JSS Mahavidyapeetha

JSS College of Arts, Commerce and Science

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PG DEPARTMENT OF BOTANY

STANDARD OPERATING PROCEDURE FOR MAJOR EQUIPMENTS

LIST OF MAJOR EQUIPMENTS IN THE DEPARTMENT

1. **CENTRIFUGE**
2. **HOT AIR OVEN**
3. **LAMINAR AIR FLOW**
4. **INCUBATOR**
5. **BOD INCUBATOR**
6. **SPECTROPHOTOMETER**
7. **COLORIMETER**
8. **pH METER**
9. **MAGNETIC STIRRER**
10. **ELECTRICAL WEIGHING BALANCE**
11. **WATER BATH**
12. **STERIO MICROSCOPES**
13. **RESEARCH MICROSCOPES**
14. **COMPOUNDMICROSCOPES**
15. **DISSECTIONMICROSCOPES**
16. **ELECTROPHORESIS UNIT**
17. **INDUCTION STOVE**
18. **GAS STOVE**
19. **CONVECTION MICROWAVE**
20. **PROJECTOR/LAPTOPS/ DESKTOPS**

Signature of Head of the Department

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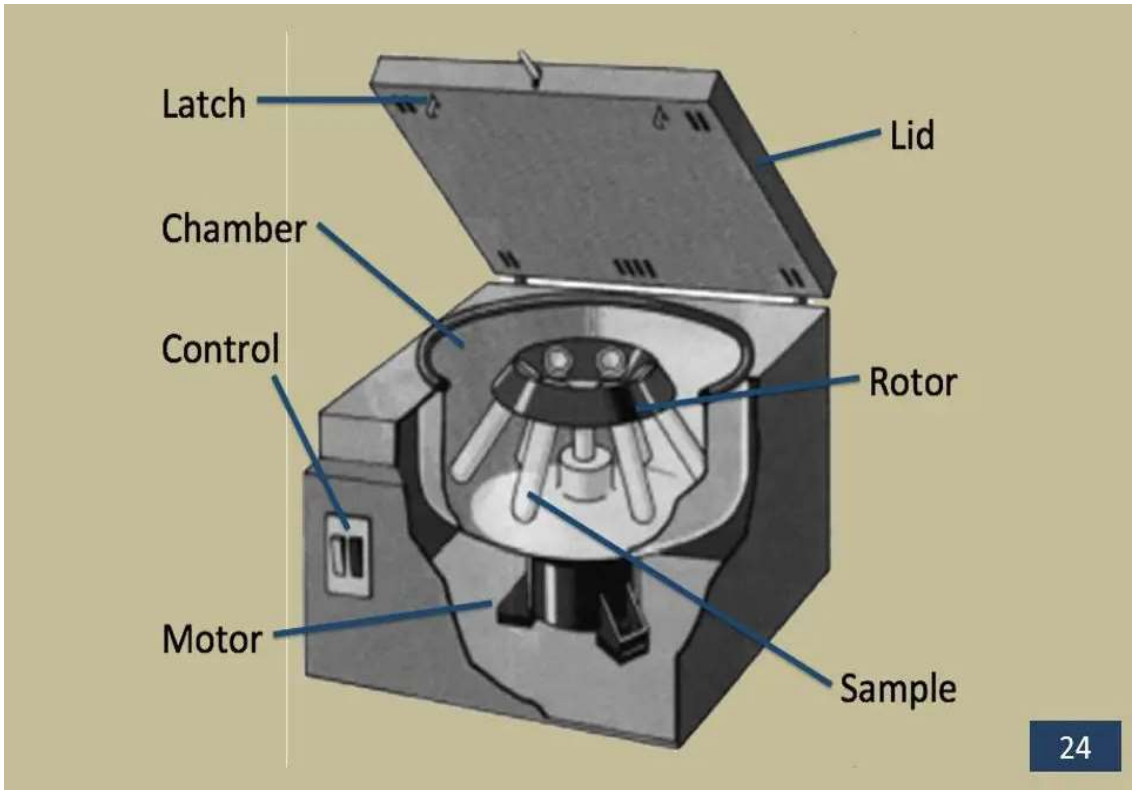
CENTRIFUGE



1. Turn on: Plug in the centrifuge and turn the power switch on
2. Load rotor: Load the rotor symmetrically and fasten the screws in the central sleeve
3. Fill tubes: Fill tubes equally by eye, about 75% of the total volume, and balance them by scale
4. Set speed and time: Use the speed knob to set the speed and the timer knob to set the runtime
5. Start: Close the lid to start the centrifuge
6. Stop: When the centrifugation is complete, use the speed or timer knob to bring the display value back to zero to gradually stop the rotor
7. Stop quickly: Press the lid release button to stop the rotor within 2 seconds

Here are some additional tips for safely operating a centrifuge:

- Ensure that centrifuge bowls and tubes are dry
- Ensure that the spindle is clean
- Use matched sets of tubes, buckets, and other equipment
- Always use safety centrifuge cups to contain potential
- Check the rotor before loading
- Never use rotors showing signs of cracking or corrosion, never use expired rotors

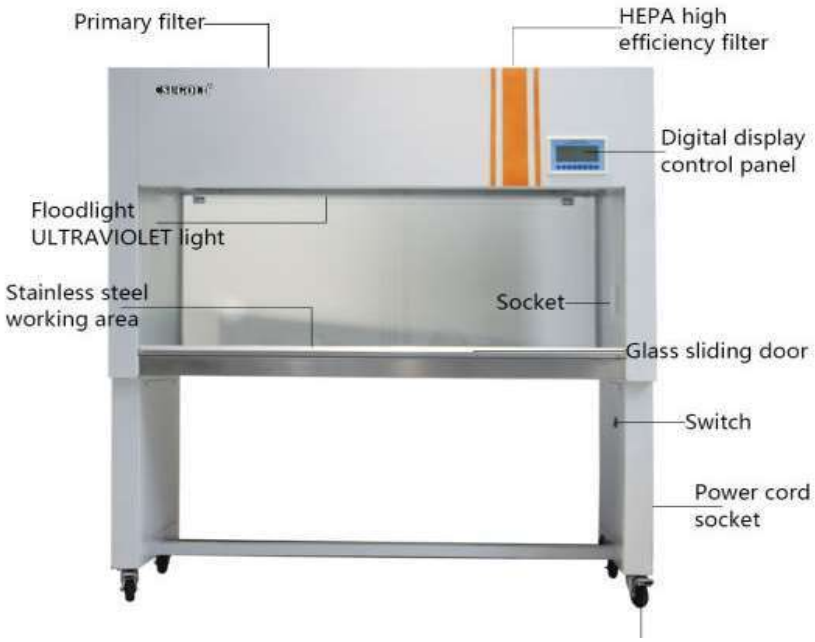
HOT AIR OVEN

1. Connect the power supply to the proper place
2. Turn on the mains switch
3. Set the temperature using the up and down keys on the digital controller
4. Press the enter key on the controller
5. Turn on the fan for proper air circulation
6. Use the rotary control switch to set the heater power
7. Place the sample to be heated in the oven
8. When the process is complete, turn off the machine

Here are some other things to know about hot air ovens:

- Hot air ovens are also known as forced-air circulating ovens
- They are used to sterilize equipment and other materials using dry heat
- The commonly used temperatures and times for sterilizing materials are 170°C for 30 minutes, 160°C for 60 minutes, and 150°C for 150 minutes
- The oven's door should not be opened and the keys of the digital controller should not be disturbed until the desired temperature is reached
- The progress of the oven's heating up can be observed on the digital controller

LAMINAR AIR FLOW

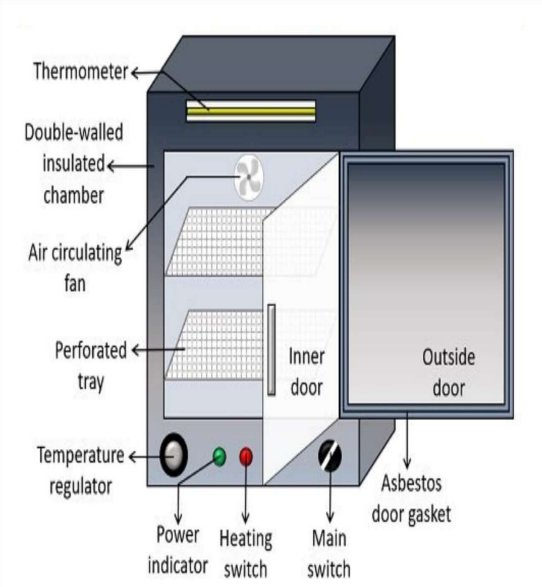


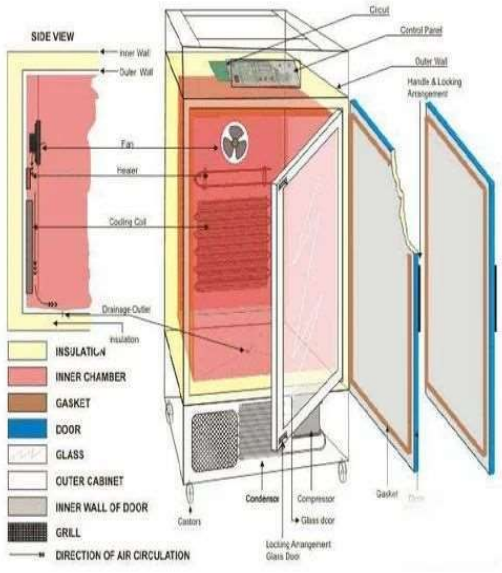
1. Turn on the mains
2. Make sure the manometer reads zero
3. Turn on the air flow switch
4. Turn on the UV lights
5. After 30 minutes, turn off the UV lights and turn on the visible light

Here are some other things to consider when operating an LAF:

- Start the LAF's main switch at least an hour before work
- Clean the LAF's platform with 70% methanol
- Close the LAF door
- Turn on the UV light for at least 45–60 minutes
- Wash your hands with a disinfectant to avoid contamination
- Turn off the UV power
- Turn on the air flow switch and open the LAF door
- Light the burner
- Start work
- Wash your hands after work
- Clean the platform with 70% methanol
- Close the door and turn off the power
- Stop the door

INCUBATOR/ BOD INCUBATOR





1. Environment temperature： 5 ~65 ℃ ℃
2. Relative humidity： ≤50%RH
3. Pressure: 80-106Kpa
4. No violent shake and corrosive gas around the incubator.
5. Avoid direct sun or effect from other cooling and heating sources.
6. There is no high concentration dust around the instrument except keeping horizontal installation.
7. Reserve particular space between equipment and wall.
8. Install it in adequate ventilation place.

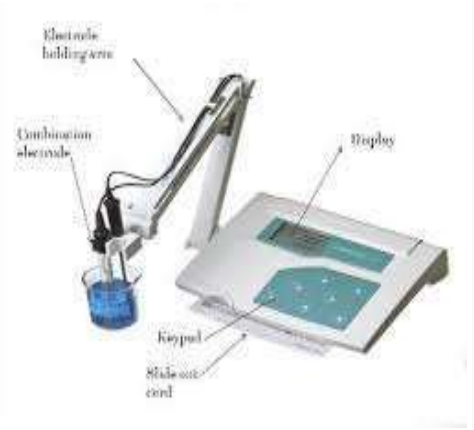
Here are some other things to consider when operating an

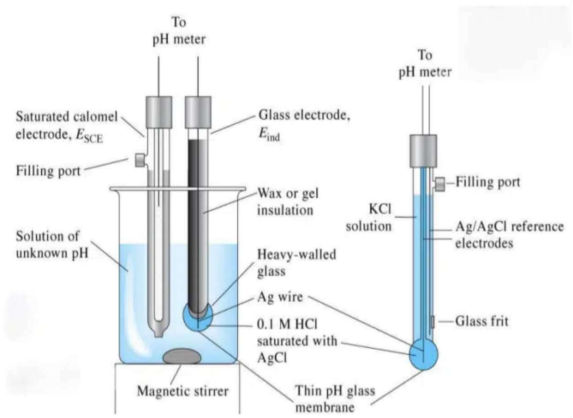
1. In order to ensure the safety of equipment and experiment, please install external grounding protection and supply power according to requirement of nameplate of equipment.
2. Don't test the inflammable and explosive materials, noxious goods and strong corrosive articles by this equipment.
3. Ensure the horizontal installation.
4. Laypeople must not demount and maintain.
5. Don't make compulsory startup, must eliminate the alarm reminder.
6. Read this instruction carefully before operate this equipment

SPECTROPHOTOMETER/ COLORIMETER

1. Connect the Spectronic 20 to an electrical outlet.
2. Most spectrophotometers need to warm up for about 20 minutes before use.
3. Turn on the instrument by rotating the power-zero control knob clockwise - (see the figure).
4. Turn the wavelength control knob to the appropriate wavelength:
5. For the spectroscopy/pipetting experiment use 510 nm
6. if you are measuring bacterial growth use 600 nm). Wait about 20 minutes.
7. 2. With the sample holder empty and closed rotate the power-zero control knob until the needle on the galvanometer reads: 0% Transmittance.
8. (To read the dial accurately move your head until the needle is at eye level and directly in front of its mirrored reflection).
9. You have now "zeroed" the spectrophotometer.
10. 3. Align the index lines of the sample holder and a cuvette containing your "blank" solution:
11. plain water in the spectroscopy/pipetting experiment
12. uninoculated medium if you are going to measure bacterial growth
13. Insert the cuvette and close the lid of the sample holder.
14. Rotate the light control knob until the needle on the galvanometer reads: 100% Transmittance. You have now "standardized" the spectrophotometer.
15. Repeat steps 2 through 4 until the readngs remain consistent, then start reading the absorbance and the % Transmittance of your samples.
16. Don't adjust any knobs when you read your samples!
17. After measuring a few samples, repeat steps 2 through 4 again. The Spectronic 20 is more accurate when it is frequently zeroed and standardized.

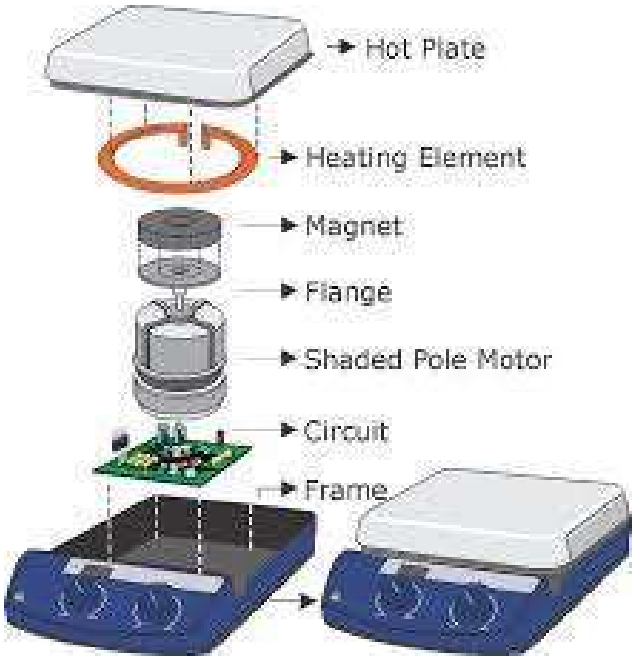
pH METER





1. New electrodes (or electrodes that have been in storage) should be conditioned in one inch (25mm) of pH 7.0 or 4.0 buffer for several hours prior to their use. Make sure that the wetting cap has been removed from the tip of the electrode.
2. Always remove the wetting cap and fill whole plug during calibration and Measurements. Replace the fill whole plug when done.
3. Calibrate the electrode daily. Though a 1 point calibration may be suitable for some applications, we recommend that a 2 point calibration (that brackets the expected pH range) be performed.
4. Be aware that if you are measuring hot or cold samples without the use of an ATC probe, the values displayed are not accurate. You should be calibrating and measuring at room temperature.
5. When transferring from one sample to another, always rinse the electrode with distilled water and blot dry. Handle the electrode carefully and do not use it as a stirring rod.
6. Do not use calibration buffers after the expiration date printed on the package. Keep the bottles tightly capped and stored according to the manufacturer's instructions.
7. Never put used buffer back into the bottle of new buffer. For small sample volumes, make sure that both the Ph bulb and the reference junction are in contact with the sample.
8. Response time is a function of both the electrode and the solution. Some solutions have very fast response while others, particularly those with low ionic strength, may take several minutes.
9. Samples must be in solution (water). You cannot measure the pH of a dry sample.

MAGNETIC STIRRER

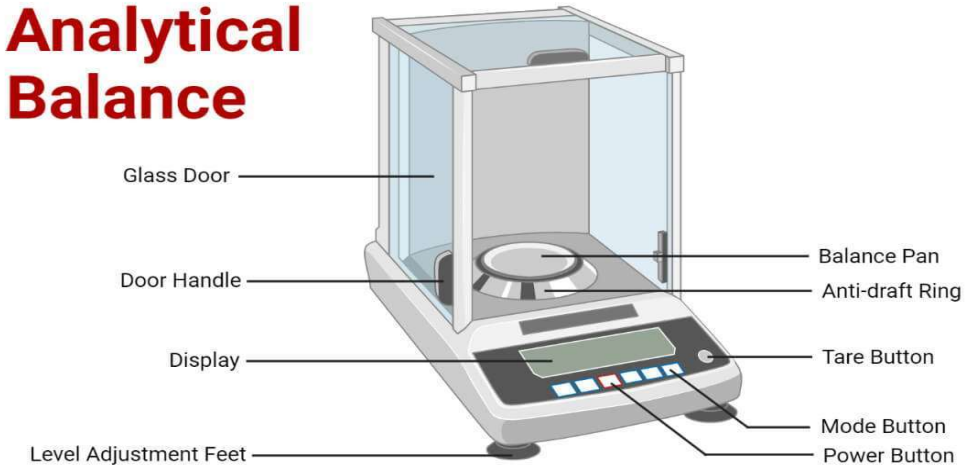


1. Ensure the socket is earthed
2. Turn off the power
3. Add the medium and stirring bar to the vessel
4. Place the vessel on the work plate
5. Set the stirring speed
6. Start stirring
7. Observe the stirring bar and LCD display
8. Stop stirring and heating when finished

Here are some additional tips for operating a magnetic stirrer:

- Do not use a metal container
- Do not heat or stir flammable or volatile liquids
- Use a slower stirring speed for high viscosity liquids
- Turn off the magnetic stirrer before connecting or disconnecting the connector
- Place the power supply unit in a dry, non-corrosive environment when working in humid or corrosive environments
- Do not use cylindrical stirring bars with a center ring or elliptical stirring bars with a round cross-section
- Avoid rotation speeds that cause the stirring bar to oscillate

ELECTRICAL WEIGHING BALANCE



1. Ensure the balance is on a shockproof surface and that all connections are secure
2. Make sure the balance is clean and the bubble in the level indicator is within the circular region
3. Turn on the balance
4. Place a clean weighing boat or paper on the balance pan
5. Close the doors
6. Press the tare button to zero the balance
7. Open one door and add the sample to the weighing boat using a spatula
8. Close the door and add more sample until the desired weight is displayed
9. Open the door and remove the sample
10. Close the door and press the tare button again

Here are some additional tips for operating an electrical weighing balance:

- Don't use damaged equipment
- Don't touch the cords or control panel with wet or contaminated hands
- Put the material to be weighed in a container or on weighing paper, not directly on the pan
- Place the material in the middle of the pan to avoid corner-load errors
- Don't return unused material to the stock bottle
- Clean the balance with a soft, clean brush after use
- Disinfect the balance pans and work area with 70% ethanol
- Turn off the balance at the end of the day

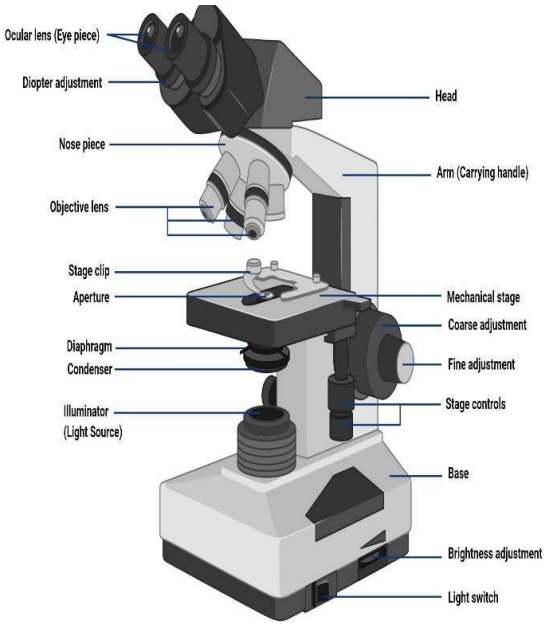
WATER BATH

1. Clean and level: Make sure the water bath is clean and on a level surface
2. Fill: Add distilled water to the desired level, making sure it covers the heating element
3. Connect: Plug in the power source
4. Turn on: Turn on the water bath's main power source
5. Set temperature: Use the SET key to set the desired temperature
6. Wait: Wait for the water bath to reach the desired temperature
7. Insert samples: Carefully place samples in the water bath, making sure they are fully submerged and stable
8. Close: Close the lid or cover to minimize heat loss
9. Set timer: Set a timer if needed
10. Turn off: When finished, turn off the water bath's main power source and remove samples

Here are some additional tips for operating a water bath:

- Ensure the surrounding area is dry and clean
- Use only purified water
- Don't disturb the temperature sensor near the heater
- Clean the water bath weekly with purified water and a clean, dry cloth

MICROSCOPES (STERIO, RESEARCH, COMPOUND, DISSECTION)

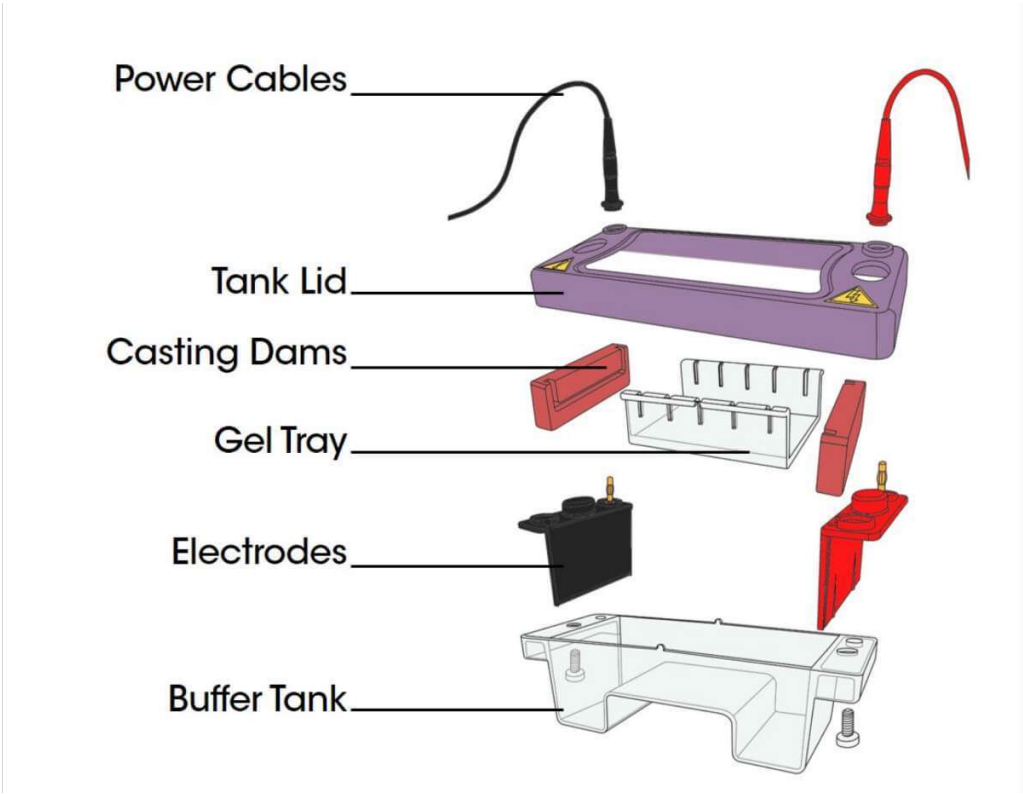


1. Turn the brightness dial to its minimum
2. Choose the correct specimen holder and mount it on the stage
3. Turn on the microscope power
4. Place the specimen on the stage plate
5. Use the revolving nosepiece to engage the lowest magnification objective
6. Adjust the illumination brightness
7. Use the coarse and fine adjustment knobs to focus on the sample
8. Adjust the interpupillary distance until the left and right fields of view coincide and the two index dots are horizontal

Here are some additional tips for operating a microscope:

- Always carry a microscope with both hands, holding the arm with one hand and supporting the base with the other
- When adjusting the focus, be careful not to drive the specimen into the objective
- If you have a stereomicroscope, adjust the distance between the eyepieces until you can see the sample clearly with both eyes simultaneously
- If you can't find your sample, use the stage knobs to move the slide so that the edge of the cover slip is directly under the objective
- Once the image is slightly in focus, use the fine focus knob to get the image perfectly in focus

ELECTROPHORESIS UNIT

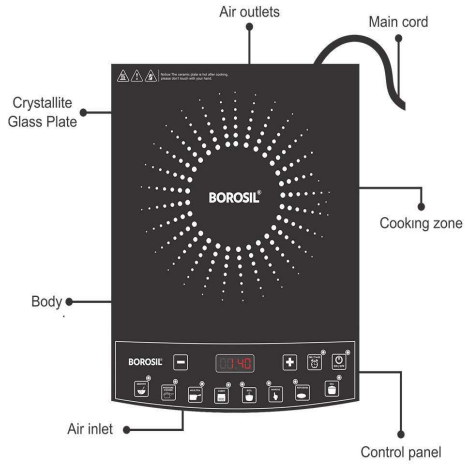


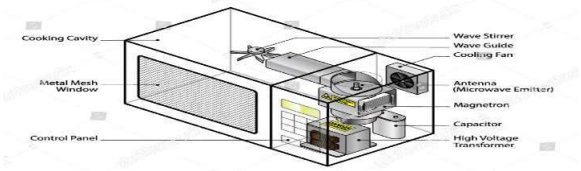
1. Connect the wires to the correct color terminals on the power supply
2. Plug in the power supply
3. Set the voltage to 150V
4. Ensure bubbles form on both sides of the gel box where the buffer reservoirs are
5. After 45 minutes, check that samples have migrated by looking through the lid
6. Turn off the power supply and disconnect it from the outlet
7. Remove the lid from the gel box and wait about 10 minutes for the gel to cool
8. Carefully remove the gel and place it onto a blue light transilluminator
9. Place an orange filter over the transilluminator to protect your eyes

Steps for experimentation

- Agarose powder is dissolved in TAE or TBE buffer. ...
- Combs are inserted into the gel. ...
- After solidification, the combs are removed to obtain wells.
- DNA samples are pipetted into the wells.
- Buffer is added to the electrophoresis chamber.
- Power is turned on to allow current conduction.

INDUCTION/ GAS STOVE/ CONVECTION MICROWAVE





1. Turn on the cooktop by pressing the Power button
2. Place compatible cookware on the heating element
3. Turn on the surface cooking area
4. Select a cooking function
5. When finished cooking, turn off the stove, remove the cookware, and serve
6. Cover the food with a lid or plastic wrap, but loosen it to let steam escape.
7. This helps destroy bacteria and cooks the food evenly. You can also use cooking bags.
8. Choose the timer: Set the timer for the desired cooking time in seconds or minutes.
9. Start cooking: Press the start button to cook the food.
10. Cancel: Press the cancel button if you accidentally enter the wrong time.
11. For using LPG stove be careful while turning the stove on lighting it with the lighter.
12. Turn off immediately after use.

Here are some safety tips for using a microwave oven:

- Be careful when heating water
- Make sure the door closes tightly
- Don't put metal in the oven
- Only use glass, ceramic, or plastic dishes
- Don't put sealed containers in the oven
- Don't turn on the microwave when it's empty
- If LPG stove smells do not use
- Keep it at well-ventilated area

PROJECTOR/ LAPTOPS/ DESKTOPS

1. Connect the power cord to the projector's power inlet
2. Plug the power cord into an electrical outlet
3. Turn on the power switch on the side of the projector
4. Press the On button on the projector or remote control
5. Laptops and desktops have many similar operating parts, including:
6. Motherboard: The main circuit board that connects and structures all other components, and controls how data transfers and what devices connect to the computer
7. Hard drive: A mechanical drive that stores data and can also be used as a boot drive
8. Random access memory (RAM): The memory that stores files from open programs
9. Central processing unit (CPU): Also known as the processor
10. Graphics processing unit (GPU): Also known as the video card

Here are some steps for setting up a projector:

1. Find a space for the projection, either a screen or a blank wall
2. Connect the projector to your video source, such as a laptop, DVD player, or gaming device, using the appropriate cable and adapter
3. Turn on the projector and select the correct input source
4. Adjust the display settings on your screen to mirror or extend the display

Here are some other tips for using a laptop:

- Backup data: Back up your drive at least once a week, or daily if you're working on an important project. This will help protect your files if your system crashes.
- Use antivirus software: Antivirus software protects against malware and viruses.
- Keeping a laptop plugged in after it's fully charged can damage the battery.
- Protect from bumps and drops: Use padding to protect your laptop from cosmetic dings.