The DIY

<table>
<thead>
<tr>
<th>DATE:</th>
<th>What are the main concepts in this lecture?</th>
<th>References:</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOPIC(S):</td>
<td>1. Types of Bonding</td>
<td>Table 11.4(pg. 466)</td>
</tr>
<tr>
<td>Bonds &amp;</td>
<td>2. Influences of vaporization</td>
<td>Lecture 9</td>
</tr>
<tr>
<td>Phase Diagrams</td>
<td>3. Phase Diagrams</td>
<td></td>
</tr>
<tr>
<td>CLASS: CH252</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Each molec. has different types of bonds...

- DISPERSION: [ALL MOLEC]
- DIPOLE-DIPOLE: [POLAR]
- HYDROGEN BONDING: [ION]
- ION-DIPOLE: [MIX of IONIC+POLAR]

VOCAB: VOLATILE

Characteristic describing a liquid that vaporates easily.

△ HEAT OF VAPORIZATION

amount of heat required to vaporize 1 mole of liquid

\[ H_{vap} = +40.7 \text{ kJ/mol} \]

Always positive/endoergic.

\[ \ln P_{vap} = -\frac{\Delta H_{vap}}{RT} + \ln B \]

Classius-Clapeyron equation

FUSION:

\[ H_{fus} = -6.02 \text{ kJ/mol} \]

△ CRITICAL POINT

Condition where gas & liquid coalesce to form supercritical fluid (11.5)

... which influences Vaporization/Fusion...

△ VAPORIZATION RATE:

1. \( \uparrow \) Temp.
2. \( \uparrow \) Surface area
3. \( \uparrow \) Strength of bond

Sublimation curve

Transition between gas & solid

Fusion curve

Transition between solid & liquid

Vaporization curve

Transition between liquid & gas

△ TRIPLE POINT

Exact condition where all three states are stable & in equilibrium. The three states coexist.
The Hierarchy

What are the main concepts in this lecture?
1. Focuses on each type of theory and how they relate
2. Where famous experiments fail
3. 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

PEHID
Behavior influenced by external factors

SITUATIONAL APPROACH

Behavior influenced by environmental factors

 need more than one situation
 People react differently even with the same external conditions

CONS of THEORY

Behavioral Erikson

Psychoanalytic

RESEARCH

Childhood exp. & Unconscious drive behavior

PSYCHOANALYTICAL THEORY

LIBIDO ENERGY
Psychosexual

CONSCIOUS vs. UNCONSCIOUS ego & Superego ID ego

KEYWORDS

HUMANISTIC THEORY

Hierarchy of needs

Rogers - growth promoting climate - nurtured acceptance

BASIC OF THEORY

BLUSS

Personality is inherited by genes

TWIN STUDIES

BIological Theory

Innate

Temperament (trait theory)

Environmental factors

KEYWORDS

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# The Instruction Manual

<table>
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<tbody>
<tr>
<td>TOPIC(S):</td>
<td>1. Basic U-Subs.</td>
</tr>
<tr>
<td>U-Substitution</td>
<td>2. Recognizing Patterns</td>
</tr>
<tr>
<td>CLASS:</td>
<td>3. Chain Rule</td>
</tr>
</tbody>
</table>

## Problem Example:

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

**Recognize:**
- exponent of e is coefficient
- \( u = x^3 + x^2 \)

\[
\frac{du}{dx} = 3x^2 + 2x \cdot dx
\]

\[
\int (3x^2 + 2x) dx \cdot e^{(x^3 + x^2)} = \int e^{(x^3 + x^2)} du
\]

\[
\int e^u du = e^u + C
\]

\[
= e^{x^3 + x^2} + C
\]

## 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

## If I get stuck on this type of problem, review or check:

- unwind chain rule
- what patterns do I recognize?
- could I make it simpler?

## Questions to Ask:

- What do I do if \( u \) does not exactly equal \( du \)?
- Could you do this with multiple variables?
# The Matrix

The Matrix is a visual aid tool used to organize information. It helps in understanding complex concepts by breaking them down into smaller, more manageable parts. Each row in the matrix represents a concept or idea, and the columns allow for the addition of definitions, characteristics, and related questions.

<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.</td>
<td>Framingham Heart Study - Hypertension (modifiable), Cholesterol (modifiable), Age, Sex, Race, Genes</td>
<td>Chest pain (crushing pain), Radiated pain, Nausea/vomiting, Shortness of breath</td>
<td>&quot;Clot-busting&quot; meds (aspirin), β-blockers, Nitro, Anticoagulants</td>
</tr>
<tr>
<td><strong>Stroke (Ischemic)</strong></td>
<td>75% of all strokes&lt;br&gt;1. Embolism (traveling mass)&lt;br&gt;2. Thrombotic (happens in blood cut-off, spot, death, tissue dies)</td>
<td>Other sclerosis, See CAD</td>
<td>Numbness/weakness, Trouble speaking or comprehension</td>
<td>Aspirin, Thrombolitic</td>
</tr>
<tr>
<td><strong>Stroke (Hemorrhagic)</strong></td>
<td>Trauma causes vessels to break, causes cascade of brain death</td>
<td>Aneurysm, Arteriovenous</td>
<td>Trouble seeing w/ one or both eyes, Dizziness</td>
<td>Anti-hypertensive, Head elevated, Lower head pressure</td>
</tr>
<tr>
<td><strong>Cardiomyopathy</strong></td>
<td>Issue with valves of the heart causing power failure, decreased pumping, or clot blockage</td>
<td>Diet (Na+), Alcohol/drugs, Abuse, Viral infections</td>
<td>Increased breathing, Edema, Weakness</td>
<td>Low-salt diet, Diuretics, ACE inhibitors, β-blockers</td>
</tr>
</tbody>
</table>

### Questions to Ask:
- Why do β-blockers work for some pathologies but not others?
The Mind Map

DATE: [Blank]

TOPIC(S): Evolution

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

Concept 2:
Best application: The Flu
Body gets better at recognizing before flu attacks. Randomly mutates, newest variants becomes more successful in attacking body.

- New bacteria doesn't have to fight the ecosystem
- Antibiotics attack bacteria, stops attack, resistant bacteria

Concept 3:
Intelligent Design:
Not everything is created just "randomly" b/c things are so awe-inspiring

- Human eye

But there is variation here (far-sighted v. near-sighted)
### The Outline

<table>
<thead>
<tr>
<th>Questions to Ask:</th>
<th>Class Notes:</th>
<th>References:</th>
</tr>
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<tbody>
<tr>
<td>What is happening during H-fusion?</td>
<td>massive = &gt;9x Sun</td>
<td>pg. 83</td>
</tr>
<tr>
<td>Review: gravity pulls hydrogen atoms together H-fusion (a plasma)</td>
<td>[Happens @ 10mil K]</td>
<td>Lec. 5 (10/2/3)</td>
</tr>
<tr>
<td>What's the reason behind this order of elements?</td>
<td>• ↑ density, ↑ pressure (gravity) → Release energy ↓ bigger radius</td>
<td>pg. 87</td>
</tr>
<tr>
<td>Fe is endothermic?</td>
<td>• H → He → C → Ne</td>
<td></td>
</tr>
<tr>
<td>Why Ni w/ Fe?</td>
<td>• Every element starts fusing until it releases energy and forms the next core</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• keeps going until Fe96</td>
<td></td>
</tr>
<tr>
<td></td>
<td>→ you can't fuse iron to iron, requires energy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• How the heavier elements form</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• will also form Ni in Fe core</td>
<td></td>
</tr>
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</table>

### Words & Theories to Define:

<table>
<thead>
<tr>
<th>Massive Star Ignition mechanism endothermic Supernova</th>
<th>Summarize and Make Connections:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Massive stars go through the same process as regular stars, only they have more heat energy. B/c of the energy, more atoms can fuse, and ↑ fusion → ↑ release in energy. This keeps going until iron b/c iron can't fuse without extra energy in. This is b/c Fe is a stable metal &amp; fusion ↑ stability.</td>
<td></td>
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</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 more predictable

FIRST BENEFIT:
- More robust + predictable food
- More demand for food

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:

<table>
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<tr>
<td>chapter 5, lecture 7+8</td>
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