Each molecule has different types of bonds...

**Dispersion:** [All Molecules]

**Dipole-Dipole:** [Polar]

**Hydrogen Bonding:** (\(\text{H}^+\text{O}^-\))

**Ion-Dipole:** [Mixture of Ionic + Polar]

...which influences Vaporization/Fusion...

1. **Vaporization Rate:**
   1. \(\uparrow\) Temp.
   2. \(\uparrow\) Surface Area
   3. \(\uparrow\) Strength of bond

**VOCAB:** **Volatile**
- Characteristic describing a liquid that vaporizes easily

**Heat of Vaporization**
- Amount of heat required to vaporize 1 mole of liquid
  \[H_{\text{Vap}} = 40.7 \text{ kJ/mol} \]
- Always positive/exothermic

**Clapeyron Equation**
\[
\ln P_{\text{Vap}} = \frac{-\Delta H_{\text{Vap}}}{R} \left(\frac{1}{T}\right) + \ln B
\]

**Fusion:**
- \(H_{\text{Fus}} = -6.02 \text{ kJ/mol} \)
- Always negative/endothermic
- Tends to be smaller than \(H_{\text{Vap}}\) for same molecule

**Sublimation Curve**
- Transition between gas and solid

**Fusion Curve**
- Transition between solid and liquid

**Vaporization Curve**
- Transition between liquid and gas

**Triple Point**
- Exact condition where all three states are stable and in equilibrium. The three states coexist.

**Critical Point**
- Condition where gas and liquid coalesce to form supercritical fluid (11.5)
The Hierarchy

DATE:

TOPIC(S):
Personality Theories

CLASS: PSY 202

What are the main concepts in this lecture?
1. Focuses at each type of theory and how they relate
2. Where famous exp. studies fall into the broader spectrum

Questions to Ask:
What theory has been shown to be the strongest indicator of personality behavior?

THEORIES OF PERSONALITIES
[not mutually exclusive]

SOCIAL PSYCH

FREUD

Behavior influenced by general factors

SITUATIONAL APPROACH

- Need more than one situation to change behavior
- People react differently with the same external conditions

ATTRIBUTION: Interpreting process of behavior

PSYCHOANALYTICAL THEORY

- Libido energy
- Psychosexual
- Conscious vs. unconscious
- Ego & Superego
- Id

Key Words:

ROGERS

- Individuals have free will & can reach self-actualization
- Focuses on conscious

HUMANISTIC THEORY

MASLOW

- Hierarchy of needs

- Rogers - growth-promoting climate, nurture, acceptance, basis of theory

BLISS

- Personality is inherited by genes
- Twin studies

BILOGICAL THEORY

- Innate
- Temperament

- Trait theory

- Environmental factors

KEYWORDS
### The Instruction Manual

#### Problem Example:
\[
\int (3x^2 + 2x) e^{x^3 + x^2} \, dx
\]

**Recognize:**  
- Exponent of \( e \) is coefficient \( u = x^3 + x^2 \)
- \( \frac{du}{dx} = 3x^2 + 2x \)
- \( du = (3x^2 + 2x) \, dx \)
- \( \int e^{u} du = e^{u} + C \)
- \( = e^{x^3 + x^2} + C \)

**Steps of the Problem:**
- **How are the exponents & coefficients related?**  
  - Make a \( u \) variable that includes as much as possible
- **pretend \( du/dx \) is a fraction,**  
  - multiply both sides by \( dx \)  
  - do this so you can rewrite the original problem easier
- **Substitute \( u \) in the original formula,**  
  - Take the derivative as usual
- **substitute the original value back in derived answer**

---

<table>
<thead>
<tr>
<th>If I get stuck on this type of problem, review or check:</th>
<th>Questions to Ask:</th>
</tr>
</thead>
</table>
| - unwind chain rule  
  - what patterns do I recognize?  
  - could I make it simpler? | what do I do if \( u \) does not exactly equal \( du \)?  
  - Could you do this with multiple variables? |
# The Matrix

**DATE:**

**TOPIC(S):**
Cardiopathologies

**CLASS:**
Anatomy

---

**What are the main concepts in this lecture?**

1. **Risk factors of Cardiopathologies**
2. **Symptoms of Cardiopathologies**
3. **Treatment of Cardiopathologies**

---

**Questions to Ask:**

why do B-blockers work for some pathologies but not others?

---

## The Matrix Example

<table>
<thead>
<tr>
<th>Theory/Concept:</th>
<th>Definition:</th>
<th>Characteristic 1: Risk Factors</th>
<th>Characteristic 2: Symptoms</th>
<th>Characteristic 3: Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coronary artery disease</strong></td>
<td>Vessels that provide blood to the heart get clogged by cholesterol causing atherosclerosis; blood can't get through Framingham Heart Study: <em>hypertension</em> (modifiable) <em>cholesterol</em> (modifiable) <em>age</em>, <em>sex</em>, <em>race</em>, <em>genes</em></td>
<td><em>chest pain</em>, <em>crushing pain</em></td>
<td><em>numbness</em>, <em>weakness</em></td>
<td><em>aspirin</em>, <em>anti-coagulants</em></td>
</tr>
<tr>
<td><strong>Ischemic Stroke</strong></td>
<td>75% of all strokes 1. embolism (traveling mass) 2. thrombosis: happens in blood cut off by clot, brain tissue dies</td>
<td><em>atherosclerosis</em>, <em>CAD</em></td>
<td><em>trouble speaking or comprehension</em></td>
<td><em>aspirin</em>, <em>Thrombolitic</em></td>
</tr>
<tr>
<td><strong>Hemorrhagic Stroke</strong></td>
<td>Trauma causes vessels to break, causes cascade of brain death 1. aneurysm 2. arteriovenous</td>
<td><em>aneurysm</em>, <em>arteriovenous</em></td>
<td><em>trouble seeing w/ one or both eyes</em>, <em>dizziness</em></td>
<td><em>anti-hypertensive</em>, <em>head elevated</em>, <em>lower head pressure</em></td>
</tr>
<tr>
<td><strong>Cardiomyopathy</strong></td>
<td>Issue with valves of the heart causing power failure, decreased pumping, or a blockage</td>
<td><em>diabetes</em>, <em>alcohol/drug abuse</em>, <em>viral infections</em></td>
<td><em>increased breathing</em>, <em>edema</em>, <em>weakness</em></td>
<td><em>low-salt diet</em>, <em>diuretics</em>, <em>ACE inhibitors</em>, <em>B-blockers</em></td>
</tr>
</tbody>
</table>
The Mind Map

DATE:  

TOPIC(S):  
- evolution

CLASS:  

What are the main concepts in this lecture?

1. evolution vs. natural selection
2. modern day natural selection | variance
3. Intelligent Design Controversy

Concept 1:  
Natural Selection:  
In any population, there are variations that end up being more helpful for survival of the species.  

Example: Peppered moths, industrial revolution

A. environment:
- rate of reproduction
- success in reproducing

happens over eons of time

Concept 2:
Best application: The Flu

Body gets better at recognizing before flu attacks. Randomly mutates, newest variants becomes more successful in attacking body

SUPERBUG

New bacteria doesn't have to fight the ecosystem

Antibiotics attack bacteria & stay away from resistant bacteria

Concept 3:
Intelligent Design:
not everything is created just "randomly" 
"things are so awe-inspiring"

Human eye

but there is variation here (far-sighted vs. near-sighted)
### The Outline

<table>
<thead>
<tr>
<th>Questions to Ask:</th>
<th>Class Notes:</th>
<th>References:</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is happening during H-fusion?</td>
<td>massive = ( &gt; 9 \times \text{Sun} )</td>
<td>pg. 83</td>
</tr>
<tr>
<td>Review: gravity pulls hydrogen atoms ( \rightarrow ) H-fusion (a plasma) [ \text{[Happens @ 10mil H]} ]</td>
<td></td>
<td>Lec. 5 (15/23)</td>
</tr>
<tr>
<td>( \Rightarrow ) ( \uparrow ) density, ( \uparrow ) pressure (gravity) ( \Rightarrow ) Release energy ( \downarrow )</td>
<td></td>
<td>pg. 87</td>
</tr>
<tr>
<td>( \Rightarrow ) H ( \rightarrow ) He ( \rightarrow ) C ( \rightarrow ) Ne ( \Rightarrow ) Every element starts fusing until it releases energy and forms the next core ( \Rightarrow ) bigger radius</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \Rightarrow ) keeps going until Fe ( \Rightarrow ) you can’t fuse iron to iron, requires energy ( # ) How the heavier elements form ( \Rightarrow ) will also form Ni in Fe core</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Words &amp; Theories to Define:</th>
<th>Summarize and Make Connections:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Massive Star Ignition mechanism endothermic Supernova</td>
<td>Massive stars go through the same process as regular stars, only they have more heat. ( \Rightarrow ) B/c of the ( \downarrow ) energy, more atoms can fuse, and ( \uparrow ) fusion ( \Rightarrow ) ( \uparrow ) release in energy. ( \Rightarrow ) This keeps going until iron b/c iron can’t fuse without extra energy ( \Rightarrow ). This ( \Rightarrow ) b/c ( \text{Fe} ) is stable.</td>
</tr>
</tbody>
</table>
The Storyboard

DATE:

TOPIC(S):
Origins of agriculture

CLASS:

What are the main concepts in this lecture?
1. How ag. was born
2. Benefits of being born
3. Why then & where

Birth of agriculture:
- Domesticated animals
- Made animals more robust
- Made plants! Harvest more predictable

FIRST BENEFIT:
More robust & predictable food means more reproduction

WHY BORN THEN:
WHERE:
Syria, China, Andes, Midwest, Savannah

SECOND BENEFIT:
Specialization, conflict dominance, property

Questions to Ask:
What was the domestication process like?
How did ice age affect ag. more specifically?

How the Concepts are Related to the Bigger Picture:

References:
Chapter 5, Lecture 7 & 8

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