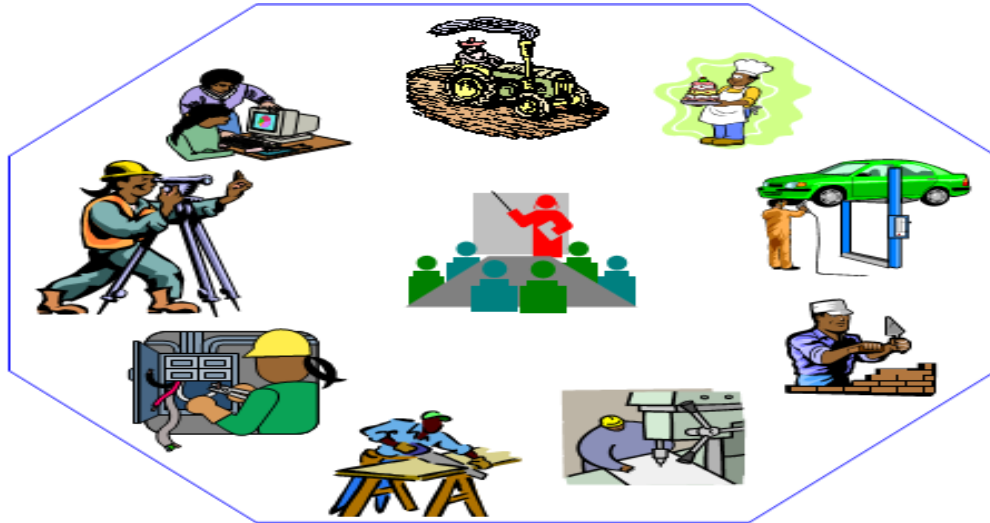




## Lapidary

### Level-II

Based on january2014, Version 1 OS and April . 2021, V1 Curriculum



Module Title: Slab/Trim and Polishing Gemstone Materials

LG Code MIN LAP2 M04L(1 -7)LG11-17)

TTLM Code: MIN LAP2 M04 21v1

April, 2021

## Table of content

### LO #1- Prepare Primary Processing equipment for operation ..... 6

|   |                                     |
|---|-------------------------------------|
| Instruction sheet.....  | 6                                   |
| Information Sheet 1- Confirming available spice and herbs materials for .....8  |                                     |
| threshing, de-stemming, de-corning and de-hulling                               | <b>Error! Bookmark not defined.</b> |
| Self-check 1 .....  | <b>Error! Bookmark not defined.</b> |
| Information Sheet 2- Confirming the availability of equipment for threshing, .. | <b>Error!</b>                       |
| <b>Bookmark not defined.</b>  |                                     |
| de-stemming, de-corning and de-hulling .....                                    | <b>Error! Bookmark not defined.</b> |
| Self-Check – 2 .....  | <b>Error! Bookmark not defined.</b> |
| Information Sheet 3- Confirming type and quality of materials for pre- .....    | <b>Error!</b>                       |
| <b>Bookmark not defined.</b>  |                                     |
| Processing .....  | <b>Error! Bookmark not defined.</b> |
| Self-Check – 3 .....  | <b>Error! Bookmark not defined.</b> |
| Information Sheet 4- Identifying and confirming cleaning and maintenance ...    | <b>Error!</b>                       |
| <b>Bookmark not defined.</b>  |                                     |
| Requirements.....   | <b>Error! Bookmark not defined.</b> |
| Self-Check – 4 .....  | <b>Error! Bookmark not defined.</b> |
| Information Sheet 5- Fitting and adjusting machine components and related .     | <b>Error!</b>                       |
| <b>Bookmark not defined.</b>  |                                     |
| Attachments .....   | <b>Error! Bookmark not defined.</b> |
| Self-Check – 5 .....  | <b>Error! Bookmark not defined.</b> |
| Information Sheet 6- Entering processing/operating parameters .                 | <b>Error! Bookmark</b>              |
| <b>not defined.</b>   |                                     |

|              |   |  |            |
|--------------|---|--|------------|
| Page 2 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|              |   |  | April 2021 |

Self-Check – 6 ..... **Error! Bookmark not defined.**  
 Information Sheet 7- Checking and adjusting equipment performance..... **Error! Bookmark not defined.**  
 Self-Check – 7 ..... **Error! Bookmark not defined.**  
 Information Sheet 8- Carrying out pre-start checks. **Error! Bookmark not defined.**  
 Self-Check – 8 ..... **Error! Bookmark not defined.**  
 Operation Sheet 1– Conducting pre-start checks of tools, equipment and ..... **Error! Bookmark not defined.**  
 machine ..... **Error! Bookmark not defined.**  
 Operation Sheet 2– Preparing raw materials for primary processing..... **Error! Bookmark not defined.**  
 LAP TEST..... **Error! Bookmark not defined.**

## **LO #2- Operate and monitor the pre-processing process** **Error! Bookmark not defined.**

Instruction sheet..... **Error! Bookmark not defined.**  
 Information Sheet 1- Confirming clean raw spice and herbs for threshing, ..... **Error! Bookmark not defined.**  
 de-stemming, de-corning and de-hulling process .. **Error! Bookmark not defined.**  
 Self-Check – 1 ..... **Error! Bookmark not defined.**  
 Information Sheet 2- Monitoring the variation of equipment and materials ..... **Error! Bookmark not defined.**  
 Self-Check – 2 ..... **Error! Bookmark not defined.**  
 Information Sheet 3- Identifying variation in equipment operation and ..... **Error! Bookmark not defined.**  
 reporting maintenance requirements ..... **Error! Bookmark not defined.**  
 Self-Check – 3 ..... **Error! Bookmark not defined.**

|              |   |  |                          |
|--------------|---|--|--------------------------|
| Page 3 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1<br>April 2021 |
|--------------|---|--|--------------------------|

Information Sheet 4- Monitoring the process ..... **Error! Bookmark not defined.**

Self-Check – 4 ..... **Error! Bookmark not defined.**

Information Sheet 5- Identifying, rectifying and/or reporting out-of-**Error! Bookmark not defined.**

specification product/process outcomes ..... **Error! Bookmark not defined.**

Self-Check – 5 ..... **Error! Bookmark not defined.**

Information Sheet 6- Achieving housekeeping standards ..... **Error! Bookmark not defined.**

Self-Check – 6 ..... **Error! Bookmark not defined.**

Information Sheet 7- Maintaining workplace records**Error! Bookmark not defined.**

Self-Check – 7 ..... **Error! Bookmark not defined.**

### **LO #3- Shut down the pre-processing process.....Error! Bookmark not defined.**

Instruction sheet..... **Error! Bookmark not defined.**

Information Sheet 1- Identifying the appropriate shutdown procedure ..... **Error! Bookmark not defined.**

Self-Check – 1 ..... **Error! Bookmark not defined.**

Information Sheet 2- Shut down the process according to workplace procedures ..... **Error! Bookmark not defined.**

Self-Check – 2 ..... **Error! Bookmark not defined.**

Information Sheet 3- Identifying and reporting maintenance requirements ..... **Error! Bookmark not defined.**

Self-Check – 3 ..... **Error! Bookmark not defined.**

Operation Sheet 1– shutting down primary processing equipment/machine .. **Error! Bookmark not defined.**

LAP TEST..... **Error! Bookmark not defined.**

|              |   |  |                          |
|--------------|---|--|--------------------------|
| Page 4 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1<br>April 2021 |
|--------------|---|--|--------------------------|



Reference Materials ..... **Error! Bookmark not defined.**

|              |   |  |            |
|--------------|---|--|------------|
| Page 5 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|              |   |  | April 2021 |

| LG #11   | LO #1 Preparing for Work |
|--|--------------------------|
| <b>Instruction sheet</b>   |                          |
| <p>This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –</p> <ul style="list-style-type: none"> <li>• Planning</li> <li>• Occupational Health and Safety (OHS) requirements</li> <li>• Selecting Tools and equipment</li> <li>• Acquiring rough gem Material</li> <li>• Cleaning equipment and work area</li> </ul> <p>This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to –</p> <ul style="list-style-type: none"> <li>• Plan</li> <li>• Occupational Health and Safety (OHS) requirements</li> <li>• Select Tools and equipment</li> <li>• Acquire rough gem Material</li> <li>• Clean equipment and work area</li> </ul> |                          |
| <p><b>Learning Instructions:</b></p> <p>Read the specific objectives of this Learning Guide.</p> <p>Follow the instructions described below 3 to 4</p>   |                          |

Read the information written in the information “Sheet 1, Sheet 2,  
Accomplish the “Self-check 1 and Self-check t 2 respectively.

## Information Sheet 1- **Planning the work**

### **Plan**

A **plan** is typically any diagram or list of steps with details of timing and resources, used to achieve an objective to do something. It is commonly understood as a temporal set of intended actions . The term planning implies the working out of sub-components in some degree of elaborate detail. Broader-brush enunciations of objectives may qualify as metaphorical roadmaps.

Planning literally just means the creation of a plan; it can be as simple as making a list. It was not has acquired a technical meaning, however, to cover the area of government legislation and regulations elated to the use of resources.

A successful plan sets quantifiable goals. Although it all starts with a goal, if you don't have an action plan your goals are just dreams. Be sure it is a realistic plan. If you've never exercised before and set a goal to run, you've almost certainly set yourself up for failure. It's great to be motivated and set lofty goals, but they must b. Your plan must be SMART-Specific, Measurable, Atainable/ Achivable, Realistic/Reliable and Time bounded

### **Purpose of plan**

What do you want to accomplish and why is that goal important to you? Your plan should be specific and relative to your needs and desires. Training with purpose and intent is vital to accomplish any fitness quest. Consider your current goals. Are they meaningful, or are they just a gluten free cookie-cutter replica of someone else's fitness goal? A goal

|              |   |  |                          |
|--------------|---|--|--------------------------|
| Page 8 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1<br>April 2021 |
|--------------|---|--|--------------------------|



that isn't attached to something deep and personal is a dead-end waiting to happen. It should hurt if you fail. If it doesn't, it won't drive you.

Before start to cut a gem stone you have to

Determine your final product

Identify the gemstone

Put the sequences of work

Implementing Your Plan. ...

Monitoring and Reviewing the Plan .

Take steps to being fully prepared and then put your plan in to action. Being proactive is about taking responsibility for your life. Proactive people focus their time and energy on things they can control

Prepare the work is defined as

A: to make ready beforehand for some purpose, use, for our activity prepare stone for slab .

B: to put in a proper state of mind is prepared to listen.

C: to work out the date Plan

A successful plan sets quantifiable goals. During planning and preparing for work you will consider the following points

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|--------------|---|--|--------------------------|
| Page 9 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1<br>April 2021 |
|--------------|---|--|--------------------------|

- Squeeze in some exercise. Exercising before you head to work can be an effective way to energize your mind and body so you're ready to face the day. ...
- Get in the right mindset. ...
- Eat a healthy breakfast. ...
- Prioritize your tasks. ...
- Plan your day. ...

|                      |                     |
|----------------------|---------------------|
| <b>Self-Check -1</b> | <b>Written Test</b> |
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**Directions 1:** short answer Items

**Instruction 1** Fill the correct word or phrase in the space provided?

1. Why do you plan? Explain it regarding to gemstone slab (6points)

---



---

2. Your plan must be SMART.What does it men? 5 pnts

---



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**Note: Satisfactory rating 8 points and above  
points**

**Unsatisfactory - below 8**

You can ask you teacher for the copy of the correct answer Name of the student  
..... Score-----

Rating-----

|               |   |  |            |
|---------------|---|--|------------|
| Page 11 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|               |   |  | April 2021 |

|                            |  |
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| <b>Information Sheet-2</b> | <b>Occupational Health and Safety (OHS) requirements</b> |
|----------------------------|--|

## 2. Occupational Health and Safety (OHS) requirements

An occupational hazard is a hazard experienced in the workplace. Occupational hazards can encompass many types of hazards, including chemical hazards, biological hazards (biohazards), psychosocial hazards, and physical hazards

Occupational Safety and Health Administration (OSHA), which sets and enforces protective workplace safety and health standards. ... Receive information and training about hazards, methods to prevent harm, and the OSHA standards that apply to their work

The major health hazards lapidaries face are dust (inhalation, ingestion, and contact with the eyes) and dermatitis due to improper skin protection.

Dermatitis is a group of skin conditions that may often be contracted by exposure to chemicals and metals

Proper ventilation is necessary for any lapidary or jeweler's workshop.

Between dust and odorous chemicals, there's good reason to invest in a ventilation system. You may want to hire an HVAC expert to assess your particular needs.

Always ensure that your ventilation intake brings in clean air, not affected by car exhaust, chimney smoke, or another pollutant source. Take care of the system and replace the filters frequently to avoid clogging.

|               |   |  |            |
|---------------|---|--|------------|
| Page 12 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|               |   |  | April 2021 |

Dusts and mists produced from lapidary work should be sucked away as close to the source as possible. The closer, the better to avoid breathing in particles. An even more effective precaution, a glovebox will enclose entirely any dust and mists produced. It's better to have an enclosed system to contain the dust and mist than to try and fully enclose yourself.

Even with proper ventilation, wear a dust mask so that the particles that inevitably escape don't settle in your mouth or lungs. Tight-fitting safety glasses or goggles will protect your eyes from dust irritation.

Use Apron that has resistance to permeation and penetration of many chemicals, or PE coated Tyvek for additional liquid and chemical splash protection. Aprons have halter neck with waist ties. Sleeves are elasticated at both ends.

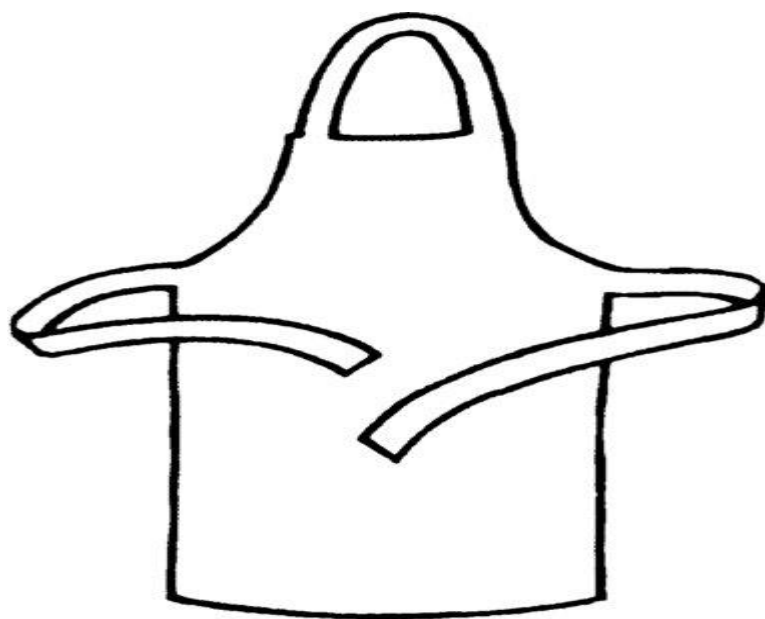


Fig Apron



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|---------------|---|--|------------|
| Page 14 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|               |   |  | April 2021 |

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| <b>Self-Check -</b> | <b>Written Test</b> |
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**Directions 2:** short answer Items

**Instruction 2** Write the correct word or phrase in the space provided?

1. Explain the importance of occupational health safety (10 points)

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2. Elaborate the uses of Apron and goggles? 10 pts

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**Note:** Satisfactory rating 5 points and above  
points

**Unsatisfactory - below 5**

You can ask your teacher for the copy of the correct answers.

Name of the student .....

Score-----

Rate-----

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|--------------------------------|-----------------------------------|
| <b>Information<br/>Sheet-3</b> | <b>Select Tools and equipment</b> |
|--------------------------------|-----------------------------------|

### 3.1 The right tool for the right job:

This adage (proverb) is as old as “the right man for the right job,” so you are probably familiar with it. Clearly, if you choose the wrong hammer, it won’t be the end of the world. But for specific jobs, the wrong equipment could mean the end of your business.

Picking the wrong size or the wrong weight could cause you irreversible problems at work. Usually, you will want a piece of equipment that is powerful, but light in weight as much as possible. This is easier said than done. So, you really want to understand the equipment to make a good purchase.

Going again back to safety precautions, many injuries are caused because a person uses the wrong equipment for the job. If unsuitable equipment is used, then you are setting yourself up for an accident to happen.

Even the gear that workers wear is considered part of the equipment. The wrong pair of gloves can cause burns, for example. Hearing loss could occur with loud machinery, because you or others were not wearing adequate hearing protection. The list can go on regarding what could go wrong when you don’t have the right equipment. Almost any tool has the potential to cause an injury to yourself or someone else if it is the wrong tool to use, or if it is used incorrectly.

### 3.2 Importance of right tools at work

|               |   |  |            |
|---------------|---|--|------------|
| Page 16 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|               |   |  | April 2021 |



Having the right tools at work should be a standard nowadays, but there are a lot of companies and workplaces that fail to do so. To bring awareness to the importance of tools and work equipment, we've decided to highlight the immediate benefits of the employer providing workers with everything they need. The following are some of the uses of selecting of right tools at work

### **The issue of safety**

At mining sites or lapidary shop, work maynot commence if all the right tools aren't at the worker's disposal. Without tools, it's impossible to get everything done, but there are also cases of employers providing their employees with faulty tools. This creates a significant safety hazard that can jeopardize not just the project, but the lives of innocent workers.

In every workplace, outdoor or otherwise, the employer mustn't allow any equipment or tools to endanger the safety of employees. If he or she displays negligence and causes injury, there could be grave consequences in court.

### **Making the job easier**

A serious employer wants to make his workers as comfortable as possible. When people are happy, they have more energy to invest in work-related matters.

Not just this - there is a profound emotional effect when an employee wants to make the work experience more pleasant. People are much more likely to sacrifice their time and effort for an employer who cares for them.

If you're choosing your next workplace, you should inspect the premises and talk to other workers. An employer that only has expectations, but is cheap in terms of providing the right tools is an employer you should steer clear of.

### **Future prospects**

|               |   |  |                          |
|---------------|---|--|--------------------------|
| Page 17 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1<br>April 2021 |
|---------------|---|--|--------------------------|

For fresh college graduates, observing the state of tools at a potential workplace is even more important. Your first experience will forever shape your career and will have profound effects on your later attitude. Getting your first job is a big deal, so you should demand the best possible tools.

If you're on an office tour, check if the employers in the cubicles have the best chairs, the right Plantronics headphone and all the software too. Don't hesitate to speak to any current or former employees at the company - if the employer has nothing to hide, they shouldn't mind.

### **Better training options**

One of the most important purposes of tools in any workplace is employee training. The quality of a company is not measured by their revenue or other statistics.

That's just a bunch of numbers for the CEO to brag about. The real sign that a company is serious is the quality of its employee training system. If they have the right tools, your integration into the collective should be relatively easy.

This all depends on the HR department, as well as the top management. If they're willing to go the extra mile and provide the best tools for training, you should consider them as your permanent workplace.

### **Creating a productive culture**

A company that truly cares about its employees (and its success) invests deeply in the culture. Like we've said - the right tools make the workers happy and they ease the transition from newbie to the member of the collective. All of this contributes to the creation of a productive culture that can be seen from both the inside and the outside.

Everyone is looking to join a collective that's directed towards improvement. With the right tools at work, you will be free to focus on that improvement and grow together with

|               |   |  |                          |
|---------------|---|--|--------------------------|
| Page 18 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1<br>April 2021 |
|---------------|---|--|--------------------------|

the company. Employers who are unwilling to provide tools for their team members are like captains on a sinking ship - you should avoid them at all costs.

### 3.3 SAW MACHINERY

Slab saw machinery is used to slab/ make slices of stone depending of the size we guide. The sizes of slab saw is 4,6,8,10,12,14,18,24 and 36 inches

For the detail refer module 13 information sheet 3 on page 22 of level I

|               |   |  |            |
|---------------|---|--|------------|
| Page 19 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|               |   |  | April 2021 |

|                      |                     |
|----------------------|---------------------|
| <b>Self-Check -3</b> | <b>Written Test</b> |
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**Directions 2:** short answer Items

**Instruction 2** Write the correct word or phrase in the space provided?

1. What is the function of slab saw and trim saw? (10 points)

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**Note:** Satisfactory rating 5 points and above  
points

**Unsatisfactory - below 5**

You can ask you teacher for the copy of the correct answers.

Name of the student .....

Score-----

Rating-----

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|--------------------------|----------------------------------|
| <b>Operation Sheet 1</b> | <b>Prepare slab saw for work</b> |
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## Select Tools and equipment

Step 1- wear PPE.

Steps 2- check the machines are settled in an appropriate position.

Step 4- check the availability of coolant and lubricants.

Step 5- check the availability of power

Step 6- then turn on the machine and check it

## LAP Test

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions:- Prepare slab saw for work using the above steps? (10 pts)**

### Task 1- Prepare slab saw for work

|                      |                              |
|----------------------|------------------------------|
| Information sheet -4 | Acquiring rough gem Material |
|----------------------|------------------------------|

#### 4. Acquiring rough gem Material

**Gem** is a ***natural mineral or organic*** substance that has substantial **beauty, rarity** and **durability**. Acquiring rough gem material means collecting or obtaining a rough gem to be slabed for different ornamental values .



Fig A. Rought Aagate



B. Rought Jasper

After selecting and arranging slab and trim saw, acquiring rough gem stone is the next step. When you acquire rough gem for slab consider the size of your project and select the size of the gem material. Clean the rough before clamp on the machine to increase the durability of colants and livelihood of the blade. You may acquire the gem materials from the shop or store and any available sources .

|               |   |  |                          |
|---------------|---|--|--------------------------|
| Page 24 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1<br>April 2021 |
|---------------|---|--|--------------------------|



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| <b>Self-Check -4</b> | <b>Written Test</b> |
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**Directions 1:** short answer Items

**Instruction1:** Write the correct word or phrase in the space provided?

1. What is your determinant factor to obtain a rough gem to slab?  
(4points)\_\_\_\_\_

\_\_\_\_\_

2. From where you may obtain rough gem stone? 2pts

\_\_\_\_\_

3. Why you clean the acquired gem clean? 2 pts

\_\_\_\_\_

**Note: Satisfactory rating 7 points and above**

**Unsatisfactory - below 7points**

You can ask you teacher for the copy of the correct answers.

Name of the student .....

Score-----

|                              |   |
|------------------------------|---|
| <b>Information sheet - 5</b> | <b>Cleaning equipment and work area</b> |
|------------------------------|---|

## 5. Cleaning equipment and work area.

It includes keeping work areas neat and orderly, maintaining halls and floors free of slip and trip hazards, and removing of waste materials (e.g., paper, cardboard) and other fire hazards from work areas such as spread and drops of coolants , any obstacles that may interapt the action, etc

Importance of Cleanliness:- Cleanliness is most important for physical well-being and a healthy environment.. It is essential for everyone to learn about cleanliness of work area and tools to protect the occurances of damages property and life..It is critical for safty.

The work environment can have a positive impact on the health and safety, productivity, and well-being of all employees. No matter the industry, maintaining workplace cleanliness will help keep staff safe, healthy, efficient, and happy.work area

Cleaning tools and equipments can be accomplished by dry or wash motheds according to the specifications of the machine and tools. Cleaning of work areas and equipments are aday to day activities.

When employees work in a messy environment, they may not notice hazards that can increase the risk of an accident. According to the Occupational Safety and Health Administration (OSHA), one of the "root causes" of workplace injuries, illnesses, and incidents is the failure to identify or recognize hazards that are present or that could have been anticipated. The 7 cleaning equipment necessities are:

|               |   |  |            |
|---------------|---|--|------------|
| Page 26 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|               |   |  | April 2021 |

1. **Matting systems:** A good interior and exterior matting system works 24/7 and can dramatically reduce how much moisture, salt, sand, and other types of debris enter the building, thus, decreasing slip and fall incidents.
2. **Trash containers:** One of the simplest ways to control odors and contain waste is with the correct size and style trash container. Oftentimes, trash containers and receptacles are incorrectly sized for the area or soil load. Too large, and the container or receptacle may not get changed as needed causing odors and bacteria to harbor. Too small, and the trash may over-fill prematurely. The wrong size liner will contribute to increased and unnecessary costs due to excessive plastic waste.
3. **Transportation:** Cleaning supplies and equipment must be “at the ready” when needed. Utility, tilt, cube, and janitor style carts are a great addition to help transport supplies and equipment from room to room and haul trash out of the building.
4. **Vacuums:** Essential for dust removal, a commercial vacuum with the proper filtration will remove and contain dust and dry soil from carpet, hard floors, walls, and ceilings.
5. **Mopping Systems:** Hard floors like tile and wood should be dust mopped, swept, or vacuumed daily to remove loose, dry soil that can abrade the floor surface and/or finish-seal. Wet cleaning using microfiber technology will remove the soil left behind and will enhance and maintain the surface.
6. **Automatic scrubbers(bursh):** Large areas may require daily or weekly deep cleaning to keep floors looking their best. Maintaining VCT and other hard floor surfaces with the proper equipment such as an automatic scrubber will help extend the life of the floor coating. These units are designed to scrub, clean, rinse, remove the soil, and dry the floor in one, easy step.

7. **High speed furnishers:** For floors treated with floor finish, a high speed burnished, using the correct pad and maintenance products, will keep the floors at an optimum gloss while helping to remove surface scratches, scuffs, swirls, and residues.

The work environment influences employee's productivity, performance, and well-being. Keeping your facility clean and safe is critical and choosing the correct cleaning equipment is important.

|               |   |  |                          |
|---------------|---|--|--------------------------|
| Page 28 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1<br>April 2021 |
|---------------|---|--|--------------------------|

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| <b>Self-Check -5</b> | <b>Written Test</b> |
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**Directions 2:** short answer Items

**Instruction 2** Write the correct word or phrase in the space provided?

1. Why do you clean work area and equipment? (10 points)

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2. List atleast 5 necessities of cleaning equipment

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**Note:** Satisfactory rating 5 points and above  
points

**Unsatisfactory - below 5**

You can ask you teacher for the copy of the correct answers.

Name of the student .....

Score-----

Rating-----

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|---------------|----------------------------------|
| <b>LG #12</b> | <b>LO #2 slab and trim stone</b> |
|---------------|----------------------------------|

## Instruction Sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- Checking parts of slab saw
- Slabbing and clean the slab
- documenting Slabbed material

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, you will be able to –

- Check parts of slab saw
- Slabbing and clean the slab
- document Slabbed material

## Learning Instructions:

- Read the specific objectives of this Learning Guide.
- Follow the instructions described below 3 to 4
- Read the information written in the information “Sheet 1, Sheet 2,
- Accomplish the “Self-check 1 and Self-check t 2 respectively.

|               |   |  |            |
|---------------|---|--|------------|
| Page 30 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|               |   |  | April 2021 |

|                            |                                   |
|----------------------------|-----------------------------------|
| <b>Information Sheet-1</b> | <b>Checking parts of slab saw</b> |
|----------------------------|-----------------------------------|

### 1. Check all parts of slab saw

All saws for stone need a liquid bath through which the blade must run. Considerable heat is generated by the impact of diamond particles against hard stone; this heat, as well as the stone dust produced by the abrasive action, must be carried off. Furthermore, friction is considerable, and the cooling liquid serves as a lubricant. The liquids used are popularly known as "coolants" and consist of either oil-kerosene mixes, water, or water to which has been added a quantity of soluble.

Open the coolant tank, just check to see whether the liquid reaches the "Full" line on the side of the coolant reservoir. It's part of the coolant recovery system. If the liquid doesn't reach the "Full" line, open and add the required amount of coolant.

Be sure whether the blade is well and the rotation is straight, the speed is normal depending on the hardness of the stone unless it damages the stone and slab saw.

Great care must be exercised in clamping stones of this shape to prevent slippage during cutting. The loading position and clamping condition also one of the major factors that determine the healthy slabbing process. So it is important to check the clamping of the stone correctly. Many blades are ruined by the shifting of a piece of rough in the clamp, causing binding of the blade, overheating, and sometimes bending or breaking of the rim. When clamping the rough, try to visualize what you want to get out of it.

|               |   |  |            |
|---------------|---|--|------------|
| Page 31 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|               |   |  | April 2021 |

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|--------------|--------------|
| Self-Check - | Written Test |
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**Directions 1:** short answer Items

**Instruction 1:-Write the correct answer for the following questions?**

2. Why great care must be exercised in clamping stones? (5points)

3. What is the importance of coolants? (5points)

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**Note:** Satisfactory rating 5 points and above  
points

Unsatisfactory - below 5

You can ask you teacher for the copy of the correct answers.

Name of the student .....

Score-----

Rating-----



|                            |                                    |
|----------------------------|------------------------------------|
| <b>Information Sheet-2</b> | <b>Slabbing and clean the slab</b> |
|----------------------------|------------------------------------|

## Slabbing and clean the slab

All that remains to do now is to start feeding the stone into the saw for the actual cutting operation. If your saw has a mechanical feed, run the carriage up so that the rough is just short of the blade, set the feed speed on low, lower the hood, and start the motor. It is always advisable to start the feed at the very slow rate because much rough is jagged and sharp, and jamming it quickly into the blade will result in severe damage

As the blade reaches the end of the cut, it is again important to avoid letting too much pressure drive the stone past the blade. Furthermore, when the slab finally breaks off, it has a nasty habit of leaving behind a sharp projection which can seriously gouge (scratch) or dish the blade. Consequently many experts stop the saw just short of completing the cut and break the slab off with their fingers. This is not quite so necessary when using a mechanical-feed saw as it is with a weight-feed saw, but it is a good idea in either case.

Finally, take out the slabbed stone and turn off the switch and immerse into the water with detergents to clean the slab. The importance of cleaning slabs is to create conducive conditions of outlining and to protect contaminations. Contamination definition, to make impure or unsuitable by contact or mixture with something unclean, bad, etc

|               |   |  |            |
|---------------|---|--|------------|
| Page 33 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|               |   |  | April 2021 |

At the end of the day the work area must be cleared and all the machines and equipment are set on the appropriate places. When you clear/ clean your shop follow the following steps

- Organize loose parts. ...
- Disinfect the classrooms. ... .
- Clean the break room. ...
- Empty waste baskets every day. ...
- Ensure the public area is presentable. ...
- Clear off desk spaces to keep clutter to a minimum for a clean company office

|                      |                     |
|----------------------|---------------------|
| <b>Self-Check -1</b> | <b>Written Test</b> |
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**Directions1:** short answer Items

**Instruction 1:** Write the correct answers for the following questions on the space provided

(4points)

1. What is the importance of clearing of work area?

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2. List the steps taken during cleaning the tools and work area. 5pts

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**Note: Satisfactory rating 8 points and above points**

**Unsatisfactory - below 8**

You can ask you teacher for the copy of the correct answers.

Name of the student .....

Score-----

Rating-----

|                          |                           |
|--------------------------|---------------------------|
| <b>Operation Sheet 1</b> | <b>slab gem materials</b> |
|--------------------------|---------------------------|

### **Procedures of operating the slab saw**

Step 1- wear PPE.

Step 2- check the slab saw is settled in an appropriate position or not.

Step 3- check the availability of coolant and lubricants.

Step 4- close the splash hood

Step 5- turn on the switch

Step 6- check the rotation of blade

Step 7 - turn off the switch

Step 8- take out the slab

Step 9- clean the slab

|                   |                          |
|-------------------|--------------------------|
| <b>LAP Test 1</b> | <b>Slab Gem materiag</b> |
|-------------------|--------------------------|

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions: Operate the slab saw using the following steps? (10 pts)**

**Task1:-** operate slab saw parts

**Task 2** Slab gem material

**Task3** Clean the slab

|                            |                                  |
|----------------------------|----------------------------------|
| <b>Information Sheet-2</b> | <b>document Slabbed material</b> |
|----------------------------|----------------------------------|

### Importance of Quality Documentation

- It helps sells a product
- It can save lives
- Reduces user frustration
- Can avoid liability
- Reduces cost (for organization)
- Reduces time (for users and the organization)

1. **Helps Sell a Product** You must have used instructions of some kind to figure out how to use a product. Even toys and games; puzzle, word games, building blocks, video games, etc., come along with instructions about using it. You must have read the instructions to start a new gadget in the kitchen (mixer grinder, microwave, washing machine, blender, and so on). If you do not understand an instruction, you get the feeling that the product is not good. In fact, you feel cheated. This is where good writing helps. It helps you use a product easily and effectively. Hence it is true to say that usable documentation plays an important role in the success of any product.
2. **Reduces User Frustration** Users get frustrated when they find vague or wrong instructions which do not help them perform a task, especially when they are in a hurry. It not only increases their learning curve and the time taken to perform the tasks but their level of frustration as well. Poor quality documentation may result in user confusion and frustration.

A good quality document means greater confidence and less frustration for the users, fewer calls to the support staff, and probably a good market for the product. So, a product is always complemented by good documentation.

3. **Can Save Lives** Complete, accurate, and easy to use documentation can also save lives? There are instances where errors in the documentation have been the direct cause of accidents. Example: *Don Phillips published an article in the Washington Post describing the causes of a plane crash in South America killing 160 people on-board. The manual containing the radio codes were so poorly*

|               |   |  |                          |
|---------------|---|--|--------------------------|
| Page 38 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1<br>April 2021 |
|---------------|---|--|--------------------------|

*designed and written that the pilot lost critical seconds while trying to find the correct code.* An accident investigation of an airline crash in Puerto Rico showed that a bolt was incorrectly installed in an engine due to bad documentation.

4. **Reduces Cost and Time** Many organizations view documentation as an added cost. If the document is not written to an acceptable level of quality and usability, it will do the following:
  - Confuse the users.
  - Require a lot of rewriting at a later stage. This is a waste of time and resource for the organization.
  - Will also affect the translation process and cost.
  - Increase the time spent by the users in trying to understand the product.
  - Compared to the cost and time taken for developing a product, good documentation is not an extravagance. Quality documentation reduces support costs for the organization.

#### 5. **Avoid Liability**

Documentation errors can lead to liability. Errors or incomplete information in the manual can create false expectations about the way the product work. Such errors make it easier for users to win a suit for fraud or unfair trade practices. Hence the document has to clearly state what the product can do and more importantly, what it can't. There should be no room/scope for assumptions and confusion:

Slabbed stones are documented as a property. Slabbed stones can be documented on their type, name, and color, size to identify easily and keep them from any danger. It is also important to write shelf number where it is found. In general record all the necessary information about the stone.

|              |              |
|--------------|--------------|
| Self-Check - | Written Test |
|--------------|--------------|

**Directions 1:** short answer Items

**Instruction 1:-Write the correct answer for the following questions?**

1. What is the importance of recording and documenting slab stone information? (5points)

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**Note:** Satisfactory rating 5points and above

Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers.

Name of the student .....

Score-----

Rating-----



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|---------------|-----------------------------------|
| <b>LG #13</b> | <b>LO #3 Cleaning up Saw Area</b> |
|---------------|-----------------------------------|

## Instruction Sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:-

- clearing Work area
- recycling or disposing off waste

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to –

- clear Work area
- recycle or dispose of waste

## Learning Instructions:

- Read the specific objectives of this Learning Guide.
- Follow the instructions described below 3 to 4.
- Read the information written in the information “Sheet 1, Sheet 2, Sheet 3 and Sheet 4”.
- Accomplish the “Self-check 1, Self-check t 2, Self-check 3 and Self-check 4” in page -6, 9, 12 and 14 respectively.

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|---------------|---|--|------------|
| Page 41 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|               |   |  | April 2021 |

|                            |                           |
|----------------------------|---------------------------|
| <b>Information Sheet-1</b> | <b>Clearing Work area</b> |
|----------------------------|---------------------------|

## 1. Clean Work area

At the end of the day the work area must be cleared and all the machines and equipment are set on the appropriate places. When you clear/ clean your shop follow the following steps

- Organize loose parts. ...
- Disinfect the classrooms. ...
- Protect your electronics by keeping them clean and dust free. ...
- Clean the break room. ...
- Empty waste baskets every day. ...
- Ensure the public area is presentable. ...
- Clear off desk spaces to keep clutter to a minimum for a clean company office

**For detail refefe Lapl Information sheet 1, LG 13 on page 66**

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|---------------|---|--|------------|
| Page 42 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|               |   |  | April 2021 |

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| <b>Self-Check -1</b> | <b>Written Test</b> |
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**Directions1:** short answer Items

**Instruction 1:** Write the correct answers for the following questions on the space provided

(4points)

1. What is the importance of clearing of work area?

**Note: Satisfactory rating 2 points and above  
below 2 points**

**Unsatisfactory -**

You can ask you teacher for the copy of the correct answers

Name of the student

..... Score-----

Rating-----

|                     |                                  |
|---------------------|----------------------------------|
| Information Sheet-2 | Recycling or disposing off waste |
|---------------------|----------------------------------|

## 2. Recycling or disposing off waste

Waste can be classified into liquid waste, solid rubbish, organic waste, recyclable rubbish and hazardous waste.

**Recycling** is the process of converting waste products into new products to prevent energy usage and consumption of fresh raw materials. The recyclability of a material depends on its ability to reacquire the properties it had in its virgin or original state. It is an alternative to conventional waste disposal that can save material and help lower greenhouse gas emissions. Recycling can prevent the waste of potentially useful materials and reduce the consumption of fresh raw materials, thereby reducing: energy usage, air pollution , and water pollution .

**A disposable (also called disposable product) is a product designed for a single use after which it is recycled or is disposed as solid waste. ... The word "disposables" is not to be confused with the word "consumables", which is widely used in the mechanical world.**

**Waste management:-** is collection, transportation, and disposal of garbage, sewage and other waste products. Waste management is the process of treating

|               |   |  |                          |
|---------------|---|--|--------------------------|
| Page 44 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1<br>April 2021 |
|---------------|---|--|--------------------------|

solid wastes and offers variety of solutions for recycling items that don't belong to trash. It is about how garbage can be used as a valuable resource.

**Lapidary wastes:-** are dangerous because of their flammable and toxic nature. You have to filter or distillate the coolants and ready it for further uses. Then the residual and chips of the gemstones must burn or buried in to the ground based the rules and regulations of environmental protections.

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|---------------|---|--|--------------------------|
| Page 45 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1<br>April 2021 |
|---------------|---|--|--------------------------|

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| <b>Self-Check -1</b> | <b>Written Test</b> |
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**Directions 1:** short answer Items

**Instruction 1:** Write the correct answers for the following questions on the space provided

1. what is the difference between waste disposal and waste recycling ?(6points)

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**Note:** Satisfactory rating 5 points and above      Unsatisfactory - below 5 points

You can ask you teacher for the copy of the correct answers.

Name of the student .....

Score-----

Rating-----

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|---------------|--------------------------------------|
| <b>LG #14</b> | <b>LO #4 Prepare Lapping Machine</b> |
|---------------|--------------------------------------|

## Instruction Sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- Preparing lapping machine and laps.
- Acquiring Grits and polishing compounds
- Charging laps are with appropriate grit based on the smoothness of the saw cut.

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, you will be able to –

- Prepare lapping machine and laps.
- Acquire Grits and polishing compounds
- Charge laps are with appropriate grit based on the smoothness of the saw cut.

## Learning Instructions:

- Read the specific objectives of this Learning Guide.
- Follow the instructions described below 3 to 4.
- Read the information written in the information “Sheet 1, Sheet 2”.
- Accomplish the “Self-check 1, Self-check t 2, in **page 3 and 4** respectively.

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|---------------|---|--|------------|
| Page 47 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|               |   |  | April 2021 |

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|----------------------|-----------------------------------|
| Information sheet -1 | Prepare lapping machine and laps. |
|----------------------|-----------------------------------|

## 1. Prepare lapping machine and laps.

There are rotary and vibratory laps. The process of lapping is extremely simple and consists merely of rubbing a stone on a flat plate charged with loose abrasive grain; however, in lapidary work it is the plate that moves and not the stone. In this photograph can be seen the steel shaft supporting the lap plate, the thrust bearing at the bottom, and the bearing near the top of the shaft. The lap plate comes off so that the splash pan can be removed periodically and cleaned out. Lapping plates may be made of almost any metal that is not too soft. Mild steel, cast iron, and brass are very commonly used, but steel and iron are preferred because they wear more slowly. Plates vary from 6" in diameter to as large as 24" or more, depending on the size of the specimens to be lapped.

The lower shaft, which is shown bare, is meant to be fitted with a pulley of about 6" to 10" in diameter to reduce the rpm of the plate so that grit will not be slung off wastefully. If a 2" pulley is used on a 1725 rpm motor, a 6" pulley on the drive shaft will give a plate rpm of 485, an 8" pulley 355 rpm, a 10" pulley 280 rpm. The 6" pulley should be used with an 8" or 10" lap, whereas the 8" pulley matches nicely with a 12" lap, and the 10" pulley with a 14" lap. Although a faster moving lap plate will remove material more quickly, it is also very troublesome because the grit mixture has to be renewed constantly to keep the plate from running dry. All in all, slower speeds are better.

Although great accuracy is desirable in grinding machinery, the slow speed of lapping equipment presents an easier problem. It is excellent, of course, to use accurate parts in making up lapping equipment but it is hardly necessary. The only real requirement is that

|               |   |  |                          |
|---------------|---|--|--------------------------|
| Page 48 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1<br>April 2021 |
|---------------|---|--|--------------------------|



the lapping plate be perfectly flat. How it can be kept flat in use is a matter of technique and will be described shortly.

Ordinary laps not exceeding 16" in diameter can be driven satisfactorily with  $\frac{1}{4}$  -hp motors. In smaller laps, even a  $\frac{1}{6}$  - hp motor may be used successfully.



Fig. A.Rotarylap



B.RotaryLap

|                      |                     |
|----------------------|---------------------|
| <b>Self-Check -1</b> | <b>Written Test</b> |
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**Directions 1:** short answer Items

**Instruction 1:** Write the correct word or phrase in the space provided?

1. What is the function of rotary lap? (4 points)

What is the difference between rotary and vibratory laps? 4 pts

**Note: Satisfactory rating 6 points and above  
points**

**Unsatisfactory - below 6**

You can ask you teacher for the copy of the correct answers.

Name of the student .....

Score-----

Rating-----

|                            |  |
|----------------------------|--|
| <b>Information sheet 2</b> | <b>Acquire Grits and polishing compounds</b> |
|----------------------------|--|

## 2. Acquire Grits and polishing compounds

### 2.1 Grits used in Lapping

Ordinarily silicon carbide grit, purchasable in pound lots, is the favorite abrasive for lapping. Where very large surfaces are to be lapped the grit may be as coarse as 50 or 60 in order to speed up the initial flattening of the surface. Surfaces of about 8" or so in diameter may be quickly lapped at the beginning with 100 or 120 grit, but most amateurs seldom tackle anything that large, and therefore find 220 grit coarse enough for almost any lapping job. If you have a lap plate of 14" or less, plan accordingly on stocking a pound or two of 220 silicon carbide grit for the first grind. The next grind will use 400 grit, and the very last will use 1200, a very fine whitish powder used to impart a very high gloss just prior to polishing. One pound of 1200 will last a long time since extremely little is used; in fact, if it is used too thickly on the lap plate it will not cut properly.

Both 400 and 220 are used in about the same proportions and should be bought accordingly. The cost of grit rises with a decrease in size, the 1200 costing considerably more per pound than the 220 grit. Many amateurs make a practice of saving the grit sediment from the bottom of their grinding wheel splash pans for first lapping. Since this residue is mainly grit torn off the grinding wheels, there is little reason not to use it for this purpose. It is not as accurately sieved as new grit, but since the surface left by its use is going to be smoothed out by later operations, it makes little difference how irregular it is.

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|---------------|---|--|------------|
| Page 51 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|               |   |  | April 2021 |



## LG #15

## LO #5 Rough Grind the Slabbed Stone

### Instruction Sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- **Adjusting machine ,**
- **grinding rough and finish**

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to –

- **Adjust machine and grind rough and finish**

### Learning Instructions:

- Read the specific objectives of this Learning Guide.
- Follow the instructions described below 3 to 4.
- Read the information written in the information “Sheet 1,page 1
- Accomplish the “Self-check 1 **page 2 and 3.**

|                            |  |
|----------------------------|--|
| <b>Information sheet 1</b> | <b>Adjusting machine , grinding rough and finish</b> |
|----------------------------|--|

## 1. Adjusting machine , grinding rough and finish

**Lapping** can be used to obtain a specific surface roughness; it is also used to obtain very accurate surfaces, usually very flat surfaces. Surface roughness and surface flatness are two quite different concepts.

**Lap machines** especially vibratory type (for this learning guide) is placed on flat and cemented floor or surface. Add appropriate grit and water, loading lapping machine with 60/80, check viscosity of the grit/water ,check viscosity of the grit/water to the appropriate amount of lap, load slabbed stone(s) on to the laps, weigh Stone specially by lead weight, (ring) guard is put on around the individual stone(s) or roll the stone with any plastic, turn on machine and check the vibration or movement of the lap , check Slab time if it is grinded appropriately or not. Remove slab(s) when the required amount of the grind and time applied. Finally clean slab(s) from grits by using different detergents and dirt then after proceed to the next step.

|                      |                     |
|----------------------|---------------------|
| <b>Self-Check -1</b> | <b>Written Test</b> |
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**Directions 1:** short answer Items

**Instruction 1:** write the correct word or phrase in the space provided?

1. What is the advantage of lap? (4 points)

|               |   |  |            |
|---------------|---|--|------------|
| Page 54 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|               |   |  | April 2021 |



**Note: Satisfactory rating 2 points and above points**

**Unsatisfactory - below 2**

You can ask you teacher for the copy of the correct answers.

Name of the student .....

Score-----

Rating-----

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| Page 55 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|               |   |  | April 2021 |

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|---------------|---|
| <b>LG #16</b> | <b>LO #6 Smooth grind Slabbed Stone</b> |
|---------------|---|

### Instruction Sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- Smooth grind Slabbed Stone

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, you will be able to –

- Smooth grind Slabbed Stone

### Learning Instructions:

- Read the specific objectives of this Learning Guide.
- Follow the instructions described below 3 to 4.
- Read the information written in the information “Sheet 1
- Accomplish the “Self-check 1, Self-check t 2, in **page 3**.

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|---------------|---|--|------------|
| Page 56 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|               |   |  | April 2021 |



|                            |                            |
|----------------------------|----------------------------|
| <b>Information sheet 1</b> | Smooth grind Slabbed Stone |
|----------------------------|----------------------------|

## 1. Smooth grind Slabbed Stone

After you finished the rough grinding you are expected to proceed the next step that is smoothing the slabbed stone .follow the following steps:-

- Determine the appropriate amount of grit and water. If the there is over load grit ,the slabbed stone become under specification/required amount and if there the grit is less ,the grinding process takes more time to accomplish it.Do not use excess amount of water because it wash out the grit. If the amount of water become less, the stone sparks fire and this may cause damage on the machine .
- load Slabbed stone(s)
- weigh Stone by lead weight or other flat surface objects.Lead wieght is a heavy manufacturing object. It is important to protect the flying of the slab/stone from the lap.
- put guard (ring) is on around the individual stone(s) to protect the the clashes/smashes between th eslabs
- Turn on Machine.
- Check Slab time
- Remove slab(s)
- Clean slab(s) by water and detergents from grits and dirt.

|                      |                     |
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| <b>Self-Check -1</b> | <b>Written Test</b> |
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**Directions 1:** short answer Items

**Instruction 1:** write the correct word or phrase in the space provided?

1. Explain how to smooth the stone on the lap? (8 points)
2. Why put the guard is important during lapping? 2pts

**Note: Satisfactory rating 4 points and above    Unsatisfactory - below 4    points**

You can ask you teacher for the copy of the correct answers.

Name of the student .....Score-----

Rating-----

|                          |                            |
|--------------------------|----------------------------|
| <b>Operation Sheet 1</b> | Smooth grind Slabbed Stone |
|--------------------------|----------------------------|

### Procedures of rough grinding of the stone on the lap

Step 1- wear PPE.

Step 2- check the lap is settled in an appropriate position or not.

Step 3- determine the amount of water and grit.

Step 4- turn on the switch

Step 5- check the rotation of lap

Step 6- Check the level of smoothness

Step 7 - turn off the switch

Step 8- Remove the slab

Step 9- clean the stone

Step 10- drying ,weighing and. or measuring the pieces

|                   |                            |
|-------------------|----------------------------|
| <b>LAP Test 1</b> | Smooth grind Slabbed Stone |
|-------------------|----------------------------|

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions: Operate the lap using the following steps? (10 pts)**

**Procedures of operating the slab saw**

Task1- Smooth grind Slabbed Stone

|               |  |
|---------------|--|
| <b>LG #17</b> | <b>LO #7 Polish and clean slab Stone</b> |
|---------------|--|

## Instruction Sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- Polishing Smooth grind lapped stone and clean up the polished pieces

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to –

- Polish Smooth grind lapped stone and clean up the polished pieces

### Learning Instructions:

- Read the specific objectives of this Learning Guide.
- Follow the instructions described below 3 to 4.
- Read the information written in the information “Sheet 1, Sheet 2”.
- Accomplish the “Self-check 1, Self-check t 2, in **page 3**.”

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|---------------|---|--|------------|
| Page 61 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|               |   |  | April 2021 |

|                     |   |
|---------------------|---|
| Information sheet 1 | Polishing Smooth grind lapped stonend clean it. |
|---------------------|---|

## 1. Polishing Smooth grind lapped stone.

These are the steps of polishing the stones using a lap

- Polishing pad is put on the flat lap. A **polishing pad** is a tool that can be used to apply **polish** to a surface and process it in a mechanical way. Although these are most commonly used in combination with a machine polisher, there are also **polishing pads** to be used by hand.



- Change the pad. Charging polishing pad mean Charge with polishing media such as cerium oxide, tin oxide or diamond compound for an exceptional polish on your gemstones, metals and glass. Also known as buffing pads. For more iformation visit this web adess

<https://www.youtube.com/watch?v=gGczSrJup2c>

- Load the machine with smooth slabbed stones.
- Ring guards are put on around the slabs
- Starting Machine.

- Checking Slab time
- The polished slabs are removed when done
- drying ,weighing and. or measuring the pieces

|                      |                     |
|----------------------|---------------------|
| <b>Self-Check -1</b> | <b>Written Test</b> |
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**Directions 1:** short answer Items

**Instruction 1:** write the correct word or phrase in the space provided?

1. Explain the use of polishing pad? (4 points)

**Note: Satisfactory rating 2 points and above points**

**Unsatisfactory - below 2**

You can ask you teacher for the copy of the correct answers.

Name of the student .....

Score-----

Rating-----



|                          |   |
|--------------------------|---|
| <b>Operation Sheet 1</b> | <b>Polishing Smooth grind lapped ston and clean it.</b> |
|--------------------------|---|

### **Procedures of rough grinding of the stone on the lap**

Step 1- wear PPE.

Step 2- check the lap is settled in an appropriate position or not.

Step 3- put polishing pad on the lap

Step 4- turn on the machine

Step 5- change the pad

Step 6 - turn off the switch

Step 7-Remove the slab

Step 8- clean and dry

|                   |                             |
|-------------------|-----------------------------|
| <b>LAP Test 1</b> | <b>Operate the slab saw</b> |
|-------------------|-----------------------------|

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Time started: \_\_\_\_\_ Time finished: \_\_\_\_\_

**Instructions: Operate the lap using the following steps? (10 pts)**

**Procedures of operating the slab saw**

**TASK: - Operate the slab saw**

### Reference

- <https://www.google.com/search?q=+cabochon+making+&ie=utf-8>
- <https://www.montsurfaces.com/blog/precious-stone-slabs>
- <https://www.youtube.com/watch?v=gGczSrJup2c>

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| Page 66 of 66 | Federal TVET Agency<br>Author/Copyright | TVET program title- Lapidary -Level-II | Version -1 |
|               |   |  | April 2021 |