Common components of all anesthetic units:
  a. source of oxygen
  b. regulator for oxygen (this may be part of the gas supply system)
  c. flowmeter for oxygen
  d. vaporizer

Used with a **breathing circuit** and **anesthetic waste gas scavenging system** for delivery of anesthetic to the patient

Anesthetic machines have **2 gas supplies:**
  a. small, high-pressure tanks attached directly to the machine
  b. hospital’s central pipeline supply

<table>
<thead>
<tr>
<th>Size</th>
<th>Gas</th>
<th>Color Code (U.S.)</th>
<th>Capacity and Pressure (at 70°F)</th>
<th>Empty Cylinder Weight (pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>Oxygen</td>
<td>Green</td>
<td>660 L</td>
<td>14</td>
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<tr>
<td>E</td>
<td>Nitrous oxide</td>
<td>Blue</td>
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<td>G</td>
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**MODERN ANESTHETIC MACHINE**

**Gas flow**
- Anesthesia delivery apparatus: (1) gas delivery system, (2) vaporizer, (3) breathing circuit, (4) waste gas scavenging system
- High-, intermediate-, and low-pressure areas in the anesthetic machine

**Flowmeter**
- Controls the rate of gas delivery to the low-pressure area of the anesthetic machine and determines the fresh gas flow (FGF) to the anesthetic circuit
- Flowmeters are gas specific and calibrated at 760 mmHg and 20°C

**Vaporizers**
- Vaporizers change liquid anesthetic into vapor and meter the amount of vapor leaving the vaporizer
- They work by splitting the carrier gas to flow into the vaporizing chamber (where it picks up anesthetic vapor) or to the bypass channel where it does not

- Factors that alter vaporizer output: temperature, flow, and pressure
- Most modern precision compensated vaporizers will maintain consistent output at flows between 0.5 and 10 L/min and temperatures between 15 and 35°C
- Three main styles of vaporizers: (1) Ohmeda Tec, (2) Drager Vapor, (3) Penlon Sigma series
Use of the wrong anesthetic in an agent-specific vaporizer
- Results in lower or higher anesthetic output (as a result of varying vapor pressures)

Oxygen flush valve
- Flush valves are designed to rapidly deliver large volumes of non-anesthetic containing gas to the patient breathing circuit in emergency situations
- Bypasses the flowmeter and vaporizer

Common gas outlet
- Gas reaching the common gas outlet has traveled from the gas supply (cylinder or pipeline), through the regulator, flowmeter, and vaporizer

Breathing system
- Primary purposes: (1) direct oxygen to the patient, (2) deliver anesthetic gas to the patient, (3) remove carbon dioxide from inhaled breaths (or prevent significant rebreathing of carbon dioxide), (4) provide a means of controlling ventilation.
- Two groups: those designed for rebreathing of exhaled gases (rebreathing or partial rebreathing system) and those designed to be used under circumstances of minimal to no rebreathing (non-rebreathing systems)

Rebreathing (Circle systems)
- Designed to produce a unidirectional flow of gas through the system and has a means of absorbing CO2 from exhaled gases
- Components include: fresh gas inlet, inspiratory one-way valve, breathing tubes, expiratory one-way valve, APL valve, reservoir bag, and carbon dioxide absorber

a. Full rebreathing: circle system using flow rates equal to, or nearing, the metabolic oxygen consumption of the patient, between 3 and 14 mL/kg/min
b. Partial rebreathing: circle system using a flow rate greater than metabolic oxygen consumption (e.g., 20 mL/kg/min) but less than that required to prevent rebreathing.
c. Non-(minimal) rebreathing: circle system using flow rates greater than 200 mL/kg/min (flow rates that would normally not be used in most circumstances). For use in very small patients that need high flow rates (<5kg).
Questions

1. Name three factors that can affect vaporizer pressure.

2. True or False. Partial rebreathing is a circle system that uses flow rates equal to, or nearing, the metabolic oxygen consumption.

3. A green H medical gas cylinder contains how many liters of gas?
   a. 660L of oxygen
   b. 6900L of oxygen
   c. 1590L of Nitrous oxide
   d. 15800L of nitrous oxide

4. Name the 4 common components to all anesthetic units

Answers

1. Name three factors that can affect vaporizer pressure
   
   Temperature, flow, and pressure

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   1. Full rebreathing: circle system using flow rates equal to, or nearing, the metabolic oxygen consumption of the patient, between 3 and 14 mL/kg/min
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   psi, pounds per square inch.

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   c. flowmeter for oxygen
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