Skills for Employment Investment Program (SEIP)

COMPETENCY-BASED LEARNING MATERIAL

(STUDENT GUIDE)

FOR

PAINTING

(CONSTRUCTION SECTOR)

Finance Division, Ministry of Finance
Government of the People's Republic of Bangladesh

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How to Use this Competency-based Learning Material

Welcome to the competency-based learning material for Painting for use in construction works. These modules contain training materials and learning activities for you to complete in order to become competent and qualified as a skilled worker.

There are eight (8) modules that make up this course which comprises the skills, knowledge and attitudes required to become a skilled worker including:

1. Perform distempering
2. Perform plastic emulsion painting
3. Perform synthetic enamel painting
4. Perform weather coat painting
5. Perform concrete painting
6. Perform spray painting
7. Perform varnishing
8. Perform estimate for painting works

As a learner, you will be required to complete a series of activities in order to achieve each learning outcome of the module. These activities may be completed as part of structured classroom activities or simulated workplace demonstrations.

These activities will also require you to complete associated learning and practice activities in order to gain the skills and knowledge needed to achieve the learning outcomes. You should refer to **Learning Activity** pages of each module to know the sequence of learning tasks and the appropriate resources to use for each task.

This page will serve as the road map towards the achievement of competence. If you read the **Information Sheets,** these will give you an understanding of the work, and why things are done the way they are. Once you have finished reading the Information Sheets, you will then be required to complete the **Self-Check Quizzes**.

The self-check quizzes follow the Information Sheets in this learning guide. Completing the self-check quizzes will help you know how you are progressing. To check your knowledge after completion of the Self-Check Quizzes, you can review the **Answer Key** at the end of each module.

You are required to complete all activities as directed in the **Learning Activity and Information Sheet**. This is where you will apply your newly acquired knowledge while developing new skills. When working, high emphasis should be laid on safety requirements. You will be encouraged to raise relevant queries or ask the facilitator for assistance as required.

When you have completed all the tasks required in this learning guide, formal assessment will be scheduled to officially evaluate if you have achieved competency of the specified learning outcomes and are ready for the next task.

List of Icons

Icon Name	Icon
Module content	
Learning outcomes	
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Module 1: Perform distempering

MODULE CONTENT

Module Descriptor: This module covers the skills, knowledge and attitudes to perform distempering for painting in construction which includes checking tools, equipment and materials, preparing surface, applying base materials, performing distempering, and cleaning tools, equipment and the workplace. It also includes information sheets, job sheets, self-check quizzes and answer keys.

Nominal Duration: 38 hours

Learning Outcomes:

Upon completion of the module, the student/trainee will be able to:

1.1 Check tools, equipment and materials
1.2 Prepare surface
1.3 Apply base materials
1.4 Perform distempering
1.5 Clean tools, equipment and workplace

Performance Criteria:

1. Tools and equipment are selected, collected and checked for usability
2. Materials are selected, collected and checked in accordance with workplace requirement
3. Personal protective equipment (PPE) is selected and used as per requirements
4. Surface is brushed thoroughly and scales, grease, dirt are removed as per standard procedure
5. Holes in plaster are filled in with plaster of Paris mixed with colour
6. Surface is rubbed down with fine grade sand paper to make it smooth
7. Patched is applied before applying regular coat of distemper
8. Appropriate ratio of base materials is maintained
9. Horizontal or vertical coating of base materials is applied from top to bottom or vice-versa
10. Base materials are prepared and applied as per requirement
11. Distemper materials are mixed with water as per requirement
12. Horizontal or vertical coating of distemper is applied from top to bottom or vice-versa
13. Second coating is then applied after the previous coating or surface is dried off properly
14. Final coating is applied up to get well finishing
15. Quality of distemper is checked and rectified (as required)
16. Tools and equipment are cleaned
17. Workplace is cleaned
18. Waste materials are disposed of

Learning Outcome 1.1 - Check Tools, Equipment and Materials

Contents:

- Collect and check personal protective equipment (PPE), tools and equipment
- Prepare personal protective equipment (PPE), tools and equipment
- Collect and check materials

Assessment criteria:

1. Tools and equipment are selected and collected.
2. Tools and equipment are checked for usability.
3. Materials are selected and collected.
4. Materials are checked in accordance with job requirements.

Resources required:

Students/trainees must be provided with the following resources:

- **Tools and equipment:** paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, sand paper (fine), pumice stone
- **Materials:** chalk powder, water, gum, sealer, distemper

Learning Activity 1.1.1

Learning Activity	Resources/Special Instructions/References
Checking tools, equipment and materials	▪ Information Sheet: 1.1.1 ▪ Self-Check Quiz: 1.1.1 ▪ Answer Key: 1.1.1 ▪ https://en.wikipedia.org/wiki/Paintbrush

Information Sheet 1.1.1

Learning Objective: to identify, collect and check usability of tools and equipment used for distempering works.

Tools and equipment:

To perform distempering in painting works, it requires use of the following tools and equipment:

- **Paint brushes:** are most common and main hand tools used by a painter for applying paint on a surface.

- **Scraper:** is a hand tool with metal or plastic blade and a small handle, used for scraping especially for removing dirt, old paint or other unwanted materials from a surface.

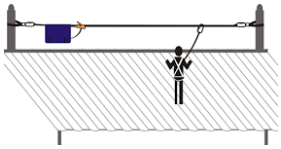
- **Spatula:** is a similar tool like scraper used for scraping to remove dirt and old paint from the surface.

- **Mixing stick:** is a hand tool used for stirring or mixing of all ingredients of paint. Wooden sticks are commonly used to mix paints and other general coatings.

- **Rags:** is a piece of old cloth, especially one torn from a larger piece, used for cleaning things.

- **Putty Knife:** is used as a tool to work putty around the edges of each pane of glass.

- **Lifeline and anchorage:** are used for safety requirement while painting works done at overhead in various location.



- **Roller brush:** is used for painting on large flat surfaces rapidly and efficiently.

- **Steel wire brush:** is used in metal works for cleaning rust and removing paint from surfaces.

- **Sand paper:** is used for rubbing surfaces to make smooth before applying paint. The sand paper may be classified as fine, medium and coarse.

- **Pumice stone:** is used for rubbing things to make them smooth.

Individual Activity:

- *Identify the tools and equipment used in painting works*
- *Check the usability/function ability of the tools and equipment*

Self-Check Quiz 1.1.1

Check your understanding by answering the following questions.

1. What is a scraper?
2. What is a mixing stick?
3. How is a putty knife an advantage as a painting tool?
4. What are the uses of steel wire brushes in painting?

Learning Activity 1.1.2

Learning Activity	Resources/Special Instructions/References
Checking tools, equipment and materials	▪ Information Sheet: 1.1.2 ▪ Self-Check Quiz: 1.1.2 ▪ Answer Key: 1.1.2 ▪ https://en.wikipedia.org/wiki/Paintbrush

Information Sheet 1.1.2

Learning Objective: to identify, collect and check materials used for distempering in the workplace.

Materials:

To perform distempering in painting works requires the use of the following materials:

- **Chalk powder:** is a white powder, mix with water which remains suspended and ideal substance for cleaning and polishing surfaces.

- **Water:** In painting, only the tap water should be used to achieve best quality of works.

- **Gum:** is a viscous secretion of some trees and shrubs that hardens on drying but is soluble in water. This is used for gluing the paint on a surface.

- **Sealer:** is a substance used to block the passage of fluids through the surface or joints or openings in materials. Sealers are not adhesives, but some have adhesive qualities and are called adhesive-sealers.

- **Distemper:** is a water-based paint - a combination of powdered chalk, water and adhesive (glue or gum) and pigment for desired colour. The distemper paint is less durable. There are two types of distemper: oil-bound distemper and dry distemper. Both are used as interior paints for walls and ceilings.

Self-Check Quiz 1.1.2

Check your understanding by answering the following questions.

Read the statement carefully and state whether it is ‘True’ or ‘False’.

1. Chalk powder does not mix with water and remains suspended as a residue.
2. In painting, can be achieved best quality of works using any water other than the tap water.
3. Gum is a viscous secretion of some trees and shrubs that hardens on drying but is insoluble in water.
4. Some sealers have adhesive qualities and are called adhesive-sealers.
5. Distemper paint is less durable, that’s why it is does not used in exterior sides of building.

Learning Outcome 1.2 - Prepare Surface

Contents:

- Personal protective equipment (PPE): functions/uses
- Surface: preparation of plastered masonry and concrete surface
- Materials: sand paper, plaster of Paris

Assessment criteria:

1. Personal protective equipment (PPE) is selected and used.
2. Surface is brushed thoroughly to make it free from mortar droppings.
3. Scales, grease, dirt are removed from an old surface.
4. Holes in plaster are filled in with plaster of Paris mixed with colour.
5. Surface is rubbed down with fine grade sand paper to make it smooth.
6. Patched is applied before applying regular coat of distemper.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** scraper, spatula, rags, lifeline and anchorage, steel wire brush, sand paper (fine), pumice stone

Learning Activity 1.2.1

Learning Activity	Resources/Special Instructions/References
Prepare surface	▪ Information Sheet: 1.2.1 ▪ Self-Check Quiz: 1.2.1 ▪ Answer Key: 1.2.1 ▪ https://www.rustoleum.com/pages/industrial/resources/.../surface-preparation-guide/

Information Sheet 1.2.1

Learning Objective: to select and check usability of personal protective equipment used for surface preparation in the workplace.

- **Personal Protective Equipment (PPE):**

When undertaking painting works, the following PPE should be worn (for safety measures):

Safety helmet/hard hat: A hard hat is a type of helmet used in workplace environments to protect the head from injury due to falling objects.	
Goggles/safety glasses/eye protector: Goggles are forms of protective eyewear that usually enclose or protect the eye area.	
Dust mask: Dust mask is necessary for dust protection in workplace.	
Working cloth/apron: Apron has been designed to protect the body from injury in the workplace.	
Belt/body harness: A belt/body harness is designed to catch and secure a person in case of falling while working at height level.	
Hand gloves: These are used to protect the hands while working and safeguarding of hands.	
Safety shoes/footwear/boots: Safety shoes are used to protect the legs/feet from any harms or injuries.	

Individual Activity:

- *Identify and select appropriate personal protective equipment (PPE) for painting and check for usability*

Self-Check Quiz 1.2.1

Check your understanding by answering the following questions.

Fill in the blanks with the correct answer:

1. _____ is used to protect the head from injury due to falling objects.
2. _____ is used to protect eyes from flying particles which may cause injury to the worker.
3. _____ is necessary to protect the body from injury in the workplace.
4. _____ is used to catch and secure a person in case of falling while working at height level.
5. _____ is used to protect the hands when working.

Learning Activity 1.2.2

Learning Activity	Resources/Special Instructions/References
Prepare surface	▪ Information Sheet: 1.2.2 ▪ Self-Check Quiz: 1.2.2 ▪ Answer Key: 1.2.2 ▪ https://www.rustoleum.com/pages/industrial/resources/.../surface-preparation-guide/

Information Sheet 1.2.2

Learning Objective: to identify and prepare different types of surface for painting in the workplace.

- **Surface:** is to be thoroughly brushed to make free from mortar droppings, scales, grease and dirt, filled holes with plaster of Paris, rubbed down with sand paper to make smooth and application of patch before regular coat of distemper paint. There are two types of surfaces for distempering which are: plastered masonry surface and concrete surface.
- **Plastered masonry surface:** to be improved the appearance by providing an even, smooth, regular, clean and finished surface for distempering. The photo from left side is original plastered surface (before preparation), the next is under preparation and the last is finished surface (after preparation) which is ready for distempering.



- **Concrete surface:** this type of surface has also to be done even, smooth, regular, clean and finished for distempering. The photo, moving from left to right, is original concrete surface (before preparation), the next is under preparation and the last is finished surface (after preparation) which is ready for distempering.



- **Surface preparation:** to obtain even and smooth surface **c**racks, voids and openings should be properly treated. Surfaces to be treated must be clean and free of dust, dirt, oil, grease, efflorescence or any other substance that could prevent the penetration of the distemper. To prepare a surface detailed instruction provided by paint manufacturers should be followed carefully.
- **Scales, grease and dirt:** any scales, grease and dirt must be removed from the surface to obtain effective and good quality product before distempering.
- **Plaster of Paris:** is a mixture of powdered gypsum with water. It is works well for filling holes or cracks in interior plaster walls and ceilings to make a level surface.
- **Holes in plaster walls:** to fill small holes in wall, start for apply the speckling to the hole until it's completely filled in. Next, use the putty knife to scrape away the excess putty, until the top layer of the putty is flush with the rest of the wall.
- **Patch:** is applied before applying a regular coat of distemper on a surface which is different in appearance from the area or used to mend a tear or break, to cover a hole or to strengthen a weak place. In other words, it is a piece of material put over a damaged area or hole to repair, strengthen or cover it.

Self-Check Quiz 1.2.2

Check your understanding by answering the following questions.

1. Why scales, grease and dirt should be removed from wall surface?
2. What is plaster of Paris?
3. How do you fill up the small holes in a wall?
4. What is the meaning of patch?

Learning Outcome 1.3 - Apply Base Materials

Contents:

- Base materials: ratio
- Coating procedure: horizontal and vertical coat

Assessment criteria:

1. Horizontal or vertical coating of mixed materials is applied on the working surface from top to the bottom or vice-versa.
2. Base materials are prepared as requirement.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, sand paper (fine), pumice stone
- **Materials:** base materials for painting

Learning Activity 1.3.1

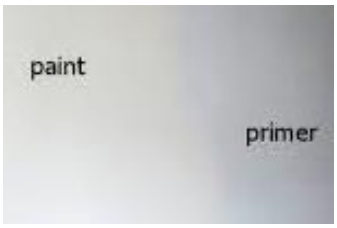
Learning Activity	Resources/Special Instructions/References
Apply base materials	▪ Information Sheet: 1.3.1 ▪ Self-Check Quiz: 1.3.1 ▪ Answer Key: 1.3.1

Information Sheet 1.3.1

Learning Objective: to identify and apply base materials used for distempering in the workplace.

- **Base materials:** are used on new, uncoated surfaces, as a primer which protects the material beneath and provides a good base for further coats.

Both oil-based and water-based primers are available in the market which help to prevent stain on wall surface. A primer or undercoat is a preparatory coating put on materials before painting. Priming ensures better adhesion of paint to the surface, increases paint durability and provides additional protection for the material being painted.



After application of the putty, priming coat is applied to ensure a good bond between distemper paint and the surface and create the better finish. It lays the foundation of paint and increases the coverage of the paint. The first coat of primer is applied with brush or roller and left it for dry. After the drying of the first coat of primer, the second coat is applied and pass 8 to 12 hours for dry. The technique is followed that the horizontal or vertical coating of mixed materials is applied on the working surface from top to the bottom or vice-versa.

Self-Check Quiz 1.3.1

Check your understanding by answering the following questions.

1. Why are base materials used?
2. What is undercoat?
3. Why prime coat is applied before painting?

Learning Outcome 1.4 - Perform Distempering

Contents:

- Distemper
- Quality of distemper
- Coating procedure

Assessment criteria:

1. Distemper materials are mixed with water as requirement.
2. Horizontal or vertical coating is thoroughly applied on the working surface from top to the bottom carefully or vice-versa.
3. Vertical or horizontal coating is then applied after the previous coating or surface is dried off properly or vice versa.
4. Another coating should be applied up to get well finishing.
5. Quality of distemper is checked and rectified as required.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, sand paper (fine), pumice stone
- **Materials:** chalk powder, water, gum, sealer, distemper

Activity

Learning Activity 1.4.1

Learning Activity	Resources/Special Instructions/References
Perform distempering	▪ Information Sheet: 1.4.1 ▪ Self-Check Quiz: 1.4.1 ▪ Answer Key: 1.4.1 ▪ https://gharpedia.com/4-simple-steps-for-application-of-distemper-paint/ ▪ https://www.wikihow.com/Paint-a-Wall

Information Sheet 1.4.1

Learning Objective: to perform distempering works in the workplace.

What is distemper?

- Distemper consists of base, carrier or solvent, binder or adhesive and coloring pigment.
- For base, whiting or chalk is used and for carrier or solvent, water is used. Glue is used as binder or adhesive and pigment of choice is added.
- There are many proprietary distempers in paste or powder form required to be mixed with water only.
- As the distemper paint is washable, this is mostly used on interior surfaces.
- There are many distemper paint manufacturers and provide their instructions as to how to use the product. These given instructions should be followed strictly to achieve the best effect and results.
- Distemper is environment-friendly paint and has no harmful ingredients.

How is distemper applied?

To complete this task, follow the steps given below:

Step 1: Surface Preparation

New Surface Preparation:

- After curing dry completely for 3 to 6-month period depending upon local climate.
- Remove the loose particles, dust, dirt, oil or grease, wax, mortar dropping etc. with the help of wire brush or putty knife.
- Wiped off the whole surface with the help of the dry cloth.

Old Surface Preparation:

- Remove the loose particles, dust, dirt, oil or grease, wax, mortar dropping, growth of fungus, algae, dampness etc. with the help of wire brush or putty knife.
- Rubbed the old surface thoroughly with sand paper.
- Wash the whole surface and leave for drying.
- Fill the holes and cracks with the putty or gypsum and leave for hardening.
- Sand the wall with the sandpaper to make a smooth surface and wipe off the dust with dry cloth.

Step 2: Application of Putty

- Apply one coat of primer before the application of putty and dry it overnight.
- Apply the first coat in a vertical ‘bottom to top’ fashion by using a putty blade/spatula/trowel or any finishing tool and leave the first coat of putty, dry completely for a minimum 6 to 8 hours.
- After drying of the first coat of putty just rub the surface gently with sandpaper to remove the loose particle.

- After finishing the first coat start applying the second coat of putty on the wall and leave the surface to dry completely for 8 to 12 hours.
- After complete drying of second coat, rub the surface very gently to remove unevenness with the help of using sandpaper of not less than 500 number to get a glossy white surface.
- Drying time may vary as per the temperature, humidity and thickness.

Step 3: Application of Primer (prime coat)

- After application of the putty, prime coat is applied to ensure a good bond between distemper paint and the surface and create the better finish. It lays the foundation of paint and increases the coverage of the paint.
- Apply first coat of primer with brush or roller and leave it to dry.
- After the drying of the first coat of primer, apply the second coat and leave it to dry for 8 to 12 hours.

Step 4: Application of Distemper Paint

- Dilute the paint as per the dilution ratio as recommended by the manufacturer.
- Apply the first coat of distemper with the help of brush or roller and leave to dry for 12 to 16 hours.
- After the drying of the first coat of distemper, apply the second coat and allow it to dry overnight.

JOB SHEET 1			
Qualification:	Painting		
Learning unit:	Perform distempering		
Learner name:			
Personal protective equipment (PPE):	Gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron		
Materials:	Chalk powder, water, gum, sealer, distemper		
Tools and equipment:	Paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, sand paper (fine), pumice stone		
Performance criteria:	1. Distemper materials are mixed with water as requirement. 2. Horizontal or vertical coating is thoroughly applied on the working surface from top to the bottom carefully or vice-versa. 3. Vertical or horizontal coating is then applied after the previous coating or surface is dried off properly or vice versa. 4. Another coating should be applied up to get well finishing. 5. Quality of distemper is checked and rectified as required.		
Measurement:	• Measurement to be taken from architectural drawing • Carefully take the measurement and calculate the area to be painted		
Notes:	• Dilute the paint as per the ratio as recommended by the manufacturer • Mix the quantity as per job requirement • Each time stir the distemper paint before wetting the brush • Cover the lead when the container is not in use		
Procedure:	1. Collect PPE, tools, equipment and distemper paint. 2. Check the usability of PPE, tools, equipment and distemper paint. 3. Calculate the area to be painted with distemper. 4. Prepare the surface with appropriate tools. 5. Prepare putty and apply after a prime coat. 6. Prepare and apply prime coat and distemper paint. 7. While working use personal protective equipment for safety. 8. Clean tools, equipment and workplace, and restore tools, equipment and excess materials properly.		
Learner signature:		**Date:**	
Assessor signature:		**Date:**	
Quality Assurer signature:		**Date:**	
Assessor remarks:			

Important:

- *The quality product (distempering) depends on smoothness of the surface.*
- *Interval between two consecutive coats depends on local weather, temperature and humidity.*
- *Use appropriate grit of sand paper.*
- *Use proper tools and equipment for painting.*

Individual Activity:

- *Watch the video shows on 'How to prepare & apply base materials', 'How to prepare surface' and 'How to apply Distemper' and summarise key points (if facilities available)*
- *Prepare surface, prepare & apply base materials and distemper paint following Job Sheet 1 (see above)*

Self-Check Quiz 1.4.1

Check your understanding by answering the following questions.

1. Why distemper does not used on exterior surfaces?
2. What are the ingredients consisting of distemper?
3. Why distemper is popularly used?
4. What are the steps to be followed for distempering?
5. What are benefits of priming coat in distempering?

Learning Outcome 1.5 - Clean Tools, Equipment and Workplace

Contents:

- Importance and necessity of cleaning tools, equipment and workplace
- Methods of cleaning, tools and equipment required for cleaning
- Display and/or storing of tools and equipment used

Assessment criteria:

1. Tools and equipment are cleaned.
2. Workplace is cleaned.
3. Waste materials are disposed of in proper place.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Cleaning tools and equipment:** brooms, dusters, dust pans, cleaning brushes, mops, waste containers and cotton rags
- **Materials:** water, detergents, abrasives, bleaches

Learning Activity 1.5.1

Learning Activity	Resources/Special Instructions/References
Clean tools, equipment and workplace	▪ Information Sheet: 1.5.1 ▪ Self-Check Quiz: 1.5.1 ▪ Answer Key: 1.5.1 ▪ https://en.wikipedia.org/wiki/Cleaning_agent

Information Sheet 1.5.1

Learning Objective: to clean tools, equipment and workplace after painting works have been completed.

General information:

After painting works, cleaning is very important and essential for both tools and equipment as well as cleaning and maintaining the workplace. To keep tools and equipment clean, extra attention and

experience is required on how to remove dirt, including dust, stains, bad smells and clutter on surfaces. For this, we can use some cleaning agents as follows:

- Water (the best cleaning agent)
- Soap or detergent
- Calcium hypochlorite (powdered bleach)
- Sodium hypochlorite (liquid bleach)
- Acetic acid (vinegar)

Methods of cleaning: cleaning can be done using the following methods:

- Dusting
- Shaking and beating
- Sweeping
- Mopping
- Washing
- Polishing

Rough Cleaning:

- First remove all debris either by hand or by using brushes, brooms, scrapers, squeegees etc.
- Collect and dispose of all debris appropriately.
- A warm rinse is recommended to complete the rough cleaning.

Tools and equipment used for cleaning:

Broom: A broom is a cleaning tool consisting of usually stiff fibres, also known as coconut broom.	
Dusters/Dust protector: A duster/dust protector is a light, loose-fitting long coat.	
Dust pan: A dustpan is used in combination with a broom. It is used to collect dust/waste/small debris.	
Cleaning brushes: Cleaning brushes are tool with bristles, wire or other filaments, used for cleaning, painting, and surface finishing, and for many other purposes.	
Mop: A mop is a bundle of coarse strings or a piece of cloth, sponge or other absorbent material, attached to a stick. It is used to soak up liquid, for cleaning floors and other surfaces, to mop up dust or for other cleaning purposes.	

Waste container: A waste container is a container for temporarily storing waste and is usually made out of metal or plastic. Some common terms are dustbin, garbage can, trash can and dumpster.	
Cotton rags: A rag is a piece of old cloth which can be used to clean or wipe things.	

Advantages of proper storage of tools and equipment:

- Ensures that tools and equipment remain in good condition and last for a long time.
- Easy to find when needed and are less likely to be lost.
- Productivity is increased because time is not lost looking for tools and equipment.

After cleaning the tools and equipment, you should follow the good habits of inventry, display and/or store the same in accordance with workplace requirements.

Common types of storage tool rack

Self-Check Quiz 1.5.1

Check your understanding by answering the following questions.

1. What are the methods of cleaning?
2. What is a broom?
3. Write the uses of mops.
4. What is the common type of storage for painting tools and equipment?
5. What are the advantages of properly storing painting tools and equipment?

ANSWER KEYS

ANSWER KEY 1.1.1

1. A scraper is a hand tool with a metal or plastic blade and a small handle. It is used for scraping and removing dirt, old paint or other unwanted materials from a surface.
2. A mixing stick is a hand tool used for stirring or mixing paint ingredients.
3. Putty knife gives the advantage of removing paint, sticky residue and filling-in cracks or holes in plaster walls, windows or doors.
4. Steel wire brushes are mainly used in metal works as a tool for cleaning rust, removing paint from surfaces, and to create better bonding.

ANSWER KEY 1.1.2

1. True
2. False
3. False
4. True
5. True

ANSWER KEY 1.2.1

1. Hard hat/safety helmet
2. Goggles/safety glasses/eye protector
3. Working cloth/apron
4. Belt/body harness
5. Hand gloves

ANSWER KEY 1.2.2

1. Scales, grease and dirt must be removed from the surface to obtain effective and good quality product before distempering.
2. Plaster of Paris is a paste formed by mixing gypsum powder with water. It is used for surface treatment before distempering.
3. To fill small holes in wall, start with applying speckling to the hole until it is completely filled in. Next, use the putty knife to scrape away the excess putty, until the top layer of the putty is flush with the rest of the wall.
4. In case of painting a patch onto a surface which is different in appearance from the area, use a small piece of material to mend a tear or break, to cover a hole or to strengthen a weak place.

ANSWER KEY 1.3.1

1. Base materials are used on new uncoated surfaces as a primer which protects the material beneath and provides a good base for further coats.
2. An undercoat is a preparatory coating put on material surface before painting.
3. Prime coat or priming ensures better adhesion of paint to the surface, increases paint durability and provides additional protection for the material being painted.

ANSWER KEY 1.4.1

1. Distemper is not used on exterior surfaces because it is washable.

2. Distemper consists of base, carrier or solvent, binder or adhesive, and colouring pigment.
3. Distemper is popularly used as it is environment-friendly paint and has no harmful ingredients, cheap in price and is available in great numbers of eye-pleasing tints.
4. The steps to be followed for distempering are - preparation of surface, application of putty, application of primer, and application of distemper paint.
5. Priming coat is applied to ensure a good bond between distemper paint and the surface, acts as the foundation of paint, increases the coverage of the paint, and creates a better finish.

ANSWER KEY 1.5.1

1. Methods of cleaning are: dusting, shaking and beating, sweeping, mopping, washing, polishing.
2. A broom is a cleaning tool consisting of usually stiff fibres, also known as coconut broom.
3. Mops are used to soak up liquid, for cleaning floors and other surfaces, to mop up dust, or for other cleaning purposes.
4. A tool rack is a common type of storage system of painting tools and equipment.
5. The advantages of properly storing painting tools and equipment are: ensures good condition, lasts for a long time, makes them easy to find, are less likely to be lost, and increases productivity.

Module 2: Perform plastic emulsion painting

MODULE CONTENT

Module Descriptor: This module covers the knowledge, skills and attitudes to perform plastic emulsion painting in construction which includes inspecting surface, collecting and checking tools, equipment and materials, preparing surface, applying plastic emulsion paint, and cleaning tools, equipment and the workplace. It also includes information sheets, job sheets, self-check quizzes and answer keys.

Nominal Duration: 40 hours

Learning Outcomes:

Upon completion of the module, the student/trainee will be able to:

2.1 Inspect surface
2.2 Collect and check tools, equipment and materials
2.3 Prepare surface
2.4 Apply plastic emulsion paint
2.5 Clean tools, equipment and workplace

Performance Criteria:

1. Surfaces are inspected/checked in conformance to required surface preparation requirements
2. Surface quality is prepared in accordance with specified quality requirement
3. Personal protective equipment (PPE) is selected and used as per requirements
4. Tools and equipment are selected, collected and checked for usability
5. Materials are selected and collected and checked in accordance with workplace requirements
6. Surface is brushed thoroughly and scales, grease, dirt are removed as per standard procedure
7. Holes in plaster are filled in with plaster of Paris mixed with colour
8. Surface is rubbed down with fine grade sandpaper to make it smooth
9. Patch is applied before applying plastic emulsion paint
10. Properties of plastic emulsion paint are identified
11. Methods and techniques of applying plastic emulsion paint are explained
12. Advantages and disadvantages of plastic emulsion paints are described
13. Application of plastic emulsion paint is carried out in accordance with workplace requirements
14. Tools and equipment are cleaned
15. Work place is cleaned
16. Waste materials are disposed of

Learning Outcome 2.1 - Inspect Surface

Contents:

- Surface quality
- Important points for inspection of surface

Assessment criteria:

1. Surfaces are inspected/checked in conformance with surface preparation requirements.
2. Surface quality is prepared in accordance with specified quality requirement.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE)**: gloves, dust mask, safety shoes, hard hat, body harness, goggles, working clothes, apron
- **Tools and equipment**: paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, sand paper (fine), pumice stone

Learning Activity 2.1.1

Learning Activity	Resources/Special Instructions/References
Inspect surface	▪ Information Sheet: 2.1.1 ▪ Self-Check Quiz: 2.1.1 ▪ Answer Key: 2.1.1 ▪ https://en.wikipedia.org/wiki/Paintbrush

Information Sheet 2.1.1

Learning Objective: to inspect and prepare surface for plastic emulsion painting works.

- **Surface Inspection:**

  To ensure quality painting works surface inspection must be done of the surfaces being painted before, during and after project completion. The durability of a paint system is highly influenced by the quality of surface preparation. The important points for inspection of surface are as follows:

- **Never paint in the following three (3) weather conditions:**

  In Cold Weather:

  - The paint takes longer to dry
  - Wet paint, as a result, is more vulnerable to collecting dirt, insects and pollen
  - Multiple coatings cannot be easily applied as the paint does not dry soon enough between coats - blistering and bubbling will result

  On Wet Surfaces:

  - Wet surfaces are not suitable for painting
  - Dirt, debris, pollution and mildew all accumulate onto the surface
  - Painting in the rain is never recommended

  In Hot Conditions:

  - Weather that is too hot or has too much sun been not ideal for painting
  - Paint dries too quickly, especially when latex (water-based) paints are used
  - Do not paint in direct sunlight – start in the shade or use a covering
  - Avoid days with too much wind

Self-Check Quiz 2.1.1

Check your understanding by answering the following questions:

1. What weather conditions are not suitable for painting jobs?
2. In which weather blistering and bubbling results more?
3. How can be avoided direct sunlight?

Learning Outcome 2.2 - Collect and Check Tools, Equipment and Materials

Contents:

- Collect and check personal protective equipment (PPE), tools and equipment
- Prepare personal protective equipment (PPE), tools and equipment
- Collect and

Assessment criteria:

1. Personal protective equipment (PPE) is selected and used.
2. Tools and equipment are checked for usability/function ability.
3. Materials are selected and collected.
4. Materials are checked in accordance with work order requirement.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, sand paper (fine)
- **Materials:** plastic emulsion paint, water, sealer

Learning Activity 2.2.1

Learning Activity	Resources/Special Instructions/References
Collecting and checking tools, equipment and materials	▪ Information Sheet: 2.2.1, 2.2.2, 2.2.3 ▪ Self-Check Quiz: 2.2.1 ▪ Answer Key: 2.2.1 ▪ https://en.wikipedia.org/wiki/Paintbrush

Information Sheet 2.2.1

Learning Objective: to select and check usability of personal protective equipment used for surface preparation.

- **Personal Protective Equipment (PPE):**

Gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron

Information Sheet 2.2.2

Learning Objective: to identify, collect and check usability of tools and equipment used for distempering works.

- **Tools and equipment:**

  Paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, sand paper (fine)

Information Sheet 2.2.3

Learning Objective: to identify, collect and check materials used for distempering in the workplace.

Materials:

To perform plastic emulsion painting works the materials required are: plastic emulsion paint, water and sealer.

- **Plastic emulsion paint:** typically consists of pigment, resin, solvent and additives. The paint film is fungus and mildew resistant**.**

  Types of plastic emulsion paint*:*

  - Tractor Emulsion
  - Premium Emulsion (Plastic paint)
  - Royal Luxury Emulsion gloss
  - Royal Luxury Emulsion semi-gloss

- **Water:** in painting, only the tap water should be used to achieve best quality of works.

- **Sealer:** is a substance used to block the passage of fluids through the surface or joints or openings in materials. Sealers are not adhesives, but some have adhesive qualities and are called adhesive-sealers.

Self-Check Quiz 2.2.1

Check your understanding by answering the following questions.

Read the statement carefully and state whether it is ‘True’ or ‘False’.

1. Plastic emulsion paint film is fungus and mildew resistant**.**
2. Only tap water should be used in plastic emulsion painting.
3. Sealer is used to block the passage of fluids through the surface or joints or openings in materials.

Learning Outcome 2.3 - Prepare Surface

Contents:

- Surface: plastered masonry and concrete surface
- Plaster of Paris
- Sand paper

Assessment criteria:

1. Surface is brushed thoroughly to make it free from mortar droppings.
2. Scales, grease, dirt are removed from old surfaces.
3. Holes in plaster are filled in with plaster of Paris mixed with colour.
4. Surface is rubbed down with fine grade sandpaper to make it smooth.
5. Patched is applied before applying plastic emulsion paint.

Resources required:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, body harness, goggles, working clothes, apron
- **Tools and equipment:** paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, sandpaper (fine), pumice stone
- **Materials:** sand paper, plaster of Paris

Learning Activity 2.3.1

Learning Activity	Resources/Special Instructions/References
Preparing surface	▪ Information Sheet: 2.3.1 ▪ Self-Check Quiz: 2.3.1 ▪ Answer Key: 2.3.1 ▪ https://www.rustoleum.com/pages/industrial/resources/.../surface-preparation-guide/

Information Sheet 2.3.1

Learning Objective: to identify and prepare different types of surface for painting in the workplace.

- **Surface:** is to be thoroughly brushed to make free from mortar droppings, scales, grease and dirt, filled holes with plaster of Paris, rubbed down with sand paper to make smooth and application of patch before regular coat of plastic emulsion painting. There are two types of surfaces for plastic emulsion painting which are: plastered masonry surface and concrete surface.

- **Plastered masonry surface:** to be improved the appearance by providing an even, smooth, regular, clean and finished surface for plastic emulsion painting.
- **Concrete surface:** this type of surface has also to be done even, smooth, regular, clean and finished for plastic emulsion painting.
- **Surface preparation:** to obtain even and smooth surface **c**racks, voids and openings should be properly treated. Surfaces to be treated must be clean and free of dust, dirt, oil, grease, efflorescence or any other substance that could prevent the penetration of the plastic emulsion paint. To prepare a surface detailed instruction provided by paint manufacturers should be followed carefully.
- **Scales, grease and dirt:** any scales, grease and dirt must be removed from the surface to obtain effective and good quality product before plastic emulsion painting.
- **Plaster of Paris:** is a mixture of powdered gypsum with water. It is works well for filling holes or cracks in interior plaster walls and ceilings to make a level surface.
- **Holes in plaster walls:** to fill small holes in wall, start for apply the speckling to the hole until it's completely filled in. Next, use the putty knife to scrape away the excess putty, until the top layer of the putty is flush with the rest of the wall.
- **Patch:** is applied before applying a regular coat of plastic emulsion painting on a surface which is different in appearance from the area or used to mend a tear or break, to cover a hole or to strengthen a weak place. In other words, it is a piece of material put over a damaged area or hole to repair, strengthen or cover it.

Self-Check Quiz 2.3.1

Check your understanding by answering the following questions:

1. What are the types of surfaces for plastic emulsion painting?
2. “To prepare a surface detailed instruction provided by paint manufacturers should be followed carefully” - is this true or false?
3. “Plaster of Paris does not work well for filling holes or cracks in interior plaster walls and ceilings” - is this true or false?

Learning Outcome 2.4 - Apply Plastic Emulsion Paint

Contents:

- Properties of plastic emulsion paint
- Methods and techniques of applying plastic emulsion paint
- Advantages and disadvantages of plastic emulsion paint

Assessment criteria:

1. Properties of plastic emulsion paint is identified.
2. Methods and techniques of applying plastic emulsion paint are explained.
3. Advantages and disadvantages of plastic emulsion paints are described.
4. Application of plastic emulsion paint is carried out in accordance with workplace requirements.

Resources required:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, body harness, goggles, working clothes, apron
- **Tools and equipment:** paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, sand paper (fine), pumice stone
- **Materials:** plastic emulsion paint

Learning Activity 2.4.1

Learning Activity	Resources/Special Instructions/References
Apply plastic emulsion paint	▪ Information Sheet: 2.4.1 ▪ Self-Check Quiz: 2.4.1 ▪ Answer Key: 2.4.1 ▪ www.quora.com/what-is-an-emulsion-paint-and-why-use-it-mainly-on-walls

Information Sheet 2.4.1

Learning Objective: to apply plastic emulsion paint in the workplace.

- **Plastic emulsion paint:** is a water-based paint which gives soft effect to the walls. It is long lasting, washable and easy to sustain.

- **Properties of plastic emulsion paint:**
  - Water based
  - Less toxic
  - Less nasty odor
  - Less skin irritant
  - Less volatile organic compound (VOC)
- **Methods and techniques of applying plastic emulsion paint:**

  Part-I: Setting up paint surfaces and materials
  - Protect floor and furniture
  - Apply painter's tape to the edges
  - Mix primer and paint
  - Prepare wall surface

  Part-II: Priming the wall
  - Pour primer into the paint tray.
  - Line the outer edges of walls with primer
  - Coat the roller in primer
  - Apply primer in a large 'W' shape
  - Allow the primer to dry for one day

  Part-III: Painting the wall
  - Pour paint into the tray
  - Begin lining the edges of the wall
  - Apply paint in up and down motions
  - Allow the paint to dry
- **Benefits of emulsion paints:**
  - Water-based emulsion paint is less toxic, no nasty odours, less volatile organic compounds and less skin irritations
  - Easy to apply and dries quickly (in about 1-2 hours)
  - Ideal for ceilings and walls because they are thick and easy to apply
  - The colour of the paint is retained for a long period
  - Can be used for various styles in painting
  - Using bright coloured plastic emulsion paints brightens up the dark areas of the house
  - Very easy to clean once the painting is done

JOB SHEET 2			
Qualification:	Painting		
Learning unit:	Performing plastic emulsion painting		
Learner name:			
Personal protective equipment (PPE):	Gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron.		
Materials:	Chalk powder, water, gum, sealer, plastic emulsion paint		
Tools and equipment:	Paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, sand paper (fine), pumice stone.		
Performance criteria:	1. Properties of plastic emulsion paint are identified. 2. Methods and techniques of applying plastic emulsion paint is explained. 3. Advantages and disadvantages of plastic emulsion paints as described. 4. Application of plastic emulsion paint is carried out in accordance with workplace requirements.		
Measurement:	• Measurement to be taken from architectural drawing • Carefully take the measurement and calculate the area to be painted.		
Notes:	• Dilute the paint as per the ratio as recommended by the manufacturer • Mix the quantity as per job requirement • Each time stir the paint before wetting the brush • Cover the lead when the container is not in use. • Do not closed the room just painting. • Do not put brushes, paint buckets or paint trays on the floors or on other bare surfaces.		
Procedure:	1. Collect PPE, tools, equipment and plastic emulsion paint 2. Check the usability of PPE, tools, equipment and the paint 3. Calculate the area to be painted with plastic emulsion paint 4. Prepare the surface with appropriate tools 5. Prepare putty and apply after a prime coat 6. Prepare and apply prime coat 7. Prepare and apply plastic emulsion paint 8. While working use personal protective equipment for safety 9. Clean tools, equipment and workplace, and restore tools, equipment and excess materials properly.		
Learner signature:		**Date:**	
Assessor signature:		**Date:**	
Quality Assurer signature:		**Date:**	
Assessor remarks:			

Important:

- *The quality product (plastic emulsion painting) depends on smoothness of the surface.*
- *Interval between two consecutive coats depends on local weather, temperature and humidity.*
- *Allow proper ventilation for fast drying after painting.*

Individual Activity:

- *Watch the video shows on 'How to prepare putty', 'How to prepare surface' and 'How to apply Plastic emulsion paint' and summarise key points (if facilities available)*
- *Prepare surface, prepare & apply putty, prime coat and plastic emulsion paint following Job Sheet 2 (see above)*

Self-Check Quiz 2.4.1

Check your understanding by answering the following questions.

1. What is plastic emulsion paint?
2. Why painter's tape is used?
3. Is plastic emulsion paint washable?
4. What is the best way to cover and safe furniture and other valuables while painting in a room?
5. Why should not apply too much pressure on roller when painting?

Learning Outcome 2.5 - Clean Tools, Equipment and Workplace

Same as Learning Outcome 1.5 - Clean tools, equipment and workplace (page 23 – 25)

ANSWER KEYS

ANSWER KEY 2.1.1

1. Too cold weather, too hot and/or rainy day.
2. Blistering and bubbling results more in cold weather.
3. To avoid direct sunlight, start in the shade or use a covering.

ANSWER KEY 2.2.1

1. True
2. True
3. True

ANSWER KEY 2.3.1

1. There are two (2) types of surfaces for plastic emulsion painting which are: plastered masonry surface and concrete surface.
2. True.
3. False.

ANSWER KEY 2.4.1

1. Plastic emulsion paint consists of tiny polymer particles within which the pigments are trapped. The particles are suspended in water then as the paint dries the particles fuse together creating a film of paint on the surface.
2. Painter's tape is used so that it is even with the edges of the walls, moldings and fixtures.
3. Once the particles fuse together creating a film of paint, it cannot be washed back off the surface once it has dried.
4. The best way to cover and safe furniture and other valuables while painting in a room is to move furniture to the center of the room and place a tarp or canvas cloth over it.
5. Do not apply too much pressure when applying paint because pressing too hard on the roller may result in paint running down the wall and this can leave lines.

Module 3: Perform synthetic enamel painting

MODULE CONTENT

Module Descriptor: This module covers the skills, knowledge and attitudes to perform synthetic enamel painting in construction which includes collecting and checking tools, equipment and materials, preparing surfaces for synthetic enamel painting, applying putty and primer, performing synthetic enamel painting, and cleaning tools, equipment and the workplace. It also includes information sheets, job sheets, self-check quizzes and answer keys.

Nominal Duration: 40 hours

Learning Outcomes:

Upon completion of the module, the student/trainee will be able to:

3.1 Collect and check tools, equipment and materials
3.2 Prepare surfaces for synthetic enamel painting
3.3 Apply putty and primer
3.4 Perform synthetic enamel painting
3.5 Clean tools, equipment and workplace

Performance Criteria:

1. Personal protective equipment (PPE) are selected and used as per requirements
2. Tools and equipment are selected, collected and checked for usability
3. Materials are selected and collected and checked in accordance with work order requirements
4. Old paint, scales, grease, dirt are removed from old surfaces following standard practice
5. Surface is rubbed down with applicable sand paper grade to produce the required texture
6. Primer material is mixed with thinner material in accordance with workplace requirements
7. Recommended putty is applied into uneven surfaces in accordance with work instruction
8. Primer is applied into the surface acting as preliminary coat in accordance with work instruction
9. Properties of synthetic enamel paint are described
10. Mixed synthetic enamel paint with thinner in accordance with work order requirements
11. Perform synthetic enamel painting
12. Synthetic enamel paint is applied using appropriate brush and/or roller following standard procedures
13. Tools and equipment are cleaned
14. Work place is cleaned
15. Waste materials are disposed of

Learning Outcome 3.1 - Collect and Check Tools, Equipment and Materials

Contents:

- Collect and check personal protective equipment (PPE), tools and equipment
- Prepare personal protective equipment (PPE), tools and equipment
- Collect and check materials

Assessment criteria:

1. Personal protective equipment (PPE) is selected and used.
2. Tools and equipment are checked for usability.
3. Materials are selected and collected.
4. Materials are checked in accordance with work order requirement.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, spray gun, air compressor
- **Materials:** synthetic enamel paint, primer paint, thinner, putty, sand paper

Learning Activity 3.1.1

Learning Activity	Resources/Special Instructions/References
Collecting and checking tools, equipment and materials	▪ Information Sheets: 3.1.1, 3.1.2, 3.1.3 ▪ Self-Check Quiz: 3.1.1 ▪ Answer Key: 3.1.1 ▪ https://en.wikipedia.org/wiki/Paintbrush

Information Sheet 3.1.1

Learning Objective: to select and check usability of personal protective equipment used in the workplace.

- **Personal Protective Equipment (PPE):**

  Gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron

Information Sheet 3.1.2

Learning Objective: to identify, collect and check usability of tools and equipment used in the workplace.

- **Tools and equipment:**

  Paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush.

- **Spray painting:** is a painting technique where a device sprays a coating through the air onto a surface.

- **Spray gun:** spray guns are used to spray paint on a surface. According to size, the air gun spraying equipment is generally larger and typically used for covering large surfaces with an even coating of liquid. Spray guns can be either automated or hand-held and have interchangeable heads to allow for different spray patterns.

- **Air compressor:** is a device which converts power into potential energy stored in pressurised air. An air compressor forces more and more air into a storage tank, increasing the pressure. When tank pressure reaches its engineered upper limit the air compressor shuts off.

Information Sheet 3.1.3

Learning Objective: to identify, collect and check materials used for synthetic enamel painting works.

Materials:

To perform synthetic enamel painting works the materials required are: synthetic enamel paint, primer paint, paint thinner, putty and sand paper.

- **Synthetic enamel paint:** air dries to a hard, usually glossy finish used for coating surfaces that are outdoors or otherwise subject to wear and tear, an variations in temperature. Most of the enamel paints are alkyd resin-based and some enamel paints have been made by adding varnish to oil-based paints. On smooth masonry surfaces, the coverage of enamel is 75-95 square feet per litre for one coat and 130-150 square feet per litre for two coats. However, the actual coverage may vary from the quoted coverage due to factors such as methods and conditions of application and surface roughness and porosity.

- **Primer paint:** is a substance used as a preparatory coat on wood, metal or canvas, especially to prevent the absorption of subsequent layers of paint or the development of rust. This is the first or preliminary coat of paint applied to a surface and is known as grounding, priming, or undercoating.

- Oil-based primers or wood primers
- Drywall primers
- Bonding primers

- **Paint thinner:** is a solvent used to thin oil-based paints and clean brushes after use. Common paint thinners are:
  - Spirits
  - Turpentine
  - Acetone
  - Naphtha

- **Putty:** is a soft, malleable greyish-yellow paste, made from chalk and raw linseed oil that hardens after a few hours and is used for sealing glass in window frames and filling holes or cracks in wood.
- **Wall putty**: is used to provide a smooth base to the wall surface. It provides a smooth, damp finish and allows all types of colours to be applied to walls. It is applied on the walls and ceilings prior to priming and painting. Wall putty serves several purposes including levelling of wall surfaces and being a protective base for expensive paints.

Self-Check Quiz 3.1.1

Check your understanding by answering the following questions.

1. How much area will cover per litre of enamel paint on smooth masonry surfaces?
2. Why primer paint is used?
3. What is paint thinner?
4. What is putty?
5. When wall putty is applied?

Learning Outcome 3.2 - Prepare Surface for Synthetic Enamel Paint

Contents:

- Surface: plastered masonry, concrete surface, wooden surface and mild steel surface
- Sandpaper grade (grit): coarse grit, medium grit, fine grit

Assessment criteria:

1. Old paint, scales, grease and dirt are removed from old surfaces.
2. Surface is rubbed down with applicable sandpaper grade to produce the required surface texture.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE)**: gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush
- **Materials:** sandpaper

Learning Activity 3.2.1

Learning Activity	Resources/Special Instructions/References
Prepare surface for synthetic enamel paint	▪ Information Sheet: 3.2.1 ▪ Self-Check Quiz: 3.2.1 ▪ Answer Key: 3.2.1 ▪ https://www.rustoleum.com/pages/industrial/resources/.../surface-preparation-guide/

Information Sheet 3.2.1

Learning Objective: to identify and prepare different types of surface for painting in the workplace.

- **Wooden surface:**
  - Wooden surfaces must be thoroughly sanded to remove any dust or grease.
  - Apply wood primer by brush after thinning to given ratio by recommended thinner.

- Allow it to dry for 6-8 hours before applying putty.
- Sand the applied putty with sandpaper no.180 and apply second coat of wood primer.
- The photo from left side is original wood surface (before preparation), the next is under preparation and the last is finished surface (after preparation) which is ready for painting.



Mild steel surface:

- The high amount of carbon within its structure makes mild steel vulnerable to corrosion (rust).
- If you need a rust-free sheet metal steel product, then surface finishing/treatments will be needed or stainless steel will need to be substituted for mild steel.
- The photo from left side is original wood surface (before preparation), the next is under preparation and the last is finished surface (after preparation) which is ready for painting.



Self-Check Quiz 3.2.1

Check your understanding by answering the following question.

1. How will you smooth the surface to be painted?

Learning Outcome 3.3 - Apply Putty and Primer

Contents:

- Mix paint/primer with thinner
- Apply putty

Assessment criteria:

1. Paint/primer material is mixed with thinner material in accordance with workplace requirements.
2. Recommended putty is applied into uneven surfaces in accordance with work instruction.
3. Approved primer is applied to the surface acting as preliminary coat in accordance with work instruction.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, sand paper (fine), pumice stone
- **Materials:** base materials for painting, primer, putty

Learning Activity 3.3.1

Learning Activity	Resources/Special Instructions/References
Apply putty and primer	▪ Information Sheet: 3.3.1 ▪ Self-Check Quiz: 3.3.1 ▪ Answer Key: 3.3.1 ▪ https://www.hunker.com/13413253/how-to-mix-primer-thinner

Information Sheet 3.3.1

Learning Objective: to identify, mix primer with thinner and apply putty used in the workplace.

- **Mixing of paint/primer with thinner:**
  - Oil-based paints frequently require 'thinning' to reduce their viscosity or thickness, to improve flow, and shorten drying time.

- For the finish coat of paint to achieve maximum coverage and adhesion, at least one coat of a primer paint should be applied to the surface prior to the top coat.

Ratio of paint and thinner:

- Check paint container labels for the manufacturer's recommended paint to thinner ratio.
- Use small amounts of thinner at a time.
- For general purpose thinning, a 3:1 or 4:1 ratio of paint to thinner or similar ratio is appropriate.

How is primer prepared and tested?

- Pour the primer paint into a mixing container.
- Stir the primer with a mixing stick until it reaches a uniform consistency.
- Thin primer for spray applications according to the paint manufacturer's specific reduction instructions.
- For spray applications, begin by reducing the primer by 10 percent.
- Fill a spray gun with the reduced primer and spray the primer on a test surface.
- If the paint shows any signs of clumping, reduce the primer by an additional 5 percent.
- Test the consistency of the primer again before thinning for brush or roller applications.
- Brush a small amount of primer on a piece of cardboard.
- If the paintbrush marks fail to level out or disappear within a few seconds of application, thin the primer by 5 percent and re-test the paint.
- Continue reducing the paint, in 5 percent increments, and re-test until the primer reaches the proper consistency.

Procedures of application of primer on a wall:

- Prepare the walls to be primed.
- Mask the room with painter's tape.
- Spread drop cloths and move furniture.
- Cut in the room with primer.
- Prime the walls.
- Sand and clean to prepare for painting.
- Paint the walls.
- Remove painter's tape.

How is putty applied to a wall?

- Clean the surface of the old wall, paint and other contaminants.
- Putty is usually applied over a layer of primer.
- If putty is diluted, then it can be applied by pneumatic spraying.
- Large cracks and other irregularities must be puttied in the first place.
- Do not apply a new layer on the wet surface. Wait for the surface to dry (24 hours maximum).
- Then putty area must be clean, sandpapered and primed again.
- Application of putty should be made of several layers for better results.
- But change the direction of the material from layer to layer each time.
- Joints, rivets and welded holes are necessary to apply several layers of putty.
- Each layer of putty must be processed with sandpaper.
- Sanding can be done on both wet and dry surfaces. The first method is more suitable for the lacquer, semi-oil and oil fillers. Second is for gluing ones.

Self-Check Quiz 3.3.1

Check your understanding by answering the following questions.

1. What ratio of paint to thinner is generally use?
2. Is puttying provide a firm grip of adhesive coating layer to the substrate?
3. Why putty is applied in several layers?
4. When sanding is suitable for wet surface?

Learning Outcome 3.4 - Perform Synthetic Enamel Painting

Contents:

- Properties of synthetic enamel paint
- Synthetic enamel painting using brush, roller and spray gun

Assessment criteria:

1. Properties of synthetic enamel paint are described.
2. Mixed synthetic enamel paint with thinner material in accordance with workplace requirement.
3. Perform synthetic enamel painting.
4. Synthetic enamel paint is applied using appropriate paint brush in accordance with job requirements.
5. Synthetic enamel paint is applied using appropriate paint roller in accordance with job requirements.
6. Synthetic enamel paint is applied using spray painting gun in accordance with job requirements.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, sandpaper (fine), spray gun, air compressor
- **Materials:** primer, putty, synthetic enamel paint

Learning Activity 3.4.1

Learning Activity	Resources/Special Instructions/References
Perform synthetic enamel painting	▪ Information Sheet: 3.4.1 ▪ Self-Check Quiz: 3.4.1 ▪ Answer Key: 3.4.1 ▪ https://gharpedia.com/4-simple-steps-for-application-of-distemper-paint/ ▪ https://www.wikihow.com/Paint-a-Wall

Information Sheet 3.4.1

Learning Objective: to perform synthetic enamel painting works using paint brush, roller and spray gun in the workplace.

- **Properties of synthetic enamel paint:**
  - Harder compare to water based
  - Oil or alkyd based
  - Washable
  - Glossy
  - Heat resistant
- **Procedures of mixing of enamel paint:**
  - Open the container and stir the paint slowly for 3 to 5 minutes in order to obtain a homogeneous mixture and smooth consistency using a mixing stick or any other rod-like object
  - Transfer the paint to another container without using a funnel as the paint is still very viscous to pass smoothly through funnel
  - Take an empty paint container and pour half of the paint into it, then start mixing the reducer in it by stirring continuously
  - Always remember that the paint and the reducer should be mixed in equal proportions
  - The paint is now ready to be applied on any surface
  - If you are using a paint gun, just pour it into the gun using a funnel to avoid spilling
  - For painting any other surface with brush or paint-roller, take out only required amount from the mixture and keep the remaining mixture tightly covered
- **How to work with enamel paint?**

  To complete this task, follow the steps given below:

  Part 1: Selecting the right materials
  - Choose the right type of paint
  - Use high quality brushes

  Part 2: Applying enamel paint
  - Always use a primer when painting wood and other uneven natural materials, walls, cabinets, trim and any surface with variations in dimension and texture.

  - When using the tip off technique, make sure that you drag the brush along the entire length of the painting surface (wood) to keep the thickness and orientation of each stroke uniform.
  - Take care to make your brush strokes as fluid and even as you can. Some surfaces, such as furniture and handmade crafts, will be harder to paint than others due to their many irregular contours.

- A sprayer will help you quickly take care of rugged painting projects such as coating a patio deck or touching up mechanical equipment.
- Thicker types of enamel paint might need to be thinned before they can be used in a sprayer.

- Two coats of paint will be superior to a single coat for seamlessness, durability and colour integrity.
- Allow paint to dry between coats and tip off the top coat for an even finish.

Part 3: Drying, Cleaning and Stripping

- Drying time: under normal conditions, oil-based enamel paints will require between 8-24 hours to dry completely due to their thickness. Water-based paint can dry to the touch in 1-2 hours or less.
- Touch up worn paint carefully. When reapplying enamel paint to worn and discoloured areas, use a single thin coat at a time. Brush the fresh coat on carefully to make sure that the surface remains uniform.

- Clean enamel paint when needed. Simply wet a towel with a mixture of warm water and a mild liquid detergent and wipe away whatever debris is clinging to the paint's exterior.
- Stripping: to take off a coating of paint, chemical strippers come in a variety of forms and are one of the only methods strong enough for removing thick, hardened paint.

Self-Check Quiz 3.4.1

Check your understanding by answering the following question:

1. What are the properties of synthetic enamel paint?

JOB SHEET 3			
Qualification:	Painting		
Learning unit:	Performing synthetic enamel painting		
Learner name:			
Personal protective equipment (PPE):	Gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron		
Materials:	Primer, putty, thinner, synthetic enamel paint		
Tools and equipment:	Paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, sand paper (fine), pumice stone, spray gun, air compressor		
Performance criteria:	1. Properties of synthetic enamel paint is described. 2. Mixed synthetic enamel paint with thinner material in accordance with workplace requirement. 3. Perform synthetic enamel painting. 4. Synthetic enamel paint is applied using appropriate paint brush in accordance with workplace requirements. 5. Synthetic enamel paint is applied using appropriate paint roller in accordance with workplace requirement. 6. Synthetic enamel paint is applied using spray painting gun in accordance with workplace requirement.		
Measurement:	• Measurement to be taken from architectural drawing • Carefully take the measurement and calculate the area to be painted		
Notes:	• Dilute the paint as per the ratio as recommended by the manufacturer • Mix the quantity as per job requirement • Each time stir the distemper paint before wetting the brush • Cover the lead when the container is not in use		
Procedure:	1. Collect PPE, tools, equipment and synthetic enamel paint 2. Check the usability of PPE, tools, equipment and synthetic enamel paint 3. Calculate the area to be painted with synthetic enamel paint 4. Prepare the surface with appropriate tools 5. Mix the primer with thinner in accordance with workplace requirement 6. Make and apply putty in accordance with workplace requirement. 7. Prepare and apply synthetic enamel paint using paint brush/roller brush/spray gun as per standard practice. 8. While working use personal protective equipment for safety 9. Clean tools, equipment and workplace, and restore tools, equipment and excess materials properly.		
Learner signature:		**Date:**	
Assessor signature:		**Date:**	
Quality Assurer signature:		**Date:**	
Assessor remarks:			

Individual Activity:

- *Watch the video shows on 'How to Mix paint, and 'How to apply Synthetic enamel paint' and summarise key points (if facilities available)*
- *Prepare surface, mix and apply synthetic enamel paint following Job Sheet 3 (see above)*

Learning Outcome 3.5 - Clean Tools, Equipment and Workplace

Same as Learning Outcome 1.5 - Clean tools, equipment and workplace (page 23 – 25)

ANSWER KEYS

ANSWER KEY 3.1.1

1. On smooth masonry surfaces, the coverage of enamel is 75-95 square feet per litre for one coat and 130-150 square feet per litre for two coats.
2. Primer paint is a substance used as a preparatory coat on wood, metal or canvas, especially to prevent the absorption of subsequent layers of paint or the development of rust.
3. A paint thinner is a solvent used to thin oil-based paints or to clean brushes after use.
4. Putty is a soft, malleable greyish-yellow paste, made from chalk and raw linseed oil that hardens after a few hours and is used for sealing glass in window frames and filling-in holes or cracks in wood.
5. Wall putty is applied on the walls and ceilings prior to priming and painting.

ANSWER KEY 3.2.1

1. The surface can be smooth for painting by rubbing thoroughly with appropriate sandpaper.

ANSWER KEY 3.3.1

1. Generally, the ratio of paint to thinner is used 3:1 or 4:1. But it should always follow the manufacturer's recommendation.
2. No - the puttying does not provide a firm grip of adhesive coating layer to the substrate.
3. Putty should be made of several layers for better results.
4. Sanding on wet surface is suitable for lacquer, semi-oil and oil fillers.

ANSWER KEY 3.4.1

1. Properties of synthetic enamel paint are:
   - Harder compared to water-based
   - Oil or alkyd-based
   - Washable
   - Glossy
   - Heat resistant

Module 4: Perform weather coat painting

MODULE CONTENT

Module Descriptor: This module covers the skills, knowledge and attitudes to perform weather coat painting in construction which includes collecting and checking tools, equipment and materials, installing scaffolding, preparing surface for painting, applying sealer, performing weather coat painting, and cleaning tools, equipment and the workplace. It also includes information sheets, job sheets, self-check quizzes and answer keys.

Nominal Duration: 40 hours

Learning Outcomes:

Upon completion of the module, the student/trainee will be able to:

4.1 Collect and check tools, equipment and materials
4.2 Install scaffolding
4.3 Prepare surface for painting
4.4 Apply sealer
4.5 Perform weather coat painting
4.6 Clean tools, equipment and workplace

Performance Criteria:

1. Personal protective equipment (PPE), tools and equipment and materials are selected, collected and checked for usability as per requirements
2. Required type of scaffolding is confirmed and associated work tasks are identified
3. Projected loading on scaffolding and supporting structure is determined based on local and international building codes and project specifications
4. Site/workplace access and egress routes are identified
5. Scaffolding components are selected and inspected for damage; rejects are labelled and segregated
6. Sole board/base plate is selected in accordance with relevant code rules and regulations and work requirements
7. Installation of scaffolding is carried out in accordance with OHS requirements
8. Scaffolding is set up/erected in accordance with work requirements and workplace rules and regulations
9. Surface is brushed thoroughly to make it free from mortar droppings, soil and other foreign matters.
10. Scales, grease, dirt are removed from old surfaces following standard practice
11. Previously painted surface with cement paint should be wire brushed and washes with water
12. Surface is rubbed down with suitable grade sand paper to make it smooth
13. Recommended sealer is applied into uneven surfaces in accordance with work instruction
14. Holes, cracks tears and open seams are filled with sealer in accordance with workplace requirements
15. Sealant is allowed to set and dried before coating with weather coat paint
16. Usage of weather coat paints are identified and properties are described
17. Initial and top coat is applied using appropriate brush and/or roller in accordance with workplace requirements
18. Tools, equipment and workplace are cleaned and waste materials disposed of

Learning Outcome 4.1 - Collect and Check Tools, Equipment and Materials

Contents:

- Collect and check personal protective equipment (PPE), tools and equipment
- Prepare personal protective equipment (PPE), tools and equipment
- Collect and check materials

Assessment criteria:

1. Personal protective equipment (PPE) is selected and used
2. Tools and equipment are checked for usability
3. Materials are selected and collected
4. Materials are checked in accordance with work order requirement

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush
- **Materials:** weather coat paint, sealer, sandpaper, water

Learning Activity 4.1.1

Learning Activity	Resources/Special Instructions/References
Collecting and checking tools, equipment and materials	▪ Information Sheets: 4.1.1, 4.1.2, 4.1.3 ▪ Self-Check Quiz: 4.1.1 ▪ Answer Key: 4.1.1 ▪ https://en.wikipedia.org/wiki/Paintbrush ▪ https://www.bergerpaints.com/products/exterior-wall-coatings/15/.../weathercoat-smooth

Information Sheet 4.1.1

Learning Objective: to select and check usability of personal protective equipment used in the workplace.

- **Personal Protective Equipment (PPE):**

  Gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron

Information Sheet 4.1.2

Learning Objective: to identify, collect and check usability of tools and equipment used in the workplace.

- **Tools and equipment:**

  Paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush

Information Sheet 4.1.3

Learning Objective: to identify, collect and check materials used for weather coat in the workplace.

Materials:

To perform weather coat painting works requires the use of the following materials:

- **Weather coat paint*:*** is an acrylic exterior emulsion paint which can resist extreme weather conditions. The paint, due to its unique additives and pigments, can withstand extreme weather conditions, and is an excellent water and dust repellent.

Self-Check Quiz 4.1.1

Check your understanding by answering the following questions:

Read the following statements carefully and state whether it is ‘True’ or ‘False’:

1. Weather coat paint is applied both inner and outer surfaces of building.
2. Weather coat paint has water repellence and dust repellence properties.

Learning Outcome 4.2 - Install Scaffolding

Contents:

- OHS requirements: wearing of appropriate personal protective equipment (PPE), disposal of waste materials, availability of first aid kit
- Types of scaffolding: steel, wooden/timber, bamboo scaffolding
- Scaffolding components: bracing, fixed/rotating clamps, U-jack, plate jack, lock pins, steel/wood platform, steel/wood ladder, bolts and nuts
- Scaffolding code rules and regulations and work requirements

Assessment criteria:

1. Installation of scaffolding is carried out in accordance with OHS requirements.
2. Required type of scaffolding is confirmed and associated work tasks are identified.
3. Projected loading on scaffolding and supporting structure is determined based on local and international building codes and project specifications.
4. Site/workplace access and egress routes are identified.
5. Scaffolding components are selected and inspected for damage; rejects are labeled and segregated
6. Sole board/base plate is selected in accordance with relevant code rules and regulations, and work requirements.
7. Scaffolding is set up/erected in accordance with work requirements and workplace rules and regulations.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush
- **Scaffolding materials:** steel, wooden/timber, bamboo
- **Scaffolding components:** bracing, fixed/rotating clamps, U-jack, plate jack, lock pins, steel/wood platform, steel/wood ladder, bolts and nuts
- Scaffolding code rules and regulations

Learning Activity 4.2.1

Learning Activity	Resources/Special Instructions/References
Install scaffolding	▪ Information Sheet: 4.2.1 ▪ Self-Check Quiz: 4.2.1 ▪ Answer Key: 4.2.1 ▪ https://en.wikipedia.org/wiki/Scaffolding ▪ https://www.wikihow.com/Erect-Scaffolding

Information Sheet 4.2.1

Learning Objective: to identify different types of scaffolding and install scaffolding used in the workplace.

- **Scaffolding:** is a temporary structure used to support a worker and materials to aid in the construction, maintenance and repair of buildings, bridges and other structures. It consists of one or more planks of convenient size and length, with various methods of support, depending on the form and use.
  - Types of scaffolding as per materials used: steel, wooden/timber, bamboo
  - Four types of scaffolding are commonly used in construction works which are as follows:

Supported Scaffolding

- This is the most commonly used, and easiest and safest form of scaffolding.
- If the scaffolding needs to take a lot of weight, then extra support may be required with supported scaffolding and also true if long scaffolding is needed.
- It is the most cost-effective type of scaffolding to use.

Suspended Scaffolding

- This type of scaffolding is usually suspended from a tall construct or roof and used when constructing a base is difficult or impossible.
- It is often used when workers need access to upper levels when building from the ground is impractical.
- Window cleaners sometimes use this type of scaffolding to clean tower block windows.
- It is often seen when repairs are needed for upper levels too.

Rolling Scaffolding

- This type of scaffolding is similar to supported scaffolding, but there are caster wheels on the base that allow the scaffolding to be moved without the need for it to be deconstructed or added to.
- The wheels are locked when the scaffolding has been moved so that the construction staff may start work.

Aerial Lifts (also known as aerial platforms):

- This form of scaffolding allows the workers to access the exterior of a structure without needing to construct and deconstruct scaffolding.
- Allows workers to access multiple levels in order to do their job.
- It is commonly used when people are working on lampposts and telephone poles.
- The most common are vehicle-mounted (scissor type) and vehicle-mounted aerial lifts with telescopic and rotating boom.

How is Scaffolding erected?

- Select a secure foundation on which to build and set the scaffold.
- Include casters and lock when get it into place.
- Assemble the scaffolding frame.
- Make sure the scaffold is stable.
- Place the planks.
- Secure access to the scaffold. Stair-like ladders can be used to access the scaffold but must have handrails and tread.
- Attach the guardrails for fall protection.
- Inspect the scaffolding to ensure safety and re-inspect the system regularly to make sure it is still safe.

C**omponents of scaffolding:**

- Standards (the vertical scaffold poles that bear the weight of the scaffolding).
- Ledgers (the horizontal poles that attach to each standard).
- Transoms (main transoms are attached at 90 degrees to ledgers adjacent to the standards).

Important:

- *Scaffolds are considered safest to a height of up to 4 times the width of the base.*
- *Keep the scaffolding away from power lines.*
- *Be aware of weather conditions. Do not work on scaffolding in bad or extreme weather.*
- *Always to lock the casters when get it into place.*

Self-Check Quiz 4.2.1

Check your understanding by answering the following questions.

1. What is scaffolding?
2. What types of scaffolding are commonly used for construction works?
3. What materials are mainly used for scaffolding?
4. Which type of scaffolding is suitable for painting works inside the building?
5. What are the main components of scaffolding?

Learning Outcome 4.3 - Prepare Surface for Painting

Same as Learning Outcome 2.3 – Prepare surface (page 34 – 35)

Learning Outcome 4.4 - Apply Sealer

Contents:

- Sealer/sealant

Assessment criteria:

1. Recommended sealer material is applied to uneven surface in accordance with work instruction.
2. Holes, cracks, tears and open seams are filled with sealant in accordance with job requirements.
3. Sealant is set and dried before coating with weather coat paint.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, sand paper (fine), pumice stone
- **Materials:** sealer

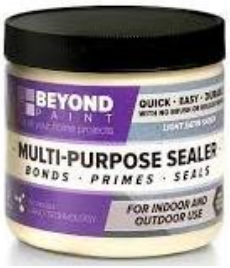
Learning Activity 4.4

Learning Activity	Resources/Special Instructions/References
Apply sealer	▪ Information Sheet: 4.4.1 ▪ Self-Check Quiz: 4.4.1 ▪ Answer Key: 4.4.1 ▪ https://www.youtube.com/watch?v=Lp58WpXDO4k

Information Sheet 4.4.1

Learning Objective: to identify and apply sealer used in the workplace.

- **Sealer:** is a substance used to seal something. Sealer is used to block the passage of fluids through the surface or joints or openings in materials. Sealers are not adhesives, but some have adhesive qualities and are called adhesive-sealers or structural sealers.



- **How is masonry sealer applied to basement?**
  - Sealing masonry walls in a basement can help reduce moisture, but it is important to make sure the ground around the basement slopes away from the foundation.
  - Apply masonry sealers to masonry basement walls with a paint brush or long nap roller.
  - Make sure to apply enough pressure to force the sealer into the masonry surface.
  - Once the first coat has dried, apply a second coat to the walls.
- **Apply a masonry sealer to the wall.**
  - Masonry sealer is a latex-based material that is applied with a brush or roller just like paint.
  - Use the roller to apply a single coat of sealer across the brick wall.
  - Allow the sealer to dry completely before proceeding to prime.
  - Brushes and rollers can be cleaned with soap and water if using a latex-based sealer.
  - If a brick wall has already been painted, applying sealer is not necessary.
  - Manufacturer's directions should be followed with all sealer applications.
  - Sealer can be applied by sprayer, roller or broom, but it is imperative to remember that sealer must be applied in thin coats.
  - Over-application can cause numerous problems including bubbling, cracking and whitening.
  - Any detergents used in the cleaning process need to be carefully rinsed off and the surface should be dry before sealer application.
  - Do not seal a surface when rain or condensation is expected within 12 hours of the sealer being applied.

Self-Check Quiz 4.4.1

Check your understanding by answering the following questions.

Read the following statements carefully and state whether it is 'True' or 'False':

1. Sealer is a substance used to seal something.
2. Sealer does not block the passage of fluids through the surface or joints or openings in materials.
3. Sealer is a type of mechanical seal.
4. If a brick wall has already been painted, applying sealer is also necessary.
5. Do not seal a surface when rain or condensation is expected within 12 hours of the sealer being placed.

Learning Outcome 4.5 - Perform Weather Coat Painting

Contents:

- Usage of weather coat paints
- Properties of weather coat paints

Assessment criteria:

1. Usage of weather coat paints is identified.
2. Properties of weather coat paints are described.
3. Initial coat of weather coat paint is applied using paint roller in accordance with job specifications.
4. Top coat is applied using recommended paint roller in accordance with job requirements.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, body harness, goggles, working clothes, apron
- **Tools and equipment:** paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, sand paper (fine), spray gun, air compressor
- **Materials:** weather coat paint

Learning Activity 4.5.1

Learning Activity	Resources/Special Instructions/References
Perform weather coat painting	▪ Information Sheet: 4.5.1 ▪ Self-Check Quiz: 4.5.1 ▪ Answer Key: 4.5.1 ▪ www.dryvit.com/media/202230/ds432-weathercoat-data-sheet.pdf

Information Sheet 4.5.1

Learning Objective: to perform weather coat painting in the workplace.

- **Weather proofing coatings:**
  - Coverage will vary depending upon substrate, surface texture, environmental conditions and application technique.
  - The coverage of the first coat on textured surfaces can vary from 350-800 square feet (33-74 square metres) per pail depending upon conditions.
  - The coverage of the second coat on textured surfaces can vary between 450-1000 square feet (42-93 square metres) per pail because the surface becomes more sealed and smoother.
  - For best uniformity of appearance two coats are recommended.
  - Coverage for two coats of Weather coat can vary from 200 - 450 square feet (19-42 square metres) per pail depending upon surface being coated.
  - Weather coat is dry to the touch in 30 minutes and dry to re-coat in 2 hours.
  - Protect work from rain for at least 24 hours.
- **Application:**
  - Weather coat may be applied by brush, roller or airless spray equipment.
  - Plan the work ahead to make sure that proper staging is provided to maintain a wet edge.
  - Apply weather coat in one continuous coat, maintaining a wet edge as the application proceeds to a natural break.
  - The roller cover must be kept fully loaded as the application proceeds.
  - Do not stretch out the application by rolling with a dry roller.
  - The last levelling roller strokes should always be in the same direction.
- **Application Tips:**
  - The surface should not be saturated with water or overly damp when weather coat is applied.
  - When changing colour, always use two coats.
  - To avoid an uneven application, do not allow weather coat to dry on roller covers.
- **Properties of weather coat paint:**
  - Acrylic emulsion based
  - Water resistant
  - Fungi resistant
  - Algae resistant
- **How is exterior wall prepared for weather coat painting?**
  1. Wash walls with using a sponge and soapy solution to get rid of any dirt or grime. Then hose down and allow time to dry.
  2. Check if any mould is present, particularly on the areas of the building which are not exposed to direct sun light. Carefully apply the bleach solution to walls using a sponge and leave to soak for 15 minutes. Rinse thoroughly and again, allow walls to dry completely.
  3. Make sure plants and ground near the walls are covered with plastic or canvas drop cloths so as to not cause damage.
  4. If there are any peeling or flaking areas, scrape them to remove the loose paint then gently sand the surface down.
  5. Fill any dents or nail holes in the walls with pre-mixed exterior grade filler using filling blades.
  6. Once the fillers and sealers have set, sand down these areas.
  7. Spot prime the filled areas with sealer primer undercoat.

JOB SHEET 4			
Qualification:	Painting		
Learning unit:	Performing weather coat painting		
Learner name:			
Personal protective equipment (PPE):	Gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron		
Materials:	Weather coat paint, sealer, sand paper, water, bleach, painter's masking tape		
Tools and equipment:	Paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush		
Performance criteria:	1. Usage of weather coat paints is identified. 2. Properties of weather coat paints are described. 3. Initial coat of weather coat paint is applied using paint roller in accordance with workplace specification. 4. Top coat is applied using recommended paint roller in accordance with work place/work order requirement.		
Measurement:	• Measurement to be taken from architectural drawing • Carefully take the measurement and calculate the area to be painted		
Notes:	• Dilute the paint as per the ratio as recommended by the manufacturer • Mix the quantity as per job requirement • Each time stir the distemper paint before wetting the brush • Cover the lead when the container is not in use		
Procedure:	1. Collect PPE, tools, equipment and weather coat paint 2. Check the usability of PPE, tools, equipment and weather coat paint 3. Calculate the area to be painted with weather coat paint 4. Prepare the surface with appropriate tools 5. Seal and smooth the surface in accordance with workplace requirement 6. Prepare and apply weather coat paint using paint brush/roller brush/spray gun as per standard practice. 7. While working use personal protective equipment for safety 8. Clean tools, equipment and workplace, and restore tools, equipment and excess materials properly.		
Learner signature:		**Date:**	
Assessor signature:		**Date:**	
Quality Assurer signature:		**Date:**	
Assessor remarks:			

Individual Activity:

- *Watch the video shows on 'How to prepare surface' and 'How to apply Weather coat paint' and summarise key points (if facilities available)*
- *Prepare surface and apply Weather coat paint following Job Sheet 4 (see above)*

Self-Check Quiz 4.5.1

Check your understanding by answering the following questions.

Choose the correct answer from the multiple-choice questions as given below:

1. Coverage of weather coat will vary depending upon:
   - substrate
   - surface texture
   - environmental conditions
   - application technique
   - all of the above
2. The coverage of per pail weather coat (first coat) depending upon conditions on textured surfaces can vary:
   - from 150-300 square feet (14-28 square metres)
   - from 200 - 450 square feet (19-42 square metres)
   - from 350-800 square feet (33-74 square metres)
   - from 450-1000 square feet (42-93 square metres)
3. The coverage of per pail weather coat (second coat) depending upon conditions on textured surfaces can vary:
   - from 150-300 square feet (14-28 square metres)
   - from 200 - 450 square feet (19-42 square metres)
   - from 350-800 square feet (33-74 square metres)
   - from 450-1000 square feet (42-93 square metres)
4. The coverage for two coats of weather coat per pail depending upon surface being coated can vary:
   - from 150-300 square feet (14-28 square metres)
   - from 200 - 450 square feet (19-42 square metres)
   - from 350-800 square feet (33-74 square metres)
   - from 450-1000 square feet (42-93 square metres)
5. Among the following properties which is not important of weather coat paint:
   - fire resistant
   - water resistant
   - fungi resistant
   - algae resistant

Learning Outcome 4.6 - Clean Tools, Equipment and Workplace

Same as Learning Outcome 1.5 - Clean tools, equipment and workplace (page 23 – 25)

ANSWER KEYS

ANSWER KEY 4.1.1

1. False
2. True

ANSWER KEY 4.2.1

1. Scaffolding is a temporary structure used to support a work crew and materials. In building construction, it is used to elevate and support workers and materials during the painting.
2. There are four types of scaffolding: supported, suspended, rolling and aerial platform are commonly used for construction works.
3. Steel, wood/timber and bamboo is mainly used for scaffolding.
4. Rolling scaffolding is most suitable for painting works inside the building.
5. The main components of scaffolding are standards, ledgers and transoms.

ANSWER KEY 4.3.1

1. To remove grease stains from a wall surface first, wipe away as much of the grease as can be using a rag. Then use a spray bottle to apply the solution obtain by mixing one-part white vinegar with one-part hot water, allowing it to set for a minute or two and wiping the surface with a soft clean rag.
2. The following task should be done to fill up small holes in a plaster wall:
   (a) Place the self-adhesive mesh patch over the hole.
   (b) Use a drywall knife to cover the patch with lightweight joint compound in a crisscross pattern, feathering the edges so it blends with the wall.
   (c) Let the patch dry and apply another coat of compound if needed.

ANSWER KEY 4.4.1

1. True
2. False
3. True
4. False
5. True

ANSWER KEY 4.5.1

1. All of the above
2. from 350-800 square feet (33-74 square metres)
3. from 450-1000 square feet (42-93 square metres)
4. from 200 - 450 square feet (19-42 square metres)
5. Fire resistant

Module 5: Perform concrete painting

MODULE CONTENT

Module Descriptor: This module covers the skills, knowledge and attitudes to perform concrete painting in construction which includes collecting and checking tools, equipment and materials, installing scaffolding, preparing concrete surface, applying concrete paint, and cleaning tools, equipment and the workplace. It also includes information sheets, job sheets, self-check quizzes and answer keys.

Nominal Duration: 40 hours

Learning Outcomes:

Upon completion of the module, the student/trainee will be able to:

5.1 Collect and check tools, equipment and materials

5.2 Install scaffolding

5.3 Prepare concrete surface

5.4 Apply concrete paint

5.5 Clean tools, equipment and workplace

Performance Criteria:

1. Personal protective equipment (PPE) is selected and used as per requirements
2. Tools and equipment are selected, collected and checked for usability
3. Materials are selected, collected and checked in accordance with work order requirement
4. Installation of scaffolding is carried out in accordance with OHS requirements
5. Required type of scaffolding is confirmed and associated work tasks are identified
6. Projected loading on scaffolding and supporting structure is determined based on local and international building codes and project specifications
7. Site/workplace access and egress routes are identified
8. Scaffolding components are selected and inspected for damage; rejects are labelled and segregated
9. Sole board/base plate is selected in accordance with relevant code rules and regulations and work requirements
10. Scaffolding is set up/erected in accordance with work requirements and workplace rules and regulations
11. Cement surfaces are applied with appropriate concrete cleaning agent
12. Sealant is applied on interior concrete surfaces to prevent moisture from seeping in accordance with sealant manufacturer's instruction and specification
13. Concrete surfaces are rubbed down with suitable grade of sand paper to make it smooth
14. Primer is applied on concrete surfaces in accordance with workplace instructions
15. Suitable type of concrete paint is gathered and prepared in accordance with work order specification
16. Base paint is mixed with tinting colour to produce desired colour in accordance with work order specifications
17. Apply coat of concrete paint in accordance with work order specifications
18. Drying/curing time of paint in every coat is followed in accordance with workplace specifications
19. Tools, equipment and workplace are cleaned
20. Waste materials are disposed of

Learning Outcome 5.1 - Collect and Check Tools, Equipment and Materials

Contents:

- Collect and check personal protective equipment (PPE), tools and equipment
- Prepare personal protective equipment (PPE), tools and equipment
- Collect and check materials

Assessment criteria:

1. Personal protective equipment (PPE) is selected and used.
2. Tools and equipment are checked for usability.
3. Materials are selected and collected.
4. Materials are checked in accordance with work requirements.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, body harness, goggles, working clothes, apron
- **Tools and equipment:** paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, spray gun, air compressor
- **Materials:** concrete paint, concrete cleaning agent, sealer, sandpaper, water

Learning Activity 5.1.1

Learning Activity	Resources/Special Instructions/References
Collecting and checking tools, equipment and materials	▪ Information Sheets: 5.1.1, 5.1.2, 5.1.3 ▪ Self-Check Quiz: 5.1.3 ▪ Answer Key: 5.1.3 ▪ https://en.wikipedia.org/wiki/Paintbrush ▪ https://www.houselogic.com/remodel/painting-lighting/concrete-painting/

Information Sheet 5.1.1

Learning Objective: to select and check usability of personal protective equipment used for surface preparation in the workplace.

- **Personal Protective Equipment (PPE):**

  Gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron

Information Sheet 5.1.2

Learning Objective: to identify, collect and check usability of tools and equipment used for concrete painting works.

- **Tools and equipment:**

  Paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, spray gun, air compressor

Information Sheet 5.1.3

Learning Objective: to identify, collect and check materials used for concrete painting in the workplace.

Materials:

To perform concrete painting works requires the use of the following materials:

- **Concrete paint*:***
  - Concrete paint is water-based paint and is applied to either exterior or interior including brick work and concrete.
  - It is used for painting exterior wall surface mainly for preventing water penetration and reductions of dirt collection.
  - It is suitable for coating concrete as well as decorating indoor and outdoor walls.
  - Typical acrylic paints can be used on concrete surfaces.
  - Epoxy coatings or paints are also used on concrete to give resistance to water.
  - Types of concrete paints are: Latex, Elastomeric and Acrylic.

- **Concrete cleaning agent:**
  - Concrete is porous, holds dirt well and can be a tough surface to clean. A wide variety of cleaners are available to clean or remove contamination from concrete surfaces. Without soap, just plain water doesn't have much cleaning ability. Soap consists of fatty acids that emulsify oil, grease and dirt, allowing the particles to be removed with a water-based solution.
  - **pH-Neutral cleaners:** These mild cleaners are primarily designed for cleaning interior sealed concrete surfaces that do not have imbedded dirt.
  - **Acidic cleaners:** These types of cleaners are used to remove stains, dirt and contamination that are soluble in an acidic solution.
  - **Alkaline cleaners:** These cleaners are most often used to eradicate oil, grease or other hydrocarbon-based stains in concrete.
  - **Enzymatic/bacterial cleaners:** These types of concrete cleaners are used to attack, break down and in some cases digest stains and contamination.

- **Specialty cleaners:** Specialty cleaners that remove specific types of contamination and may be a blend of two or more of the four aforementioned cleaner types. Success of these products varies depending on environmental conditions.

Self-Check Quiz 5.1.1

Check your understanding by answering the following questions.

Read the statement carefully and state whether it is 'True' or 'False'.

1. pH neutral cleaners are mild cleaners which are primarily designed for cleaning interior sealed concrete surfaces.
2. Acidic cleaners are not effective for removing efflorescence on concrete.
3. Alkaline cleaners are most suitable to eradicate oil, grease or other hydrocarbon-based stains in concrete.
4. Enzymatic cleaners cannot digest stains and remove contamination from concrete surface.
5. Success of specialty cleaners depend on environmental conditions.

Learning Outcome 5.2 - Install Scaffolding

Same as Learning Outcome 4.2 – Install scaffolding (page 61 – 64)

Learning Outcome 5.3 - Prepare Concrete Surface

Contents:

- Surface preparation
- Concrete surface
- Concrete primer

Assessment criteria:

1. Surface is brushed thoroughly to make it free from mortar droppings, soil and to her foreign matters.
2. Scales, grease, dirt are removed from an old surface.
3. Previously painted surface with cement paint should be wire brushed and washed with water.
4. Surface is rubbed down with suitable grade sand paper to make it smooth.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush
- **Materials:** sandpaper, primer

Activity

Learning Activity 5.3.1

Learning Activity	Resources/Special Instructions/References
Prepare concrete surface	▪ Information Sheet: 5.3.1 ▪ Self-Check Quiz: 5.3.1 ▪ Answer Key: 5.3.1 ▪ https://www.rustoleum.com/pages/industrial/resources/.../surface-preparation-guide/ ▪ https://en.wikipedia.org/wiki/Primer_(paint)

Information Sheet 5.3.1

Learning Objective: to identify and prepare concrete surface for painting in the workplace.

- **Surface Preparation:**
  - Cracks, voids and openings should be properly treated to prevent points for significant water ingress.
  - Surfaces to be treated must be clean and free of dust, dirt, oil, grease, efflorescence, or any other substance that could prevent the penetration of the treatment or compromise its long-term performance.
  - On previously painted surfaces, all loose, peeling and chalking paint must be removed.
  - When washing surface, sufficient drying time must be provided before coating application.
  - Detailed instructions for surface preparation are provided by coating manufacturers and should be followed carefully.
- **Concrete Surface Preparation:**
  - Before sealing or re-sealing concrete that has already hardened, the surface must be well cleaned to ensure good product performance.
  - Removal of dirt, oil and other contaminants is necessary.
  - Allow the concrete to dry thoroughly before applying a sealer.
  - Following a wash, there may be a significant amount of water left in the concrete even though the surface may appear dry.
- **Primer:**
  - A primer or undercoat ensures better adhesion of paint to the surface, increases paint durability and provides additional protection for the material being painted. There are some more reasons for priming before painting:
    - Adhesion
    - Reduce bubbles
    - Impression
    - Consumption
    - Clean
- **Types of Concrete Primer:**
  - Acrylic Primer
  - Polyurethane Primer
  - Epoxy primer
- **Silane Penetrating Sealer**:
  - This sealer is perfect for use outdoors since it's water resistant and helps to protect concrete from extreme changes in temperature.
  - Silane Penetrating Sealer is also resistant to the effects of chemicals and biological growth.

Self-Check Quiz 5.3.1

Check your understanding by answering the following questions.

1. What is primer or undercoat?
2. Why priming is done?
3. What are the types of primer?

Learning Outcome 5.4 - Apply Concrete Paint

Contents:

- Usage of weather coat paints on cement plaster, concrete stone, brick asbestos, cement sheet, all types of building boards
- Properties of weather coat paints: acrylic emulsion based, water resistant, fungi resistant, algae resistant

Assessment criteria:

1. Usage of weather coat paints is identified.
2. Properties of weather coat paints are described.
3. Initial coat of weather coat paint is applied using paint roller in accordance with workplace specification.
4. Top coat is applied using recommended paint roller in accordance with work order requirements.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, sand paper (fine), spray gun, air compressor
- **Materials:** weather coat paint

Learning Activity 5.4.1

Learning Activity	Resources/Special Instructions/References
Apply concrete paint	▪ Information Sheet: 5.4.1 ▪ Self-Check Quiz: 5.4.1 ▪ Answer Key: 5.4.1 ▪ https://www.wikihow.com/Paint-Concrete

Information Sheet 5.4.1

Learning Objective: to apply concrete paint in the workplace.

- **How to paint concrete?**

Painting of concrete is a simple and inexpensive task. Interior and exterior concrete surfaces can be made to look interesting and beautiful by applying just a few coats of paint.

- **Preparing the concrete**
  - Clean the concrete surface with soap and warm water, removing any old paint.
  - Sweep away any surface leaves, debris, and dirt.
  - Remove any existing paint using a power washer or scraper and wire brush.
  - Scrub away any dirt, grime, or gunk that is stuck to the concrete.
  - Simply mix TSP with water in the ratio illustrated on the packaging and wash away any oil stains, rinsing the cleaner off.
  - Allow the concrete surface to dry completely before proceeding with the next steps.
  - Apply concrete patch to fix any major defects such as cracks, gouges or uneven surfaces.
  - Any breaks and cracks are places where moisture could potentially get under the paint, peeling it off the surface later.
  - Follow the manufacturer's instructions to confirm proper drying time for the patch.
  - Seal any indoor concrete to prevent moisture from coming through the cement.
  - Follow the sealant manufacturer's instructions for the proper preparation and application of the product.
- **Painting concrete**
  - Give the paint ample time to dry between each coat.
  - Different paints will have their own specific drying times so always check the manufacturer's instructions.
  - In some cases, paint can take up to 24 hours to dry completely.
  - Apply one layer of concrete paint primer with a paint roller.
  - Apply a primer to the concrete to ensure strong adhesion of the paint.
  - Again, follow the manufacturer's instructions to confirm the necessary application and drying time.
  - To get better results use 2 coats of primer.
  - Be sure to let the first coat dry fully before applying the second.
  - Use the right paint for the right concrete.
  - Apply a thin, even coat of paint using a paint roller.
  - Start in one of the corners or at the top of the surface you are painting and work slowly and evenly across the entire surface.
  - Return the next afternoon and apply a second coat of paint.
  - Once the paint has dried overnight you can layer on another coat.
  - You should add at least one more coat of paint, thinly, but you could add a third as well for a deeper colour and a more even coating.
  - Let the paint dry for 1-2 days before placing anything on the concrete.

JOB SHEET 5			
Qualification:	Painting		
Learning unit:	Performing concrete painting		
Learner name:			
Personal protective equipment (PPE):	Gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron		
Materials:	Concrete paint, cleaning agent, sealer, sand paper, water		
Tools and equipment:	Paint brushes, scraper, spatula, mixing stick, rags, putty knife, lifeline and anchorage, roller brush, steel wire brush, spray gun, air compressor		
Performance criteria:	1. Suitable type of concrete paint is gathered and prepared in accordance with work order specification. 2. Base paint is mixed with tinting colour to produce desired colour in accordance with work order specification. 3. Apply coat of concrete paint in accordance with workplace/work order specification. 4. Drying/curing time of paint in every coat is followed in accordance with workplace specifications.		
Measurement:	• Measurement to be taken from architectural drawing • Carefully take the measurement and calculate the area to be painted		
Notes:	• Dilute the paint as per the ratio as recommended by the manufacturer • Mix the quantity as per job requirement • Each time stir the paint before wetting the brush/roller • Cover the lead when the container is not in use		
Procedure:	1. Collect PPE, tools, equipment and concrete paint 2. Check the usability of PPE, tools, equipment and concrete paint 3. Calculate the area to be painted with concrete paint 4. Prepare the surface using proper cleaning agent and appropriate tools 5. Seal and smooth the surface in accordance with workplace requirement 6. Prepare and apply concrete paint using paint brush/roller brush/spray gun as per standard practice. 7. While working use personal protective equipment for safety 8. Clean tools, equipment and workplace, and restore tools, equipment and excess materials properly.		
Learner signature:		**Date:**	
Assessor signature:		**Date:**	
Quality Assurer signature:		**Date:**	
Assessor remarks:			

Individual Activity:

- *Watch the video shows on 'How to prepare concrete and 'How to apply Concrete paint' and summarise key points (if facilities available)*
- *Prepare surface, prepare & apply sealer, primer and concrete paint following Job Sheet 5 (see above)*

Self-Check Quiz 5.4.1

Check your understanding by answering the following questions.

1. How can you smooth and regular concrete surface?
2. What happens when moisture trapped in concrete?
3. What should be the starting point for concrete painting?

Learning Outcome 5.5 - Clean Tools, Equipment and Workplace

Same as Learning Outcome 1.5 - Clean tools, equipment and workplace (page 23 – 25)

ANSWER KEYS

ANSWER KEY 5.1.1

1. True
2. False
3. True
4. False
5. True

ANSWER KEY 5.2.1

1. Scaffolding is a temporary structure used to support a work crew and materials. In building construction, it is used to elevate and support workers and materials during the painting.
2. There are four types of scaffolding: Supported, Suspended, Rolling and Aerial platform are commonly used for construction works.
3. Steel, wood/timber and bamboo is mainly used for scaffolding.
4. Rolling scaffolding is most suitable for painting works inside the building.
5. The main components of scaffolding are standards, ledgers and transoms.

ANSWER KEY 5.3.1

6. A primer or undercoat is a preparatory coating put on materials before painting.
7. Priming ensures better adhesion of paint to the surface, increases paint durability, and provides additional protection for the material being painted.
8. Types of primer are: acrylic primer, polyurethane primer, epoxy primer and silane penetrating sealer.

ANSWER KEY 5.4.1

1. The concrete surface can be smooth and regular as possible by rubbing with suitable grade of sand paper.
2. Concrete is very porous, which means trapped moisture in the concrete could rise and ruin the paint.
3. Start in one of the corners or at the top of you are painting a wall and work slowly and evenly across the entire surface.

Module 6: Perform spray painting

MODULE CONTENT

Module Descriptor: This module covers the skills, knowledge and attitudes to perform spray painting in construction which includes collecting and checking tools, equipment and materials, inspecting and preparing surface for spray painting, applying putty and primer, performing spray painting, and cleaning tools, equipment and the workplace. It also includes information sheets, job sheets, self-check quizzes and answer keys.

Nominal Duration: 32 hours

Learning Outcomes:

Upon completion of the module, the student/trainee will be able to:

6.1 Collect and check tools, equipment and materials

6.2 Inspect and prepare surface for spray painting

6.3 Apply putty and primer

6.4 Perform spray painting

6.5 Clean tools, equipment and workplace

Performance Criteria:

1. Personal protective equipment (PPE) is selected and used as per requirements
2. Tools and equipment are selected, collected and checked for usability
3. Materials are selected, collected and checked in accordance with work order requirements
4. Scales, grease and dirt are removed from surfaces to be spray painted using recommended cleaning agents
5. Sealant is applied on surfaces to be painted in accordance with work order requirements
6. Surfaces to be spray painted is rubbed down with suitable grade of sand paper to produce the surface finish in accordance with work order specifications
7. Recommended putty is applied into uneven surfaces in accordance with work instruction
8. Base paint is mixed with tinting colour to produce desired colour in accordance with work order specifications
9. Primer is applied on surfaces in accordance with work order specifications
10. Base paint is mixed with thinner to specified viscosity in accordance with workplace specifications
11. Spray gun parts are thoroughly cleaned using recommended cleaning agent
12. Air pressure is adjusted to recommended set pressure
13. Surfaces are spray painted in accordance with work order requirements
14. Drying/curing time of paint in every coat is followed in accordance with workplace specifications
15. Tools and equipment are cleaned
16. Work place is cleaned
17. Waste materials are disposed of.

Learning Outcome 6.1- Collect and Check Tools, Equipment and Materials

Contents:

- Collect and check personal protective equipment (PPE), tools and equipment
- Prepare personal protective equipment (PPE), tools and equipment
- Collect and check materials

Assessment criteria:

1. Personal protective equipment (PPE) is selected and used.
2. Tools and equipment are checked for usability.
3. Materials are selected and collected.
4. Materials are checked in accordance with work order requirements.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** mixing stick, putty knife, lifeline and anchorage, steel wire brush, spray gun, air compressor, spray nozzle cleaner
- **Materials:** paint, thinner, sandpaper

Learning Activity 6.1.1

Learning Activity	Resources/Special Instructions/References
Collecting and checking tools, equipment and materials	▪ Information Sheets: 6.1.1, 6.1.2, 6.1.3 ▪ Self-Check Quiz: 6.1.1, 6.1.2 ▪ Answer Key: 6.1.1, 6.1.2 ▪ https://en.wikipedia.org/wiki/Paintbrush ▪ https://en.wikipedia.org/wiki/Paint

Information Sheet 6.1.1

Learning Objective: to select and check usability of personal protective equipment used in the workplace.

- **Personal Protective Equipment (PPE):**

  Gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron

Information Sheet 6.1.2

Learning Objective: to identify, collect and check usability of tools and equipment used in the workplace.

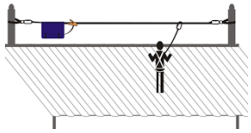
- **Tools and equipment:**

  To perform spray painting works, it requires use of the following tools and equipment:

- **Mixing stick:** is a hand tool used for stirring or mixing of all ingredients of paint. Wooden sticks are commonly used to mix paints and other general coatings.

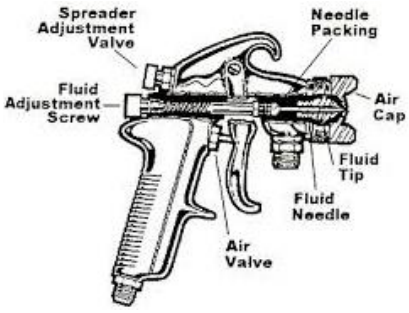
- **Putty Knife:** is used as a tool to work putty around the edges of each pane of glass.

- **Lifeline and anchorage:** are used for safety requirement while painting works done at overhead in various location.



- **Steel wire brush:** is used in metal works for cleaning rust and removing paint from surfaces.

- **Spray gun:** spray guns are used to spray paint onto a surface. According to size, the air gun spraying equipment is generally larger and typically used for covering large surfaces with an even coating of liquid. Spray guns can be either automated or hand-held and have interchangeable heads to allow for different spray patterns.



- **Air compressor:** is a device which converts power into energy stored in pressurised air. A compressor forces more and more air into a storage tank, increasing the pressure. When the tank pressure reaches its engineered upper limit the air compressor shuts off.

- **Spray nozzle cleaner:** are used to remove chemical residues and keep spray equipment clean with sprayer rinsing products and sprayer tank cleaner.

Self-Check Quiz 6.1.1

Check your understanding by answering the following questions.

1. What are the common parts of a spray gun?
2. What is an air compressor?
3. What are the functions of a spray nozzle cleaner?

Information Sheet 6.1.3

Learning Objective: to identify, collect and check materials used for spray painting in the workplace.

Materials:

To perform spray painting works requires the use of the following materials:

- **Paint*:*** is any liquid, liquefiable composition that, after application to a substrate in a thin layer, converts to a solid film. It is most commonly used to protect colour or provide texture to objects. Add a little water or chemical thinner of choice (depending on type of paint) to the bucket of paint and stir thoroughly. When mixing paint, the recommendation with latex paint is to add in 1/4 cup of water for every 1 gallon of paint. Put some in the sprayer and test it.

- **Paint thinner:** is a solvent used to thin oil-based paints or clean brushes after use. Common solvents used as paint thinners are:
  - Spirits
  - Turpentine
  - Acetone
  - Naphtha

Self-Check Quiz 6.1.2

Check your understanding by answering the following questions.

Read the statement carefully and state whether it is ‘True’ or ‘False’.

1. Paint is any liquid, liquefiable or mastic composition that, after application to a substrate in a thin layer, converts to a solid film.
2. Paint is most commonly used to protect colour or provide texture to objects.
3. Water can be added to all paint when mixing of paint.
4. When mixing paint, the recommendation with latex paint is to add in 1 cup of water for every 1 gallon of paint.

Learning Outcome 6.2 - Inspect and Prepare Surface for Spray Painting

Contents:

- Scales, grease, dirt
- Cleaning agent: acidic concrete cleaners, alkaline concrete cleaners, enzymatic/bacterial cleaners, specialty cleaners, soap, water, thinner
- Sealant
- Sandpaper

Assessment criteria:

1. Scales, grease and dirt are removed from surfaces to be spray painted using recommended cleaning agents.
2. Sealant is applied on surfaces to be painted in accordance with work order requirements.
3. Surfaces to be spray painted are rubbed down with suitable grade of sandpaper to produce the surface finish in accordance with work order specifications.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, body harness, goggles, working clothes, apron
- **Tools and equipment:** mixing stick, putty knife, lifeline and anchorage, steel wire brush, spray gun, air compressor, spray nozzle cleaner
- **Materials:** paint, thinner, sandpaper

Learning Activity 6.2.1

Learning Activity	Resources/Special Instructions/References
Inspect and prepare surface for spray painting	▪ Information Sheet: 6.2.1 ▪ Self-Check Quiz: 6.2.1 ▪ Answer Key: 6.2.1 ▪ https://www.rustoleum.com/pages/industrial/resources/.../surface-preparation-guide/

Information Sheet 6.2.1

Learning Objective: to inspect and prepare surface for spray painting in the workplace.

- **Recommended cleaning agent:**
  - **pH-Neutral cleaners:** These mild cleaners are primarily designed for cleaning interior sealed concrete surfaces that do not have imbedded dirt.
  - **Acidic cleaners:** These types of cleaners are used to remove stains, dirt and contamination that are soluble in an acidic solution.
  - **Alkaline cleaners:** These cleaners are most often used to eradicate oil, grease or other hydrocarbon-based stains in concrete.
  - **Enzymatic/bacterial cleaners:** These types of concrete cleaners are used to attack, break down and in some cases digest stains and contamination.
  - **Specialty cleaners:** Specialty cleaners remove specific types of contamination and may be a blend of two or more of the four aforementioned cleaner types. Success of these products may varies depending on environmental conditions.
- **Sealant:** is a substance used to seal something. Sealer is used to block the passage of fluids through the surface or joints or openings in materials. Sealers are not adhesives, but some have adhesive qualities and are called adhesive-sealers or structural sealers.
- **Application of sealer:**
  - Manufacturer's directions should be followed in all sealer applications.
  - Sealer can be applied by sprayer, roller or broom, but it is imperative to remember that sealer must be applied in thin coats.
  - Over-application can cause numerous problems including bubbling, cracking and whitening.
  - Coverage rates listed on the product labelling are the best guideline to application rate.
  - Prior to resealing, the area should be systematically cleaned with a walk-behind scrubber, power washer or given a thorough hand scrubbing.
  - Any detergents used in the cleaning process need to be carefully rinsed off and the surface should be dry before sealer application.
  - Do not seal a surface when rain or condensation is expected within 12 hours of the sealer being placed.

Self-Check Quiz 6.2.1

Check your understanding by answering the following questions:

Read the following statements carefully and state whether it is 'True' or 'False':

1. Sealer is a substance used to seal something.
2. Sealer does not block the passage of fluids through the surface or joints or openings in materials.
3. Sealer is a type of mechanical seal.
4. Do not seal a surface when rain or condensation is expected within 12 hours of the sealer being applied.

Learning Outcome 6.3 - Apply Putty and Primer

Contents:

- Putty
- Base paint
- Primer

Assessment criteria:

1. Recommended putty is applied into uneven surfaces in accordance with work instructions.
2. Base paint is mixed with tinting colour to produce desired colour in accordance with work order specifications.
3. Primer is applied on surfaces in accordance with work order specifications.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** mixing stick, putty knife, lifeline and anchorage, steel wire brush, spray gun, air compressor, spray nozzle cleaner
- **Materials:** base paint, primer, putty

Learning Activity 6.3.1

Learning Activity	Resources/Special Instructions/References
Apply putty and primer	▪ Information Sheet: 6.3.1 ▪ Self-Check Quiz: 6.3.1 ▪ Answer Key: 6.3.1 ▪ https://www.hunker.com/13413253/how-to-mix-primer-thinner

Information Sheet 6.3.1

Learning Objective: to identify, mix primer with thinner and apply putty used in the workplace.

- **Putty:** The following tasks to be considered when apply putty on a surface for painting.
  - Clean the surface of the old wallpaper, paint and other contaminants.
  - Puttying does not provide a firm grip of adhesive coating layer to the substrate, so usually they are applied over a layer of primer.
  - If putty is diluted with small amount of solution, then it can be applied by pneumatic spraying.
  - Put the starting filler layer of 5-7 millimeters.
  - If the surface is badly uneven, reinforce it with special plastic mesh.
  - Large cracks and other irregularities must be puttied in the first place.
  - Do not apply a new layer on the wet surface. Wait for the surface to dry (24 hours maximum).
  - Then putty area must be clean, sand papered and primed again.
  - Application of putty should be made of several layers for better results.
  - But change the direction of the material from layer to layer each time.
  - Joined, riveted and welded holes are necessary to apply several layers of putty.
  - The finish coat should be applied in a layer of 2 millimeters.
  - Each layer of putty must be processed with sandpaper.
  - Sand can be done both wet and dry surfaces. The first method is more suitable for the lacquer, semi-oil and oil fillers. Second is for the gluing ones.

- **Primer:** The following tasks to be considered to prepare primer.
  - Pour the primer paint into a mixing container.
  - Stir the primer with a mixing stick until it reaches a uniform consistency.
  - Measure the thinner with a measuring cup.
  - Thin primer for spray applications according to the paint manufacturer's specific reduction instructions.
  - For spray applications, begin by reducing the primer by 10 percent.
  - Fill a spray gun with the reduced primer and spray the primer on a test surface.
  - If the paint shows any signs of clumping, reduce the primer by an additional 5 percent.
  - Test the consistency of the primer, before thinning, for brush or roller applications.
  - Brush a small amount of primer on a piece of cardboard.
  - If the paintbrush marks fail to level out or disappear within a few seconds of application, thin the primer by 5 percent and retest the paint.
  - Continue reducing the paint in 5 percent increments and retesting until the primer reaches the proper consistency.

Self-Check Quiz 6.3.1

Check your understanding by answering the following questions:

1. Does puttying provide a firm grip of adhesive coating layer to the substrate?
2. Why putty is applied in several layers?
3. What thickness should be applied for finish coat?
4. When is sanding suitable for wet surface?

Learning Outcome 6.4 - Perform Spray Painting

Contents:

- Spray gun parts: air cap, baffle, fluid tip, trigger, needle packing, air valve, spreader adjuster, fluid adjustment screw
- Air pressure
- Drying/curing time of paint

Assessment criteria:

1. Base paint is mixed with thinner to specified viscosity in accordance with workplace specifications.
2. Spray gun parts are thoroughly cleaned using recommended cleaning agent.
3. Air pressure is adjusted to recommended set pressure.
4. Surfaces are spray painted in accordance with work order requirements.
5. Required personal protective equipment (PPE) is used when performing spray painting work.
6. Drying/curing time of paint in every coat is followed in accordance with workplace specifications.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** mixing stick, putty knife, lifeline and anchorage, steel wire brush, spray gun, air compressor, spray nozzle cleaner
- **Materials:** thinner, primer, putty, cleaning agents, rags/cotton cloth

Activity

Learning Activity 6.4.1

Learning Activity	Resources/Special Instructions/References
Perform spray painting	▪ Information Sheet: 6.4.1 ▪ Self-Check Quiz: 6.4.1 ▪ Answer Key: 6.4.1 ▪ http://youtube.com/watch?v=u9IF-FFjSkM

Information Sheet 6.4.1

Learning Objective: to perform spray painting in the workplace.

- **How to mix paint for spray gun?**
  - Pour the paint into the bucket.
  - Add ½ cup of water for every gallon of paint.
  - Mix thoroughly.
  - Check the thickness by running the paint through a funnel.
  - If it flows freely through the funnel, you know the paint is thinned enough.
- **How to spray paint?**

Part 1: Getting started

a. Assemble materials:
   - Spray paint
   - Primer
   - Old newspaper, drop cloth or a plastic tarp to protect the ground
   - Painter's tape
   - Disposable gloves, safety glasses and a ventilator mask.

b. Prepare work area:
   - Place the newspaper, drop cloth or tarp down.
   - Tape off any areas you don't want to paint.
   - Be sure the edges are sealed well to the surface to prevent paint from leaking underneath.

c. Consider using sawhorses to suspend the painting item:
   - If you are painting an object that will sit well on sawhorses, then you may use these.
   - This will help to make it easier for you to spray paint the item.

d. Create a paint box for a small item:
   - If you have a small item to spray paint, then you can also try putting it inside of a box.
   - Then, you can spray the paint into the box to spray paint the item.

e. Clean the surface of the item:
   - Paint won't stick to surfaces that are dusty, greasy or otherwise unclean.
   - Take a few minutes to wipe off any debris that might be clinging to the surface.
   - Use a damp rag only or use a household cleaner to clean the surface if it is extra dirty.
   - Just make sure to dry the surface completely before you paint it.
   - Use sandpaper to smooth out rough surfaces.

Part 2: Staying safe and using good technique

a. Put on your protective gear before do any painting.
b. Apply one coat of primer before spray painting an item.
c. Shake the can well to ensure that the paint is mixed well.
d. Do a spot test.

Part 3: Painting of item

a. Apply one coat over the entire item:
   - Make sure to slowly sweep the paint across the surface of item to get an even coat.
   - Don't aim the nozzle at just one spot.

- Make sure to overlap each of passes slightly to ensure that you do not have gaps in between the areas of spray paint.
- Hold the can of paint about 8 inches away from your object and move the can back and forth slowly at a rate of about one foot per second.

b. Allow minimum 24 hours for the first coat of paint to dry

c. Apply a second coat of paint.

d. Allow 24 hours for the second coat of paint to dry:

- Remove any tape that used to protect certain areas of the item.
- Clean up any tarps or newspapers and store any extra paint in a clean dry area.

e. Apply a top coat if desired

- If desire a top coat can be added to any item.
- Wait for the last top coat to dry completely before touching or moving the item.

How is spray gun cleaned?

- Remove the air regulator from the paint.
- Open the lid from the paint cup to pour out any unused material.
- Using paper towels, wipe as much left-over material from the cup and lid of the cup as possible.
- Pour a small amount (fill gun throat to overflowing) of waste thinner into the cup.

JOB SHEET 6			
Qualification:	Painting		
Learning unit:	Performing spray painting		
Learner name:			
Personal protective equipment (PPE):	Gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron		
Materials:	Base paint, thinner, primer, putty, cleaning agents, sand paper, rags/cotton cloth		
Tools and equipment:	Mixing stick, putty knife, lifeline and anchorage, steel wire brush, spray gun, air compressor, spray nozzle cleaner		
Performance criteria:	1. Base paint is mixed with thinner to specified viscosity in accordance with workplace specification. 2. Spray gun parts are thoroughly cleaned using recommended cleaning agent. 3. Air pressure is adjusted to recommended set pressure. 4. Surfaces are spray painted in accordance with workplace/work order requirements. 5. Required PPE is used when performing spray painting work. 6. Drying/curing time of paint in every coat is followed in accordance with workplace specifications.		
Measurement:	• Measurement to be taken from architectural drawing • Carefully take the measurement and calculate the area to be painted		
Notes:	• Dilute the paint as per the ratio as recommended by the manufacturer • Mix the quantity as per job requirement • Cover the lead when the container is not in use		
Procedure:	1. Collect PPE, tools, equipment and paint with other materials for spray 2. Check the usability of PPE, tools, equipment and paint for spray 3. Calculate the area to be painted using paint sprayer 4. Prepare the surface using proper cleaning agent and appropriate tools 5. Seal and smooth the surface in accordance with workplace requirement 6. Prepare and apply spray paint using spray gun as per standard practice. 7. While working use personal protective equipment for safety 8. Clean tools, equipment and workplace, and restore tools, equipment and excess materials properly.		
Learner signature:		**Date:**	
Assessor signature:		**Date:**	
Quality Assurer signature:		**Date:**	
Assessor remarks:			

Keep in mind:

- *Spray paint won't adhere well if it is too cold or wet outside, so wait for a time when humidity is below 65% and it is sunny and warm.*
- *Do not shake the can too much, but you can shake it too little.*
- *Must avoid breathing vapor while spraying paint.*
- *Health and safety are always more important than painting.*
- *Applying a top coat is optional if you are happy with finish.*

Individual Activity:

- *Watch the video shows on 'How to spray paint' and summarise key points (if facilities available)*
- *Prepare surface, apply putty and primer and perform spray painting following Job Sheet 6 (see above)*

Self-Check Quiz 6.4.1

Check your understanding by answering the following questions.

1. How will you check if the paint is thin enough to spray?
2. Why are sawhorses used in spray painting?
3. Why is it necessary to overlap in spray painting?
4. What is the minimum time to dry spray paint?

Learning Outcome 6.5 - Clean Tools, Equipment and Workplace

Same as Learning Outcome 1.5 - Clean tools, equipment and workplace (page 23 – 25)

ANSWER KEYS

ANSWER KEY 6.1.1

1. The common parts of a spray gun: air cap, fluid tip, fluid needle, air valve, fluid adjustment screw, spreader adjustment valve.
2. Air compressor is a device that converts power into potential energy stored in pressurised air.
3. To remove chemical residues and keep spray equipment clean with sprayer rinsing products and sprayer tank cleaner.

ANSWER KEY 6.1.2

1. True
2. True
3. False
4. False

ANSWER KEY 6.2.1

1. True
2. False
3. True
4. True

ANSWER KEY 6.3.1

1. No - the puttying does not provide a firm grip of adhesive coating layer to the substrate.
2. Putty should be made of several layers for better results.
3. Thickness of the finish coat should be applied in a layer of 2 millimeters.
4. Sanding on wet surface is suitable for lacquer, semi-oil and oil fillers.

ANSWER KEY 6.4.1

1. Check the thickness by running the paint through a funnel. If it flows freely through the funnel, you know the paint is thinned enough.
2. The sawhorses will help to make it easier for spray paint the item because you will not have to be bending over as much.
3. Make sure to overlap each of passes slightly to ensure that you do not have gaps in between the areas of spray paint.
4. Most spray paints require a minimum of 24 hours drying time.

Module 7: Perform varnishing

MODULE CONTENT

Module Descriptor: This module covers the skills, knowledge and attitudes to perform varnishing works which includes collecting and checking tools, equipment and materials, inspecting and preparing surface for varnishing, applying putty and stain, performing varnishing, and cleaning tools, equipment and the workplace. It also includes information sheets, job sheets, self-check quizzes and answer keys.

Nominal Duration: 24 hours

Learning Outcomes:

Upon completion of the module, the student/trainee will be able to:

7.1 Collect and check tools, equipment and materials

7.2 Inspect and prepare surface for varnishing

7.3 Apply putty

7.4 Perform varnishing

7.5 Clean tools, equipment and workplace

Performance Criteria:

1. Personal protective equipment (PPE) is selected and used as per requirements
2. Tools and equipment are selected, collected and checked for usability
3. Materials are selected, collected and checked in accordance with work order requirements
4. Scales, grease and dirt are removed from surfaces to be varnished using recommended cleaning agents
5. Surfaces to be varnished is rubbed down with suitable grade of sand paper to produce the surface finish in accordance with workplace/work order specifications
6. Recommended putty is applied into holes and uneven surfaces in accordance with work instructions
7. Surface to be varnished is sanded to eliminate in perfections and rough areas with the recommended grit sandpaper
8. Stain is applied on the surface in accordance with workplace requirements
9. Sanding sealer is applied evenly on the surface in accordance with workplace requirements
10. After the sanding sealer dries, surface is rubbed with a fine grit sand paper in accordance with workplace specifications
11. Oil-based varnish is applied on the surface evenly in accordance with workplace specifications
12. Fine good quality brush material is used in applying varnish on surfaces in accordance with workplace specifications
13. Tools and equipment are cleaned
14. Work place is cleaned
15. Waste materials are disposed of

Learning Outcome 7.1 - Collect and Check Tools, Equipment and Materials

Contents:

- Collect and check personal protective equipment (PPE), tools and equipment
- Prepare personal protective equipment (PPE), tools and equipment
- Collect and check materials

Assessment criteria:

1. Personal protective equipment (PPE) is selected and used.
2. Tools and equipment are checked for usability.
3. Materials are selected and collected.
4. Materials are checked in accordance with work order requirements.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** brush, sanding block, mixing stick, putty knife, lifeline and anchorage
- **Materials:** varnish, sanding sealer, sanding pads, disposable gloves, stain, thinner, sandpaper, rags/cotton cloth

Learning Activity 7.1.1

Learning Activity	Resources/Special Instructions/References
Collecting and checking tools, equipment and materials	▪ Information Sheets: 7.1.1, 7.1.2, 7.1.3 ▪ Self-Check Quiz: 7.1.1 ▪ Answer Key: 7.1.1 ▪ https://en.wikipedia.org/wiki/Varnish

Information Sheet 7.1.1

Learning Objective: to select and check usability of personal protective equipment used in the workplace.

- **Personal Protective Equipment (PPE):**

  Gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron

Information Sheet 7.1.2

Learning Objective: to identify, collect and check usability of tools and equipment used in the workplace.

- **Tools and equipment:**

  Brush, sanding block, mixing stick, putty knife, lifeline and anchorage

Information Sheet 7.1.3

Learning Objective: to identify, collect and check materials used for varnishing in the workplace.

Materials:

To perform varnishing works requires the use of the following materials:

- **Varnish:**
  - Varnish is a solution, gives transparent, hard, protective finish or film that is primarily used in wood finishing but also for other materials.
  - Generally, varnish contains no pigments to make colours but can be used as a very light tint.
  - Ingredients of varnish:
    a. Resin (like copal, amber, lac, gum, mastic)
    b. Solvent (like boiled linseed oil, turpentine)
    c. Drier (like litharge, white copper, lead acetate)
  - Types of varnishes:
    1. Oil
    2. Spirit
    3. Turpentine
    4. Water

- **Sanding sealer:** can be used on bare, unstained floors, doors, furniture and cabinets prior to applying either an oil-based or a water-based clear finish. It is designed as a base coat that will dry quickly, seal the pores and sand easily with fine sandpaper to create an ultra-smooth foundation.

- **Sanding pads:** are used to smooth the surfaces of wood, plastic, metal and other materials to finish for painting or varnishing.

- **Disposable gloves*:*** are made from synthetic rubber so that there is no risk of latex allergies. These are available in industrial and medical grades for a wide variety of uses.

- **Stain:** is a transparent or translucent agent used to colour wood and is dissolved in liquid. Stain penetrates into the wood fibres rather than resting on a surface film like paint.

- **Thinner:** is a solvent used to thin paints and clean up brush after use. Common paint thinners are:
  - Spirits
  - Turpentine
  - Acetone
  - Naphtha

Self-Check Quiz 7.1.1

Check your understanding by answering the following questions.

1. What is varnish?
2. What are the ingredients of varnish?
3. What are the types of varnish?
4. Why are disposable gloves used in painting/varnishing work?

Learning Outcome 7.2 - Inspect and Prepare Surface for Varnishing

Contents:

- Scales, grease, dirt
- Cleaning agent: acidic concrete cleaners, alkaline concrete cleaners, enzymatic/bacterial cleaners, specialty cleaners, soap, water, thinner

Assessment criteria:

1. Scales, grease and dirt are removed from surfaces to be varnished using recommended cleaning agents.
2. Surfaces to be varnished are rubbed down with suitable grade of sandpaper to produce the surface finish in accordance with work order specifications.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** brush, sanding block, mixing stick, putty knife, lifeline and anchorage
- **Materials:** sanding sealer, sanding pads, disposable gloves, stain, thinner, putty, sandpaper, rags/cotton cloth

Learning Activity 7.2.1

Learning Activity	Resources/Special Instructions/References
Inspect and prepare surface for varnishing	▪ Information Sheet: 7.2.1 ▪ Self-Check Quiz: 7.2.1 ▪ Answer Key: 7.2.1 ▪ https://www.rustoleum.com/pages/industrial/resources/.../surface-preparation-guide/

Information Sheet 7.2.1

Learning Objective: to inspect and prepare surface for varnishing in the workplace.

- **Recommended cleaning agent:**

- **pH-Neutral cleaners:** These mild cleaners are primarily designed for cleaning interior sealed concrete surfaces that do not have imbedded dirt.
- **Acidic cleaners:** These types of cleaners are used to remove stains, dirt and contamination that are soluble in an acidic solution.
- **Alkaline cleaners:** These cleaners are most often used to eradicate oil, grease or other hydrocarbon-based stains in concrete.
- **Enzymatic/bacterial cleaners:** This type of concrete cleaners is used to attack, break down and in some cases digest stains and contamination.
- **Specialty cleaners:** Specialty cleaners remove specific types of contamination and may be a blend of two or more of the four aforementioned cleaner types. Success of these products may varies depending on environmental conditions.

Self-Check Quiz 7.2.1

Check your understanding by answering the following questions:

Read the statement carefully and state whether it is ‘True’ or ‘False’.

1. PH neutral cleaners are used for mild cleaning.
2. Acidic cleaners cannot remove stains, dirt and contamination that are soluble in acidic solution.
3. Alkaline cleaner is also used to neutralise surfaces after acid staining or acid cleaning.
4. Success of specialty cleaners may varies depending on environmental conditions.

Learning Outcome 7.3 - Apply Putty

Contents:

- Putty and stain
- Surfaces
- Grit sandpaper: 100, 200, 240, 280, 400

Assessment criteria:

1. Recommended putty is applied into holes and uneven surfaces in accordance with work instructions.
2. Surface to be varnished is sanded to eliminate in perfections and rough areas with the recommended grit sandpaper.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** brush, sanding block, mixing stick, putty knife, lifeline and anchorage
- **Materials:** putty, sandpaper, rags/cotton cloth

Learning Activity 7.3.1

Learning Activity	Resources/Special Instructions/References
Apply putty	▪ Information Sheet: 7.3.1 ▪ Self-Check Quiz: 7.3.1 ▪ Answer Key: 7.3.1 ▪ https://www.hunker.com/13413253/how-to-mix-primer-thinner ▪ https://www.bergerpaints.com/imaginecolours/decor-culture/wall-putty-make-

Information Sheet 7.3.1

Learning Objective: to identify, prepare and apply putty used in the workplace.

- **Procedures of application of putty:**
  - Clean the surface of the old wallpaper, paint and other contaminants.

- Puttying does not provide a firm grip of adhesive coating layer to the substrate, so usually they are applied over a layer of primer.
- If putty is diluted with small amount of solution, then it can be applied by pneumatic spraying.
- Put the starting filler layer of 5 to 7 millimeters.
- If the surface is badly uneven, reinforce it with special plastic mesh.
- Large cracks and other irregularities must be puttied in the first place.
- Do not apply a new layer on the wet surface. Wait for the surface to dry (24 hours maximum).
- Putty area must be cleaned, sandpapered and primed again.
- Application of putty should be made over several layers for better results.
- Change the direction of the material from layer to layer each time.
- Joined, riveted and welded holes are necessary to apply several layers of putty.
- The finish coat should be applied in a layer of 2 millimeters.
- Each layer of putty must be processed with sandpaper.
- Sand can be done both wet and dry surfaces. The first method is more suitable for the lacquer, semi-oil and oil fillers. Second is for the gluing ones.

Grit: is a type of abrasive particles or granules, as of sand or other small coarse particles used to rub the surface before painting or varnishing.

- The grit size indicates the abrasive grade on the abrasive side of the paper.
- A higher grit number indicates a smaller abrasive grain and a finer abrasive product.
- Grit is the number of abrasive grain particles per inch of sandpaper.
- The lower the grit, the bigger the grain and the coarser the sandpaper.
- Higher grit sandpaper has smaller grains. This means that it takes more grains to fill up a square inch, which helps give the nail file a smoother feel.

Size of the Abrasive Grain

Coarse	Medium	Fine	Very Fine
8	30	70	220
10	36	80	240
12	46	90	280
14	54	100	320
16	60	120	400
20	-	150	500
24	-	180	600

Self-Check Quiz 7.3.1

Check your understanding by answering the following questions.

Read the statements carefully and state whether it is ‘True’ or ‘False’.

1. Grit is the number of abrasive grain particles per meter of sandpaper.
2. The grit size indicates the abrasive grade on the abrasive side of the paper.
3. Higher grit sandpaper has larger grains.

Learning Outcome 7.4 - Perform Varnishing

Contents:

- Brush materials: natural fibre, black china, ox hair blend, white china and synthetic fibre, nylon, nylon/polyester blend, polyester

Assessment criteria:

1. Stain is applied on the surface in accordance with workplace requirements.
2. Sanding sealer is applied evenly on the surface in accordance with workplace requirements.
3. After the sanding sealer dries, surface is rubbed with a fine grit sand paper in accordance with workplace specifications.
4. Oil-based varnish is applied on the surface evenly in accordance with workplace specifications.
5. Fine good quality brush material is used in applying varnish on surfaces in accordance with workplace specifications.

Resources required:

Students/trainees must be provided with the following resources:

- **Personal protective equipment (PPE):** gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron
- **Tools and equipment:** brush, sanding block, mixing stick, putty knife, lifeline and anchorage
- **Materials:** varnish, putty, sealer, sandpaper, rags/cotton cloth

Learning Activity 7.4.1

Learning Activity	Resources/Special Instructions/References
Perform varnishing	▪ Information Sheet: 7.4.1 ▪ Self-Check Quiz: 7.4.1 ▪ Answer Key: 7.4.1 ▪ https://www.youtube.com/watch?v=1Zum813aR9Q

Information Sheet 7.4.1

Learning Objective: to perform varnishing in the workplace.

- **How to stain wood?**

  Method 1: Know the woods

  - Know what type of wood: soft wood or hard wood
  - Consider a wood conditioner for soft woods.

  Method 2: Preparing wood for staining

  - Check to make sure the wood is free of dirt, grease etc.
  - Decide the type of sandpaper should use.
  - For flat surfaced pieces, use a lower grit sandpaper (60 or 80).
  - Go with a high grit number (200 or more) and add multiple coats of stain.
  - Wipe down wood with damp cloth, making sure wood is free from any debris.

  Method 3: Staining

  - Know the types of stains
  - Put your rubber gloves on.
  - Using a sponge, brush, rag or clean cloth, apply stain to wood generously.
  - Make sure work in one continuous movement across wood, going with the grain.
  - Wait 5 to 15 minutes for stain to absorb.
  - When satisfied with the stain colour, let dry for 6 to 8 hours.

  Method 4: Polyurethane

  - Use polyurethane for protection and beauty.
  - Make sure that the wood is free of any debris.
  - After a couple hours, re-apply if necessary.
  - If using the liquid type, wearing gloves, brush it on with the grain.

- **How is varnish applied?**

  Method 1: Preparing to varnish wood

  - Sand the wood.
  - Clean the workspace.
  - Gather all varnishing supplies.
  - Stir the varnish carefully.
  - Thin the varnish.

  Method 2: Applying varnish to wood

  - Brush varnish lightly onto the wood.
  - Tip off while the varnish is still wet.
  - Apply two thin coats of varnish, then sand and apply another.

- **Brush materials:**

  The following brush materials are used in applying varnish on surfaces in accordance with workplace specification:

  - For natural fiber: Black china, Ox-hair blend and White china.
  - For synthetic fiber: Nylon, Nylon/Polyester blend and Polyester.

JOB SHEET 7			
Qualification:	Painting		
Learning unit:	Performing varnishing		
Learner name:			
Personal protective equipment (PPE):	Gloves, dust mask, safety shoes, hard hat, belt/body harness, goggles, working clothes, apron		
Materials:	Varnish, sanding sealer, sanding pad, stain, thinner, sand paper, cleaning agents, rags/cotton cloth, brush materials.		
Tools and equipment:	Brush, sanding block, mixing stick, putty knife, lifeline and anchorage.		
Performance criteria:	1. Stain is applied on the surface in accordance with workplace requirements. 2. Sanding sealer is applied evenly on the surface in accordance with workplace requirements. 3. After the sanding sealer dries, surface is rubbed with a fine grit sand paper in accordance with workplace specification. 4. Oil-based varnish is applied on the surface evenly in accordance with workplace specification. 5. Fine good quality brush material is used in applying varnish on surfaces in accordance with workplace specification.		
Measurement:	▪ Measurement to be taken from architectural drawing ▪ Carefully take the measurement and calculate the area to be varnished		
Notes:	▪ Work in a dust-free environment, otherwise dust particles will get stuck in the wet varnish		
Procedure:	1. Collect PPE, tools, equipment and all other materials used in varnishing 2. Check the usability of PPE, tools, equipment and materials to be used 3. Calculate the area to be varnished 4. Prepare the surface using appropriate tools 5. Apply stain and sanding sealer and smooth the surface in accordance with workplace requirement 6. Prepare and apply varnish using fine quality brush materials as per standard practice. 7. While working use personal protective equipment for safety 8. Clean tools, equipment and workplace, and restore tools, equipment and excess materials properly.		
Learner signature:		**Date:**	
Assessor signature:		**Date:**	
Quality Assurer signature:		**Date:**	
Assessor remarks:			

Keep in mind:

- *Must use dust mask while rubbing the surface with sand paper*
- *Always varnish the whole of the painting in one go*
- *Try to have the same amount of varnish on the brush for each stroke so put equal amounts of varnish on all parts of the painting*

Individual Activity:

- *Watch the video shows on 'How to Stain' and 'How to perform Varnishing' and summarise key points (if facilities available)*
- *Prepare surface, apply stain and perform varnishing following Job Sheet 7 (see above)*

Self-Check Quiz 7.4.1

Check your understanding by answering the following questions.

1. What are the natural fibre brush materials used in applying varnish on surfaces?
2. What are the synthetic fibre brush materials used in applying varnish on surfaces?

Learning Outcome 7.5 - Clean Tools, Equipment and Workplace

Same as Learning Outcome 1.5 - Clean tools, equipment and workplace (page 23 – 25)

ANSWER KEYS

ANSWER KEY 7.1.1

1. Varnish is a solution, gives transparent, hard, protective finish or film that is primarily used in wood finishing but also for other materials.
2. Resin, solvent and drier.
3. Oil, spirit, turpentine and water varnish.
4. Disposable gloves are used to avoid the risk of latex allergies from paint or varnish.
5. Spirit, acetone, turpentine, naphtha, toluene.

ANSWER KEY 7.2.1

1. True
2. False
3. True
4. True

ANSWER KEY 7.3.1

1. False
2. True
3. False

ANSWER KEY 7.4.1

1. Natural fibre brush materials are: black china, ox hair blend, white china.
2. Synthetic fibre brush materials are: nylon, nylon/polyester blend, polyester.

Module 8: Prepare estimate for painting works

MODULE CONTENT

Module Descriptor: This module covers the skills, knowledge and attitudes to prepare estimate for painting works in construction which includes identifying required tools, equipment and materials, accessing the location, measuring paint work area and calculating cost, calculating materials quantity and cost, calculating labour cost, estimating total cost of painting works. It also includes information sheets, job sheets, self-check quizzes and answer keys.

Nominal Duration: 24 hours

Learning Outcomes:

Upon completion of the module, the student/trainee will be able to:

8.1 Identify required tools, equipment and materials
8.2 Access the location
8.3 Measure paint work area and calculate cost
8.4 Calculate materials quantity and cost
8.5 Calculate labour cost
8.6 Estimate total cost of painting works

Performance Criteria:

1. Personal protective equipment (PPE) needed to carry out the painting work is identified
2. Tools and equipment needed to carry out the painting work are identified
3. Materials needed to complete the painting work are identified
4. Cost for the utilization/purchase of PPE, tools, equipment and materials are identified
5. Job site is visited and accessed to determine cost factors when carrying out the painting work
6. Area to be covered for paint work is measured in accordance with workplace standards
7. Area to be covered for paint work is calculated in accordance with workplace calculation standards
8. Cost of paint is calculated in accordance with workplace calculation standards
9. Cost of consumables and other materials are calculated in accordance with workplace requirements/standards
10. Man-hours to complete the painting work is calculated in accordance with workplace requirements and standards
11. Labor cost is calculated in accordance with workplace standards
12. Overhead cost is identified and factored-in in accordance with workplace requirements
13. Final total cost estimate is determined in accordance with workplace standards

Learning Outcome 8.1 - Identify Required Tools, Equipment and Materials

Contents:

- Cost of personal protective equipment (PPE), tools and equipment
- Cost of materials

Assessment criteria:

1. Personal protective equipment (PPE) needed to carry out the painting work is identified.
2. Tools and equipment needed to carry out the painting work are identified.
3. Materials needed to complete the painting work are identified.
4. Cost for the purchase of personal protective equipment (PPE), tools, equipment and materials are identified.

Resources required:

Students/trainees must be provided with the following resources:

- List of personal protective equipment (PPE) to be needed
- List of tools and equipment to be needed
- List of materials to be needed
- Calculator

Learning Activity 8.1.1

Learning Activity	Resources/Special Instructions/References
Identify required tools, equipment and materials	▪ Information Sheet: 8.1.1 ▪ Self-Check Quiz: 8.1.1 ▪ Answer Key: 8.1.1

Information Sheet 8.1.1

Learning Objective: to identify and make a list of personal protective equipment (PPE) for painting works.

A. List of personal protective equipment (PPE) required for a professional Painter:

No.	Personal Protective Equipment (PPE)	Quantity	Estimated Cost (BDT)
1.	Safety helmet/hard hat	1	800
2.	Goggles/safety glasses/eye protector	1	300
3.	Dust mask	1	60
4.	Working cloth/apron	1	700
5.	Belt/body harness	1	600
6.	Hand gloves	1 pair	400
7.	Safety shoes/footwear/boots	1 pair	2000

B. List of tools and equipment required for a professional Painter:

No.	Tools and Equipment	Quantity	Estimated Cost (BDT)
1.	Paint brush (small, medium & large size)	3	600
2.	Paint roller (small & medium size)	2	500
3.	Scraper	1	100
4.	Spatula	1	100
5.	Mixing stick (small, medium & large)	3	100
6.	Putty knife	1	150
7.	Steel wire brush	1	150
8.	Lifeline and anchorage	1 set	700
9.	Rags	100g	50
10.	Spray gun	1	5000
11.	Sealant gun	1	800
12.	Air compressor	1	6000
13.	Sanding machine	1	4000
14.	Measuring tape (50 feet)	1	150

C. List of materials required for painting works:

No.	Name of Material	Quantity	Estimated Cost (BDT)
1.	Distemper	per litre	170
2.	Sealer	per litre	250
3.	Plastic emulsion paint	per litre	350
4.	Sealer	per litre	200
5.	Synthetic enamel paint	per litre	350
6.	Primer paint	per litre	300
7.	Paint thinner	per litre	150
8.	Ready mix putty	per litre	350
9.	Weather coat paint	per litre	400
10.	Sealer	per litre	200
11.	Varnish	per litre	400
12.	Thinner	per litre	150
13.	Disposable gloves	per pair	50
14.	Sand paper (fine, medium & coarse)	per piece	100

Just checking:

- *What are the personal protective equipment (PPE) requirements for a professional painter?*
- *What are the tools and equipment required for a professional painter?*
- *What are the materials used in painting works?*
- *What is the cost to purchase personal protective equipment (PPE), tools and equipment, and painting materials in the local market?*
- *Compare the quality and price among the different brands available in the market.*

Self-Check Quiz 8.1.1

Check your understanding by answering the following questions.

Make a survey in the local market and submit the report to your trainer.

1. Identify the quality PPE available in local market.
2. Compare the quality of each PPE among the different brands.
3. Collect the price of each PPE.
4. Identify the tools and equipment in market.
5. Compare the quality of each tools and equipment among the different brands.
6. Collect the price of each type of tools and equipment.
7. Identify different type of paints available in market.
8. Identify ready-made varnish available in market.
9. Collect the price of paint and varnish.

Learning Outcome 8.2 - Access the Location

Contents:

- Cost factors: outdoor obstruction, indoor obstruction, movement /transfer requirements of furniture, counters, cupboards, etc., wall and surface area for painting, surface texture for painting

Assessment criteria:

1. Job site is visited and accessed to determine cost factors when carrying out the painting work.

Learning Activity 8.2.1

Learning Activity	Resources/Special Instructions/References
Access the location	▪ Information Sheet: 8.2.1 ▪ Self-Check Quiz: 8.2.1 ▪ Answer Key: 8.2.1

Information Sheet 8.2.1

Learning Objective: to access the location safely for painting in the workplace.

- **Job site visit:**
  - A job site visit helps to identify different kinds of outdoor and indoor obstructions.
  - Make a list of outdoor obstructions and think to solve the problem.
  - Make a list of indoor obstructions and think to solve the problem.
  - There may be movement/transfer requirements of furniture, counters, cupboards, etc.
  - All other obstructions should be considered properly in accordance with the workplace requirements.
  - Cost factors in painting works depends on conditions of job site accesses procedures, wall and surface for painting and texture of surfaces for painting.

Sample picture of a building for painting

Group Activity

Field Visit:

Visit a construction site where painting works is going on in your neighbourhood.

Observe some activities there like:

- *What tasks are being performed?*
- *Which tools are being used and for what purpose?*
- *Are the workers worn adequate PPE? List out the names.*
- *Anything more observed you may mention.*

- *Fill-up the 'Field Visit Format' given and submit to your trainer.*
- *Present the experience group wise as per instruction of your trainer.*

Self-Check Quiz 8.2.1

Check your understanding by answering the following question.

1. What are the cost factors should consider while carrying out painting works?

Learning Outcome 8.3 - Measure Paint Work Area and Calculate Cost

Contents:

- Surface area calculation and cost calculation

Assessment criteria:

1. Area to be covered for paint work is measured in accordance with workplace standards.
2. Area to be covered for paint work is calculated in accordance with workplace standards.

Resources required:

Students/trainees must be provided with the following resources:

- Calculator
- Tape measure

Learning Activity 8.3.1

Learning Activity	Resources/Special Instructions/References
Measure paint work area and calculate cost	▪ Information Sheet: 8.3.1 ▪ Self-Check Quiz: 8.3.1 ▪ Answer Key: 8.3.1

Information Sheet 8.3.1

Learning Objective: to measure work area and calculate cost for painting in the workplace.

- **Measurement of paint work area:**
  - The work area for painting is measured from architectural detail designed drawing: plan, elevation and section.
  - Area is calculated by multiplication of length & breadth for horizontal surface and, length & height/breadth & height for vertical surface.
  - Subtract areas that won't be painted and get the actual work area.
  - Example: A single room of size 5.0m x 4.0m and height is 3.0m. The room has 2 doors and 2 windows. Size of each door is 1.0m x 2.1m and window is 1.5m x 1.4m. Find out the area of

painting works for Distempering, Plastic emulsion painting, Weather coat painting, Synthetic enamel painting, Concrete painting and Varnishing.

1. Considering the distempering works to ceiling: Area = 5.0m x 4.0m = 20 square metres.
2. Considering plastic emulsion painting to inside walls: 2 x (5.0m + 4.0m) x 3.0m = 54 square metres, deduct for doors: (1.0m x 2.1m) x 2 = 4.2 square metres and for windows: (1.5m x 1.4m) x 2 = 4.2 square metres. Actual area = 54 -4.2 - 4.2 = 45.6 square metres.
3. Considering weather coat painting to outer sides: 2 x (5.5m + 4.5m) x 3.0m = 60 square metres, deduct for doors: (1.0m x 2.1m) x 2 = 4.2 square metres and for windows: (1.5m x 1.4m) x 2 = 4.2 square metres. Actual area = 60 -4.2 - 4.2 = 51.6 square metres.
4. Considering synthetic enamel painting to window grills: 2 x (1.5m x 1.4m) = 4.2 square metres.
5. Considering concrete painting to floor: (5.0m x 4.0m) = 20 square metres.
6. Considering varnishing to doors: 2 x (1.0m x 2.1m) x 2 sides = 8.4 square metres

- **Calculate cost:**
  - Amount of cost depends on the following issues:
    - Surface of work area
    - Scrap of old paint
    - Type, colour and quality of paint
    - Time of painting
    - Location of work area / easy access the location
    - Scaffolding works
    - Obstructions of work area
    - Movement / transfer requirements of furniture, counters, cupboards etc.
    - Cost of consumable materials
    - Labour charges
    - Account for potential accidents
    - Overhead cost

Self-Check Quiz 8.3.1

Check your understanding by answering the following questions:

1. What are the surfaces that can be painted?
2. Which are consumable materials for painting works?
3. What is meant by overhead cost?

Learning Outcome 8.4 - Calculate Materials Quantity and Cost

Contents:

- Consumables: masks, booties, painter's tape, cleaning supplies, disposable items

Assessment criteria:

1. Cost of paint is calculated in accordance with workplace calculation standards.
2. Cost of consumables and other materials are calculated in accordance with workplace requirements and standards.

Resources required:

Students/trainees must be provided with the following resources:

- Calculator

Learning Activity 8.4.1

Learning Activity	Resources/Special Instructions/References
Calculate materials quantity and cost	▪ Information Sheet: 8.4.1 ▪ Self-Check Quiz: 8.4.1 ▪ Answer Key: 8.4.1

Information Sheet 8.4.1

Learning Objective: to calculate materials quantity and cost used in the workplace.

Materials quantity:

- **Distemper:**
  - Paint : 1 litre required for 100 square foot area
  - Sealer : 1 litre required for 100 square foot area

- **Plastic emulsion paint:**
  - Paint : 1 litre required for 100 square foot area
  - Sealer : 1 litre required for 100 square foot area

- **Synthetic enamel paint:**

- Paint : 1 litre required for 100 square foot area
- Sealer : 1 litre required for 100 square foot area
- Thinner : 1 litre required for 100 square foot area

Weather coat:

- Weather coat : 1 litre covers 65 square foot area
- Sealer : 1 litre covers 100 square foot area

Varnish:

- Varnish : 1 litre required for 75 square foot area
- Thinner : 1 litre required for 285 square foot area

Self-Check Quiz 8.4.1

Check your understanding by answering the following questions:

1. How much area will be covered by 1 litre of distemper?
2. How much area will be covered by 1 litre of weather coat?
3. How much area will be covered by 1 litre of varnish?

Learning Outcome 8.5 – Calculate Labour Cost

Contents:

- Calculate labour cost: man-hours

Assessment criteria:

1. Man-hours to complete the painting work is calculated in accordance with workplace requirements and standards.
2. Labor cost is calculated in accordance with workplace standards.

Resources required:

Students/trainees must be provided with the following resources:

- Calculator

Learning Activity 8.5.1

Learning Activity	Resources/Special Instructions/References
Calculate labour cost	▪ Information Sheet: 8.5.1 ▪ Self-Check Quiz: 8.5.1 ▪ Answer Key: 8.5.1

Information Sheet 8.5.1

Learning Objective: to calculate labour cost for painting works in the workplace.

Man-hour:

A man-hour is the average amount of work that one person can do in an hour. Man-hours are used to estimate how long jobs take or how many people are needed to do a job over a particular period of time.

- 1 man/day = 8 man/hours (40 hours per week)
- 1 man/month = 20 man/days (approximately) and are finding some discrepancies when converting man/hours from the timesheets, reporting the work done by each person, into man months.

- To calculate the total number of hours: multiply the number of days by the number of working hours per day.

Labour cost:

According to the Bureau of Labour Statistics, 45 percent of all painters are self-employed, though that number may be slightly higher if companies hire freelancers or self-employed painters as part of their team. The price that painters charge for their services is largely dependent on their association and whether the job is completed in the warmer or colder months (painters often charge more in the summer and less in the winter, given demand and other factors).

Some painters will charge by the hour, while others will charge based on the amount of rooms or square footage to have painted.

- Professional Painters charge between BDT 700 to BDT 800 per day.
- Helper to painter charge between BDT 500 to BDT 550 per day.

Tips for hiring Painter:

- Ask for recommendations
- Get multiple estimates
- Interview
- Review credentials
- Figure out a payment plan
- Get the contract and review it thoroughly before signing
- Pick the paint and finish
- Check for lead

Self-Check Quiz 8.5.1

Check your understanding by answering the following questions:

1. What is the meaning of man hour?
2. How many hours are in a day?
3. How many man hours are there per week?

Learning Outcome 8.6 - Estimate Total Cost of Painting Works

Contents:

- Overhead cost: cost of operating expense, shipping and handling, transportation cost

Assessment criteria:

1. Overhead cost is identified and factored-in in accordance with workplace requirements.
2. Final total cost estimate is determined in accordance with workplace standards.

Resources required:

Students/trainees must be provided with the following resources:

- Calculator

Learning Activity 8.6.1

Learning Activity	Resources/Special Instructions/References
Estimate total cost of painting works	▪ Information Sheet: 8.6.1

Information Sheet 8.6.1

Learning Objective: to estimate total cost of painting works in the workplace.

- **Estimate total cost:**
  - Cost of paint
  - Cost of consumables
  - Cost of labour
  - Overhead cost
- According to Bangladesh Public Works Department (BPWD), rate analysis for painting works are as follows:

- **Analysis of distempering two coats over a coat of priming (for 100 square feet of work):**

No	Item	Quantity	Unit			Rate	Per unit			Amount
1	Painter	1	no.	@	BDT	700.00	Each	=	BDT	700.00
2	Painter helper	1	no.	@	BDT	500.00	Each	=	BDT	500.00
3	Scaffolding, sundries etc.						L.S	=	BDT	100.00
4	Distemper	1	litre	@	BDT	170.00	Each	=	BDT	170.00
5	Under-coat sealer	1	litre	@	BDT	250.00	Each	=	BDT	250.00
							Total	=	BDT	1720.00
							Profit	10%	=	BDT	172.00
							Overhead	3.5%	=	BDT	60.20
							Total	=	BDT	1952.20
							VAT	4.5%	=	BDT	87.85
								Grand total	=	BDT	2040.05
								Rate per sft	=	BDT	20.40
								Rate per sqm	=	BDT	219.50
								Say, rate per sqm	=	BDT	220.00

- **Analysis of plastic emulsion paint two coats over a coat of priming (for 100 square feet of work):**

No	Item	Quantity	Unit			Rate	Per unit			Amount
1	Painter	1	no.	@	BDT	700.00	Each	=	BDT	700.00
2	Painter helper	1	no.	@	BDT	500.00	Each	=	BDT	500.00
3	Scaffolding, sundries etc.						L.S	=	BDT	100.00
4	Plastic emulsion paint	1	litre	@	BDT	350.00	Each	=	BDT	350.00
5	Sealer/under-coat	1	litre	@	BDT	200.00	Each	=	BDT	200.00
							Total	=	BDT	1850.00
							Profit	10%	=	BDT	185.00
							Overhead	3.5%	=	BDT	64.75
							Total	=	BDT	2099.75
							VAT	4.5%	=	BDT	94.49
								Grand total	=	BDT	2194.24
								Rate per sft	=	BDT	21.94
								Rate per sqm	=	BDT	236.07
								Say, rate per sqm	=	BDT	236.00

- **Analysis of synthetic enamel paint two coats over a coat of priming (for 100 square feet of work):**

No	Item	Quantity	Unit			Rate	Per unit			Amount
1	Painter	1	no.	@	BDT	700.00	Each	=	BDT	700.00
2	Painter helper	1	no.	@	BDT	500.00	Each	=	BDT	500.00
3	Scaffolding, sundries etc.						L.S	=	BDT	100.00
4	Synthetic enamel paint	1	litre	@	BDT	350.00	Each	=	BDT	350.00
5	Sealer	1	litre	@	BDT	200.00	Each	=	BDT	200.00
6	Thinner	1	litre	@	BDT	150.00	Each	=	BDT	150.00
							Total	=	BDT	2000.00
							Profit	10%	=	BDT	200.00
							Overhead	3.5%	=	BDT	70.00
							Total	=	BDT	2270.00
							VAT	4.5%	=	BDT	102.15
								Grand total	=	BDT	2372.15
								Rate per sft	=	BDT	23.72
								Rate per sqm	=	BDT	255.24
								Say, rate per sqm	=	BDT	255.00

- **Analysis of weather coat (three coats) (for 100 square feet of work):**

No	Item	Quantity	Unit			Rate	Per unit			Amount
1	Painter	1	no.	@	BDT	700.00	Each	=	BDT	700.00
2	Painter helper	1	no.	@	BDT	500.00	Each	=	BDT	500.00
3	Scaffolding, sundries etc.						L.S	=	BDT	100.00
4	Weather coat paint	1.50	litre	@	BDT	400.00	Each	=	BDT	600.00
5	Sealer	1	litre	@	BDT	200.00	Each	=	BDT	200.00
							Total	=	BDT	2100.00
							Profit	10%	=	BDT	210.00
							Overhead	3.5%	=	BDT	73.50
							Total	=	BDT	2383.50
							VAT	4.5%	=	BDT	107.26
								Grand total	=	BDT	2490.76
								Rate per sft	=	BDT	24.91
								Rate per sqm	=	BDT	268.00
								Say, rate per sqm	=	BDT	268.00

- **Analysis of varnishing (for 100 square feet of work):**

No	Item	Quantity	Unit			Rate	Per unit			Amount
1	Painter	1.00	no.	@	BDT	700.00	Each	=	BDT	700.00
2	Painter helper	1.00	no.	@	BDT	500.00	Each	=	BDT	500.00
3	Sand paper	4.00	no.	@	BDT	20.00	Each	=	BDT	80.00
4	Markin cloth	0.50	m	@	BDT	40.00	Meter	=	BDT	20.00
5	Scaffolding, sundries etc.						L.S	=	BDT	100.00
6	Varnish	1.00	litre	@	BDT	400.00	Each	=	BDT	400.00
7	Thinner	1.00	litre	@	BDT	150.00	Each	=	BDT	150.00
							Total	=	BDT	1950.00
						Profit	10%	=	BDT	195.00
						Overhead	3.5%	=	BDT	68.25
							Total	=	BDT	2213.25
						VAT	4.5%	=	BDT	99.60
							Grand total	=	BDT	2312.85
							Rate per sft	=	BDT	23.12
							Rate per sqm	=	BDT	248.77
							Say, rate per sqm	=	BDT	249.00

ANSWER KEYS

ANSWER KEY 8.1.1

1. Make a list of personal protective equipment (PPE) used by a professional painter.
2. Survey a local market to identifying costs for personal protective equipment (PPE).
3. Calculate the cost to purchase the personal protective equipment (PPE).
4. Make a list of tools and equipment used for painting works.
5. Survey a local market to identifying costs for tools and equipment.
6. Calculate the cost to purchase the tools and equipment.
7. Make a list of materials required for painting and varnishing.
8. Survey a local market to identifying costs for paint and varnish.
9. Calculate the cost to purchase the paint and varnish.

ANSWER KEY 8.2.1

1. The following cost factors should be considered: outdoor obstruction, indoor obstruction, movement/transfer requirements of furniture, counters, cupboards, etc., wall and surface area for painting, surface texture for painting.

ANSWER KEY 8.3.1

1. Masonry plastered, concrete, metal and wooded surfaces may be painted.
2. Following are the consumable materials for painting works: masks, painter's tape, cleaning supplies, disposable items.
3. Overhead cost: cost of operating expense, shipping and handling, transportation cost etc.

ANSWER KEY 8.4.1

1. 1 litre of distemper will cover a 100 square foot area.
2. 1 litre of weather coat will cover a 65 square foot area.
3. 1 litre of varnish will cover a 75 square foot area.

ANSWER KEY 8.5.1

1. A man-hour is the average amount of work that one person can do in an hour.
2. 8 hours.
3. 40 hours.