handlebar.

Step 3: Assembling the gear shift control and knobs

Place now also on the handlebar the brakes handles (with the gear changing box if present).

Step 4: Assembling the V brakes

Grease the pins where the V brakes are placed. Then, place back the brakes and close them with their screws using the Allen key.

Step 5: Assembling the bottom bracket

Check if the bottom bracket is rusted. In case, remove the rust and grease it before placing it back (greasing even the part of the frame where the bottom bracket stays). Insert the bottom bracket in the crankcase bracket and then insert it in the frame. Fix it with the bottom bracket puller. Place the other cap (on the opposite side) and fix it with the bottom bracket puller.

Step 6: Assembling the crank

Place back the crank and insert its screw. Fix the crank to the bottom bracket with the crank-pulling tool. Do this for both sides. Close both screws with the protective caps.

Step 7: Assembling the rear wheel

Grease the pin of the wheel. Fix the wheel to the frame with its bolt.

Step 8. Assembling the gearbox and the chain

Place the gearbox and fix it to the frame putting its screw in place with an Allen key. Take the chain and put it on the first gear and insert it in the gearbox (follow the pictures for placing it correctly). The chain can now be reconnected using the bike chain breaker.

Step 9: Assembling the gear and brakes wires

Insert the gear wires in the direction holes that are on the frame. Insert the gear wire in the gearbox and fix it with its specific bolt. Close the wire with a protective cap. You can now tighten the screws of the front gear lever. Check then if the wires are too loose or too rigid and adjust them accordingly.

Insert the brake's wire in the direction holes that are on the frame. Put it then back in the V brake and secure it with its specific screw. Close the wire with a protective cap.

Step 10: Assembling the mudguard

Place the mudguards back and fix them with their screws. Do the same if the bicycle has a carter and a carrier.

Step 11: Assembling the pedals and the saddle and the front wheel

Place and fix the pedals to the cranks (check for the right and left pedal). Insert the saddle and fix it to the frame. It is now possible to place back the front wheel and to fix it with its bolts.

4.2 Adding elements (bags, basket)

Showing examples, ideas for adding useful and creative elements to the bicycle

ACTIVITY PLAN 4

Activity title 4.1: Inflate your bike tires

Module Title: Assembling the bicycle and adding elements
Learning outcomes By the end of this **activity**, the participants will be able to: • will learn how to inflate the tires properly in Schrader valve and presta valve • will learn about tire pressure for different types of bike
Duration: 20 minutes
Target ages: N/A
Type of activity: Indoor or outdoor activity
Guidelines
Preparation of the activity (before the activity): • **You will need a bike** • **Pump** • **A stand for the bicycle** **Delivery of the activity:** **Method 1: Schrader Valve**[15] • The valve stem is surrounded by a threaded valve core; to press down on the stem, you need to use a tool like a pen cap or your thumbnail. • Figure out the recommended PSI 8 pounds per square inch) for your tires: this is usually on raised print on the side of your bike tires and will consist of a range. Narrow tires need more air pressure than wide ones: Road tires typically require 80 to 130 psi; mountain bike tires, 25 to 35 psi; and hybrid tires, 40 to 70 psi[16]. • Locate a pump: if you don't have one, you can use a gas station pump, or borrow one from a friend. • Inflate the tire: unscrew the rubber cap on top of the valve and put it somewhere safe, like your back pocket. Put the pump on the valve and Flip the lever back up to remove the pump, then quickly return the rubber cap to the valve.

15 https://www.wikihow.life/Inflate-Bike-Tires
16 https://www.bicycling.com/repair/a20004232/how-to-achieve-the-perfect-bike-tire-pressure/

Method 2: Presta Valve[17]

• The Presta valve, also called a Sclaverand or French valve, is usually found on high-end road bikes. Presta valves are longer and narrower in diameter than Schrader valves, and feature an external valve stem that is protected by a valve cap, instead of being surrounded by a valve core . [18]

• Open the valve: to open a presta valve, unscrew the dust cap at the top and put it somewhere safe. Then, loosen the small brass cap on the valve stem. It doesn't come off completely, but you should be able to raise it a bit.

• Figure out the recommended PSI for your tires

• Locate the pump

• Inflate the tire

Tips and tricks

• To deflate a tire with a Schrader valve, simply press on the springy valve stem with a fingernail or other small tool until all the air escapes.

Useful links/Further reading

Useful links:

• Video #4 from part B - https://www.youtube.com/watch?v=rB6oS0TBqDo

17 https://www.wikihow.life/Inflate-Bike-Tires

18 https://www.bicycling.com/repair/a20048610/the-difference-between-a-schrader-valve-and-a-presta/

Activity title 4.2: Adjusting threaded headsets

Module Title: Assembling the bicycle and adding elements

Learning outcomes

By the end of this **activity**, the participants will be able to:

- Know how to adjust the rotation of road handlebars in different kind of bicycle

Duration: 10-15 minutes

Target ages: N/A

Type of activity: Indoor and outdoor activity

Guidelines

Preparation of the activity (before the activity):

- In order to implement this activity, you need to know if you have a threaded headset. These are the one has a continuous metal piece (stem) that comes up out of the frame, bends forward, and then attaches to the handlebars. These stems are common on single-speed, fixed gear, and older bikes.
- You will need some instruments (Allen key, some spacers).

Delivery of the activity[19]:

- Loosen the bolt on the top of the stem
- Loosen the locknut with a wrench (which is the "ring" where the stem meets the bike frame)
- Pull the handlebars out of the frame
- Wipe down and grease the stem lightly (Clean off any gunk on the stem with soapy water and then dry it with an old rag. To prevent the stem from getting stuck in the frame later on, apply a little anti-seize grease around the bottom 2-3 inches of the stem).
- Consider the kind of riding you'll be doing when deciding a new handlebar type. Take into note that handlebar positioning largely depends on the type of bicycle you're using, such as;
    - Road bike: road bikes gives you a pleasant riding experience on tiled roads. Handlebars on road bikes should be slightly lower than the seat, so it can provide optimum aerodynamics and control at high speeds.
    - Mountain bike: the wider the handle bar, the more leverage you can apply to the front wheel to force the bike onto more aggressive lines20. In order to have a better balance when negotiating rugged terrain, you need to have the handlebars lower than your seat.

19 https://www.wikihow.com/Adjust-Handlebars
20 https://www.bikeradar.com/advice/buyers-guides/best-mountain-bike-handlebars/

Conclusion:

- Once you place the team back at your comfortable height, you can tighten the hex nut and top bolt.

Tips and tricks

- If altering the position of your handlebars becomes problematic, consider changing the height of the seat.

Useful links/Further reading

Useful links:

- Video #4 from part B - https://www.youtube.com/watch?v=rB6oS0TBqDo

Activity title 4.3: Assembling the bicycle

Module Title: Assembling the bicycle and adding elements

Learning outcomes

By the end of this **activity**, the participants will be able to:

- Know how to correctly assemble the bicycle
- learn different part of the bicycle and their use

Duration: 60-90 minutes

Target ages: N/A

Type of activity: Indoor activity

Guidelines

Preparation of the activity (before the activity):

- Prepare all the tools for Assembly/Adjustment
- Assembling takes more time than disassembling because all parts have to be crossed checked for their correct functioning.

Delivery of the activity: (Please follow following steps, each step is explained in details in the Part B, Chapter 4;

- Assembling the fork
- Assembling the handlebar
- Assembling the gear shift control and knobs
- Assembling the V brakes
- Assembling the bottom bracket
- Assembling the crank
- Assembling the rear wheel
- Assembling the gearbox and the chain
- Assembling the gear and brakes wires
- Assembling the mudguard
- Assembling the pedals and the saddle and the front wheel
- Adding elements (bags, basket)

Tips and tricks

- Give opportunity for participants to assemble process so they can also practice with you.

Useful links/Further reading

Useful links:

- Video #4 from part B - https://www.youtube.com/watch?v=rB6oS0TBqDo

Chapter 5: How to propose your service to customers

In the previous chapters you learned about different painting techniques, such as (air brush painting, brush painting, hydro dipping method etc.), in this chapter, we will explain how you can provide the services and products to your customers. **A product** is an essential part of any business. It is defined as 'the sum of the physical and psychological satisfactions the buyer receives when he makes a purchase'.[21] It is important to take the right decisions at the right time to the right customers in order to get success of your business. You have to choose **the right product**: the quality, designs, product variety and change, packaging, brands, features, models, sizes, returns warranties and services.[22] It applies also if you are a bicycle seller or if you want to provide your bicycle repairing service to the customer with artistic design in attractive ways.

Image: Source

5.1 How to identify your customers and target market?

When it comes to selling your product or services, your **customer** is the main target you have to focus on. It is a person who is interested in your services because you made one to believe that it is the most needed thing in their life. If you want to provide bike services to them, you need to make them trust that your services can make their bike more attractive, protective and they can make their bike looks like a brand-new without spending a lot of money.

21 https://pdfs.semanticscholar.org/d15d/45932da53b05211248a19712c1b7bfc88ae9.pdf
22 http://www.businessstudynotes.com/marketing/marketing-and-important-marketing-terms/

It is essential to know, to whom you are providing this service or to whom you are selling the product. Market research is the first major step when it comes to launching a new business, as it allows you to assess whether there's sufficient demand within your chosen location to set up a bike shop. If you're a cycling specialist and you have been riding bikes for years, you'll already have important information about the bike industry and it will be easier for you to identify your customer.
It's an essential step in helping you get to know the area in which you'd like to set up your bike shop. Before identifying your customer, it's important to have a clear knowledge on what services you want to provide. Once you have the idea of your business and ideal location, this point you need to focus on who's your customer. Because this will help you to assess their needs and determine whether your product or service will meet those needs.

Here we will present some tips to identify your potential clients[23]:

- **Characteristics of your ideal customer**: (to identify the characteristics of your ideal customers, you start with any data you've gathered about your best customers, their habits, professions, age, gender, their income etc..)
- **Create a customer persona:** (a **customer persona** is a description of the ideal customer. You can use the information that you collected about your ideal customers previously)
- **Find more of your ideal customers:** (you can use different channels to increase your market. Advertising in the media where they spend the most time (social networks, blogs, websites, events related to your business etc..)

• **How to identify your customer's needs**

Once you have recognised your potential market and the potential customers, this is the time to identify the market or customer needs. Talking about customer needs helps to ensure that your businesses meets their expectations. Specifically, when you understand customers' needs, you will have the information you need to open the business.

This allows your business on[24]:

- providing better customer support that truly respond their demands
- improving Your Products and Services
- reduce costs

23 https://www.score.org/resource/how-identify-your-ideal-customers-and-get-more-them
24 https://www.bonnevillebayarea.com/blog/effective-ways-to-identify-and-meet-consumer-needs

You can do the market research based on following questions in order to understand, in details, what are your potential customer's needs [25]:

- Is the current supplier in your city are providing the services that you are planning to?
- are they meeting the level of consumer demands?
- what are the average number of people that can use our service?

Once you've answered these questions, it will be easier for you to understand the main demands of your customers within the area where you want to set up your shop.

Here are some ways that can help you to understand your customers' needs[26]:

- Interviews with potential customers
- surveys
- focus groups
- using social networks

5.2 How to propose your service to customers

Before launching a new product or service, it is important to understand the channel you will use to reach your customers. There are two different channels through you can use to sell your own products or services:

1. **Direct channels:** these are the channels owned by the company, for example their sales points or through their own websites. This can be your bike shop or other physical place where you will provide artistic painting to the bikes.

2. **Indirect channels:** these are the one owned by the company's partners such as partner shops, wholesalers and web channels owned by the partners.

Since you want to provide the bike service, for you the direct channel is the most suitable method to provide your service to the customers.

25 https://www.thebusinessplanshop.com/en/blog/market-research-bike-shop
26 https://www.bonnevillebayarea.com/blog/effective-ways-to-identify-and-meet-consumer-needs

ACTIVITY PLAN 5

Activity title 5.1: Analysing Your Potential Markets

Module title: How to propose your service to customers

Learning outcomes

By the end of this **activity**, the participants will be able to:

- will analysis their potential market in the complex process by asking and answering the questions
- will know their potential client, competitors, and a market

Duration: 30-40 minutes

Target ages: N/A

Type of activity: Indoor activity

Guidelines

Preparation of the activity (before the activity):

- Divide participants in groups (4/5 participants in a group)
- Print the following questions (see the delivery of activity section)

Delivery of the activity: (list of questions)

- Who are my potential clients in the city?
- How many of them are there?
- How much they can pay for my product?
- What kind of bicycle have been using by other people in the city?
- Who is my competition? (if there are other bicycle shops in the city or nearby you)
- What have their challenges and successes been?
- How big is your market?

Image: Source

Tips and tricks

- Give opportunity for participants to discuss in the group before writing the answers
- After they finish answering the questions, give them time to share in the group.

Activity title 5.2: Create Your Customer Persona

Module Title: How to propose your service to customers

Learning outcomes

By the end of this **activity**, the participants will be able to:

- will be able to identify their potential customer and their habits
- you will create your customer persona

Duration: 40-60 minutes

Target ages: N/A

Type of activity: Indoor activity

Guidelines

Preparation of The Activity (Before the Activity):

- a persona is a fictional representation for your company's customer. It is designed to help everyone in the organisation understand and target the same customer.
- when you are creating your customer persona, you have to describe as if they are a real person, which means they're given a name, a career, motivations, goals and problems .[27]
- divide participants in groups (4/5 participants in a group)

Delivery of The Activity: (Create Your Own Customer Personas)

Step 1: try to answer as many of the below questions in following section:

1. **Personal information**
   - o what is the average age of your potential customer?
   - o what is their gender?
   - o where do they live?
   - o what are their hobbies?
   - o do they have children? (if yes, what age, you can target their children also as a potential customer)

2. **Career history**
   - o what is their highest level of education?
   - o what industry do they work in?
   - o what is their profession?
   - o what are their common sports?
   - o what kind of transportation do they use?
   - o how much do they earn?

27 https://www.hardiegrant.com/au/media/blog/how-to-create-customer-personas

3. Purchasing behaviour

o what are their goals?

o what are their challenges?

o what do they like about your company/your industry, and why do they feel this way?

o what are their biggest issues with your company/your industry, and why do they feel this way?

o what might prevent them from making a purchase from you?

Step 2: Create your persona

Once you collected all the information, now it's time to create your potential customer that you imagine. It's also recommended to put a face to your persona because this will help everyone in your team to view as a real person.

Now participants need to create their customer research into a "BIO" format like the example below.

Image: Source

This will be your final persona.

name:	
age:	
location:	
family:	
education:	
work place	
income:	
hobbies/interests:	
purchase habits:	
use of social media	
challenges:	

Tips and tricks

Activity title 5.3: Launching Your Product

Module Title: How to propose your service to customers
Learning outcomes By the end of this **activity**, the participants will be able to: • to learn my step-by-step strategy for launching a product • to learn how to promote their product in the right way to the right targets • be able to identify their potential customer
Duration: 20-30 minutes
Target ages: N/A
Type of activity: Indoor activity
Guidelines
Preparation of The Activity (Before the Activity): • Prepare a projector with audio system • You will need to have an internet connection in order to show this video **Delivery of The Activity: (show the video about how to launch the product)** • Show this video: **https://www.youtube.com/watch?app=desktop&v=jMS5p0KwKyA**
Tips and tricks