

## Physical Development and Learning

### Slide 1) Physical Development and Learning

### Slide 2) Learning Targets

- ▶ Students will gain an increased appreciation of natural human physical development.
- ▶ Students will be able to identify at least 3 aspects of human physical development & describe 2 or more implications of each for classroom learning &/or teaching.
- ▶ Students will gain a deeper understanding of practices that support or are detrimental to human physical development and optimal functioning.

### Slide 3)

- ▶ As you view these slides, a technique that may enhance your learning is to translate the ideas presented into images on a piece of paper using colored pencils, crayons, markers, etc.

### Slide 4)

- ▶ You already know many things about human physical development from your own observations and experiences.
- ▶ Make a list of 10 of these things & share them with another student.

### Slide 5) Some things you listed:

### Slide 6) Physical Development

- Proceeds in an orderly, universal sequence.
- Occurs in “spurts” (periods of rapid growth) interspersed with “plateaus” (periods of slower growth).<sup>1</sup>

### Slide 7) Physical Development:

- Senses become more refined.
- Sensorimotor integration occurs.
- Brain “wiring” becomes more complex, paralleling an increase in thinking & communication skills.

### Slide 8) As children get older:

- ▶ height & weight increase.
- ▶ muscle strength and refinement of movements increases, first in gross motor then fine motor skill areas.

### Slide 9) Adolescence

- ▶ Adolescence brings changes in physical features and hormonal activity, enabling adolescents to become parents and introducing a number of potential social, physical, & emotional changes and issues.

### Slide 10) Other issues:

- Some lifestyle practices, e.g. exercise, good nutrition, and sleep and rest contribute to healthful physical development.
- Conversely, consumption of alcohol and drugs, smoking, and high-risk behaviors such as reckless driving and unprotected sex can be detrimental to one's physical development & well-being.

**Slide 11) Review and Discuss**

- ▶ Describe how physical development occurs through childhood and adolescence.
- ▶ During puberty what types of changes occur? What is the impact on learning?

**Slide 12) What is the role of physical development in learning?**

**Slide 13) What does Zull mean by this statement?**

- ▶ “Learning is about biology.” (p. xiii) <sup>2</sup>

**Slide 14) At birth, we are a world of possibilities**

**Slide 15) Sonogram picture**

**Slide 16) You are a marvel**

“... Do you know what you are? You are a marvel. You are unique. In all the years that have passed, there has never been another child like you. Your legs, your arms, your clever fingers, the way you move.

**Slide 17)**

You may become a Shakespeare, a Michelangelo, a Beethoven. You have the capacity for anything. Yes, you are a marvel. And when you grow up, can you then harm another who is, like you, a marvel?

You must work -- we all must work – to make the world worthy of its children.”

**Slide 18) Nature vs. Nurture Debate**

**Slide 19) The “father of behaviorism,” John Watson, stated in 1930:**

“Give me a dozen healthy infants, well formed, and my own specified world to bring them up in and I’ll guarantee to take any one at random and train him to become any type of specialist I might select – doctor, lawyer, artist – regardless of his talents, penchants, tendencies, abilities, vocations and race of his ancestors.”

**Slide 20) Watson continued:**

- ▶ “I am going beyond my facts and I admit it, but so have the advocates of the contrary and they have been doing so for many thousands of years.” (p. 104)<sup>4</sup>

**Slide 21) Review and Discuss**

- ▶ **As a behaviorist Watson focused on observable characteristics. Is his claim possible based on this philosophy? Explain.**

**Slide 22) Philosopher John Locke believed  
that we enter the world as  
a blank slate  
(tabula rasa)  
with a few mental  
capabilities**

**Slide 23)**

**??? What do YOU think ?**

**??? Is intelligence fixed at birth?**

**??? Do you have a “fixed” or “growth” mindset ?<sup>5</sup>**

In her book, *Mindset: The New Psychology of Success* (2007), Carol Dweck, Ph.D. includes Nigel Holmes' diagram that contrasts a person with a fixed mindset (“Intelligence is static”) with a growth mindset (“Intelligence can be developed”). According to Dweck and Holmes, as a result of their respective mindsets and an emphasis on appearing smart vs. an eagerness to learn, fixed-mindset (F) vs. growth-minded (G) individuals tend to: avoid (F) or welcome (G) challenges; regard effort as useless or an indication of deficiency (F) as compared with a way to progress ; give up (F) vs. persist when confronted with obstacles; disregard (F) or learn from negative feedback; and find others' success threatening vs. learning and being inspired by others' success.

**Slide 24) Review and Discuss**

- ▶ **How does the type of mindset that students have affect development?**

**Slide 25) Big Idea: Plasticity of the brain**

The findings, over the past four decades, of scientists dubbed ‘neuroplasticians’ by Doidge (2007)<sup>6</sup> has demonstrated the error of the long-held belief that the structure and functioning of the brain is fixed. Not only does the brain change in response to various activities, including learning<sup>7</sup> but in some cases, when damaged, the brain may reorganize itself so that another part of the brain takes over the previous functions of the damaged portion, and sometimes replaces brain cells that have died.<sup>6</sup> Unlike other cells in the body, which are replaced on a regular basis, neurons tend to exist for the life of an individual. It has also been commonly accepted that new nerve cells are not produced after the nervous system has been formed. A relatively recent finding that challenges this idea is the discovery that neurogenesis occurs in the adult human hippocampus, which has been called ‘the gateway to memory’ (Kempermann, 2002, p. 635).<sup>8</sup>

**Slide 26) In the beginning...**

- ▶ **During the 1<sup>st</sup> 18 weeks of life, *neurogenesis* (production of neurons, i.e. nerve cells) occurs at an average rate > 500,000/minute.**

- ▶ Using glial cells to guide them, these neurons migrate to their genetically preordained place in the brain.<sup>9</sup>

Slide 27)

The result is a human brain containing 100 billion neurons and 1 trillion glia, cells that support the neurons.<sup>10</sup>

Slide 28)

Subsequently...

other processes, which continue after birth, occur:

Slide 29)

1) Dendrites branch and form spines in response to sensory stimulation and experience.

Diamond & Hopson (1998)

call these structures “Magic trees of the mind”.<sup>10</sup>

Slide 30) Diagram of a neuron

Slide 31)

NOT Nature OR Nurture,

Nature AND Nurture:

Initial brain development unfolds via genetic instructions. (Nature)

Most dendrite growth (up to about 83%) happens AFTER a baby is born. (Nurture)<sup>9</sup>

Slide 32)

2) Synaptogenesis, the formation of junctions between neurons, enables communication among them.<sup>9,11</sup>

- In the human brain, 1,000 *trillion* junctions are created!<sup>10</sup>

Slide 33)

3) Myelination, the coating of an axon with a fatty sheath, speeds the transmission of messages from one neuron to another.

Slide 34) Pruning

- In order to fit the individual’s neural circuitry to the demands of his or her particular environment, little-used synapses (not much electrical & chemical activity) are eliminated.

Slide 35)

Through the

INTERACTION of NATURE and NUTURE,

therefore, a structure (the human brain) is created that can direct thousands of activities at the same time, including:

- **perceiving, interpreting, & reacting to sensory stimulation**
- **solving problems**
- **initiating thoughts**
- **generating feelings**
- **overseeing numerous processes and chemical interactions<sup>9</sup>**

**Slide 36) Review and Discuss**

- ▶ **Why are dendrites described as magic trees of the mind?**
- ▶ **How do nature and nurture affect neurons? What is the impact on physical development?**

**Slide 37) Diagram of the brain**

**Slide 38)**

**As we learn more about the brain through the use of increasingly sophisticated technologies, we are finding support for various theories that have been proposed regarding learning.**

**Slide 39) Edward Lee Thorndike**

- **For example, Thorndike's Law of Effect- "an act that is followed by a favorable effect is more likely to be repeated in similar situations"<sup>12</sup> (and vice versa) - is congruent with the reinforcing effect of the "pleasure pathway" in the brain.**

**Slide 40) Albert Bandura**

- **Likewise, the discovery of the brain's mirror neurons<sup>13</sup> -- which appear to play a role in empathy and help humans learn via imitation<sup>14</sup> -- supports the work of Albert Bandura regarding modeling.**

**Slide 41) Jean Piaget**

- **Developmental stages of cognitive and moral development are consistent with development of the central nervous system.**
- **Example: the prefrontal cortex (problem-solving, decision-making, judgment) continues to develop into early adulthood.**

**Slide 42) Lev Vygotsky**

- **Zone of Proximal Development (ZPD):**
- **With help from adults or more capable peers, children can "grow their brains" through experience and accomplish more than they could do on their own.**

**Slide 43) Review and Discuss**

- ▶ **How does the development of the brain affect cognition or thought processes?**

**Slide 44) What are key physical factors involved in learning?**

- **Integration of primitive reflexes**
- **Movement and exercise**
- **Integrity of senses & neurological system**
- **Nutrition including adequate hydration**
- **Sufficient sleep and rest**
- **Oxygen, fresh air, and natural light**
- **Stress level**

**Slide 45) Primitive Reflexes**

- **“...are automatic, stereotyped movements, directed from the brain stem and executed without cortical involvement.”**
- **“...designed to insure immediate response to this [the infant’s] new environment and to his changing needs.”**

**- Goddard (2005, p. 1)<sup>15</sup>**

**Slide 46) Primitive Reflexes**

**Designed to become inactive and integrated into the child’s physiological system according to a natural developmental sequence. Example: Rooting Reflex, Spinal Galant, ATNR**

**Failure to integrate at the proper time can interfere with the appearance of other reflexes and negatively impact ability to function and learn.**

**Slide 47) NDD**

- **The “omission or arrest of a stage of early development” is known as NDD (Neuro-Developmental Delay).<sup>16</sup>**

Additional information on NDD is available at the website of The Institute for Neuro-Physiological Psychology, [http://www.inpp.org.uk/ndd\\_neuro\\_developmental\\_delay/index.php](http://www.inpp.org.uk/ndd_neuro_developmental_delay/index.php)

**Slide 48) Some consequences of NDD**

**Problems with:**

- **eye-hand coordination, cursive writing, reading, telling time by using the hands of a clock, speech/articulation, sitting still**
- **ignoring non-relevant auditory & visual stimuli**
- **performance in physical activities**
- **sense of time & balance**
- **inconsistency between oral and written work**

**Slide 49) Movement...**

**...is important developmentally as the body's motor and sensory apparatus become integrated and**

**the child learns to crawl, walk, run, etc.**

**...also serves a number of important functions throughout life, such as toning the muscles and increasing oxygen intake.**

**Slide 50) Supervised 'tummy time' when babies are awake is essential**

- ▶ **to develop core muscles (chest, back, neck, and abdomen) needed not only for locomotion but also sensory integration (e.g. hand-eye coordination), regulation of breathing, and future speech development. [Newsweek]**
- ▶ **Keeping babies in car seats and other apparatus restricts movement, and therefore, natural development.**
- ▶ **See Tummy Time Tools at [http://www.moveforwardpt.com/consumer\\_tips/](http://www.moveforwardpt.com/consumer_tips/) for activities.**

**Slide 51)**

**According to Dennison & Dennison, who developed Edu-K (Educational Kinesiology), "Movement is the door to learning."<sup>18</sup>**

**Although more research is needed, there is some evidence to suggest that the use of their Brain Gym exercises may have an integrative effect on a person's nervous system and ability to function effectively. \***

\* For example, several small studies which have been conducted have yielded positive results including improvements: in academic as well as athletic performance; attendance; attitude and behavior; ability to make decisions; and self-esteem (Bredal,1994,1996,1997,1998 cited in Justice, 2008).

**Slide 52) Review and Discuss**

- ▶ **What else have you learned about the importance of movement?**
- ▶ **How might movement be incorporated into various aspects of the school day?**
- ▶ **What are potential results on learning when primitive reflexes fail to disappear?**
- ▶ **Explain the importance of tummy time during infancy.**

**Slide 53) Sensory development and integration**

- ▶ **We take in information from the environment through our senses, which include visual, auditory, vestibular, proprioception, taste, and touch.**
- ▶ **Development and integration of these senses with each other and the CNS (central nervous system) are key tasks of childhood.**

Note 1: Proprioception is defined by Bear et al. (1996) as "the sensation of body position and movement using sensory signals from muscle, joint, and skin" (p. 629). Note 2: An example of the interaction among the senses- touching a baby, especially on the hands, arms, feet, & face causes production of a hormone that stimulates nerve ending growth in nerve cells involved in sensory functions such as vision (Hannaford, 2005).

**Slide 54) Vision**

- ▶ **Continues to develop for several years after birth**
- ▶ **Is shaped by our experiences with our environment**
- ▶ **Mostly occurs in the brain, which interprets visual inputs – about 50% of the cerebral cortex (more than 24 areas) as well as parts of “lower” brain regions are involved with the process of vision.<sup>9, 19</sup>**

**Slide 55)**

**Ability to see clearly (visual acuity), which is typically checked in school screenings, is just one aspect of vision. Other important aspects include:**

- **ability to focus at varying distances (accommodation)**
- **ability of the eyes to work together in a coordinated way (teaming)**
- **tracking (pursuit)-ability to follow a moving target or in the case of reading, to smoothly follow a line of print**
- 

In a visual assessment of 461 California high school students whose reading performance was 2 or more years below grade level, Grisham, Powers, and Riles (2007) found that whereas 17% of the group had visual acuity problems, 80% displayed inadequacies related to accommodation and vergence. [Justice]

**Slide 56)**

**According to The American Public Health Association, “25% of students in grades K-6 have visual problems that are serious enough to impede learning.”<sup>20</sup>**

**The Vision Council of America states: “It is estimated that 80% of children with a learning disability have an undiagnosed vision problem.”<sup>20</sup>**

For more information, go to <http://www.visionforlearning.org>.

**Slide 57) Signs of visual problems that interfere with learning**

- \*While reading or copying-**
  - a) **skips lines or words**
  - b) **loses place or**
  - c) **substitutes words**
- \*Rereads words or lines**
- \*Reverses letters, numbers or words**
- \*Uses a finger or marker to keep place while reading/writing**
- \*Reads very slowly**
- \*Poor reading comprehension**
- \*Poor spelling skills**
- \*Difficulty remembering what has been read**
- \*Eye turns in or out**
- \*Dislikes tasks requiring sustained concentration**
- \*Holds head too close when reading or writing (within 7-8 inches)**
- \*Squints, closes, or covers one eye while reading**

- \*Unusual posture/head tilt when reading/writing
- \*Red or watery eyes
- \*Headaches following intense reading/computer work
- \*After completing a visual task-
  - a) eyes hurt or feel tired
  - b) person is unusually tired
- \*Double vision
- \*Unusual blinking or eye rubbing
- \*Avoids near tasks such as reading
- \*Carsickness

**Slide 58) Additional signs**

- \*Vision blurs at distance when student looks up from near work
- \*When reading
  - a) letters or lines ‘run together’ or words ‘jump’
  - b) print seems to move or go in and out of focus
- \*Writing is crooked or poorly spaced
- \*Misaligns letters or numbers
- \*Makes errors copying from the board
- \*Feels sleepy while reading
- \*Difficulty tracking moving objects
- \*Eyes bothered by light
- \*Unusual clumsiness, poor coordination
- \*Confuses left & right directions
- \*Difficulty with sports involving good eye-hand coordination
- \*Sees more clearly with one eye than the other
- \*Becomes restless when working at his/her desk
- \*Tends to lose awareness of surroundings when concentrating
- \*Must ‘feel’ things to see them
- \*Exaggerated head movements while reading
- \*Homework takes longer than it should.

**Slide 59)**

<http://fpdc.kent.edu/justice/MOV00442.MPG>

To view a video clip illustrating eye movement, click on the website on this slide. Students can observe eye movement directly by working in pairs facing each other and sitting with knees almost touching. One member of each pair moves a pencil or pen at the partner’s eye level- horizontally, vertically, clockwise, counterclockwise and diagonally- while his/her partner looks at the end of the pen/pencil and follows its movements, moving only the eyes. Move the pen or pencil smoothly and more slowly than shown in the video clip.

**Slide 60) Recommendations for supporting the visual system**

- Encourage far point visual activities such as outdoor play.

- **Alternate close up activities, e.g. computer work and reading with those requiring far point vision; take short, frequent breaks when using a computer.**
- **Limit the time spent in “screen time” activities such as TV and video games.**
- **Teach stress reduction techniques in order to prevent tension which has a detrimental effect on eyesight.**

Schneider (2004) says that our lifestyle habits in this country contribute to visual problems and notes that, “It has been shown that illiterate societies have much better eyesight than those who are more literate” and compares the 62% of children needing glasses in Hong Kong with the 3% of those with visual problems in rural Tibet, which has a high rate of illiteracy (p. 19) .

#### **Slide 61) Sound and Audition**

**“Virtually everything on earth vibrates...*everything* has a sound, a vibration all its own.”**  
(Leeds, 2001, p. 120)<sup>21</sup>

**Humans typically can hear vibrations with a frequency between 20 and 20,000 Hz.**<sup>19</sup>

**According to Tomatis, sound, especially at higher frequencies, functions as a nutrient for the brain & promotes cognitive development.**<sup>21,22</sup>

#### **Slide 62)**

**Sound can also have detrimental effects-**

- **According to Healy, TV speech may affect children’s language development because they need to hear slower pronunciation of words.**<sup>23</sup>
- **Environmental noise can create stress,<sup>24</sup> affect student achievement<sup>25, 26</sup>, and at higher levels, cause hearing loss<sup>21</sup>. EPA maximum recommended levels= 45 db. (day) & 35 db. (night)<sup>26</sup>**

#### **Slide 63)**

**Very low frequencies, such as those generated by air conditioners, vehicles, and other machines, can be harmful to the body and may cause physical symptoms such as headaches.**<sup>19</sup>

**Could an explanation be the phenomenon of “sympathetic vibration”, in which one substance (which may include living tissue) resonates to the frequency from another source? In medicine, for example, the power of resonance is employed in the use of sound to dissolve kidney stones.**<sup>21</sup>

#### **Slide 64)**

**How might you use your knowledge about sound productively in the classroom?**

#### **Slide 65) Review and Discuss**

- ▶ **What are educational implications for visual problems? How can you as a teacher accommodate these issues?**
- ▶ **What are educational implications for auditory problems? How can you as a teacher accommodate these issues?**

**Slide 66)**

What we eat and drink, of course, is a key to good health and ability to function. Discuss some things you would recommend to your students. Here are some guidelines:

- Be sure you are relaxed and aware of your food when eating; take your time. Breathe in more oxygen to digest and assimilate your food.
- Choose quality foods, including fresh fruits & vegetables, whole grains, high-quality meats & other proteins, quality fats such as olive, sesame, & coconut oil.
- Avoid poor quality foods, including hydrogenated oils & refined carbohydrates, e.g. corn syrup, white flour, white sugar, & artificial sweeteners.<sup>27</sup>

**Slide 67) Refined carbohydrate intake on a regular basis**

Can lead to a functional hypoglycemic cycle in which the bloodstream is flooded with glucose, followed by a drastic decrease in blood glucose, resulting in irritability and difficulty with concentration and clear thinking as well as a desire for more food.<sup>28</sup>

**Slide 68) Allergies**

... can also result in irritability and reduced ability to function well, including academic performance.

**Slide 69) Water**

As a fetus, you were 99% water. Now your body is about 70-75% water, with water composing an even greater percentage of your brain.<sup>29</sup>

Adequate water intake is essential for health and ability to function. Coffee, tea, caffeinated soft drinks, and alcohol take water OUT of the body.<sup>29</sup>

**Slide 70)**

Why is water so essential to life and learning?

**Slide 71)**

‘Water, the solvent of the body, regulates all functions, including the activity of the solutes it dissolves and circulates’.

-(Batmanghelidj, 1997, p.19)<sup>29</sup>

Besides dissolving and transporting various substances in the body, water:

- plays a role in chemical reactions & aids digestion.
- generates energy.
- supports the weight of the upper body<sup>29,30</sup>

**Slide 72) Water also:**

- is important in maintaining the architecture & polarity (electric potential) of cells.
- plays a role in message transmission in the brain.
- contributes to efficiency of protein and enzyme functions, promoting development of nerve nets and growth of dendrites.<sup>29,30</sup>

**Slide 73) In addition, water in the body:**

- ▶ provides moisture on the surface of the lungs' air sacs needed for oxygen transmission into the bloodstream
- ▶ plays a role in hemoglobin's ability to transport oxygen, which is considered "the most fundamental and necessary metabolic nutrient for the body." (David, 2005, p. 42)<sup>27</sup>

**Slide 74) Dehydration:**

May contribute to

- headaches,
- stomach pain,
- allergies,
- asthma, and
- stress.<sup>29</sup>

**Slide 75) Review and Discuss**

- ▶ As a teacher, how can you apply your knowledge about water to promote learning and development in your classroom and school?

**Slide 76) Sleep**

Discuss:

Why is sleep important?

How much sleep do people need?

What happens when you don't get enough sleep-

How do you feel?

What effect does inadequate sleep have on your ability to function?

**Slide 77)**

**SLEEP...**

- is necessary for processes of growth and repair.

**Rapid Eye Movement (REM) sleep...**

- may be important in brain development as well as memory formation/consolidation.<sup>11,31</sup>

**Slide 78) What is stress and how does it impact learning?**

"The way we choose to perceive and process our experiences determines whether we handle them calmly or allow them to trigger the stress response....We can choose to see any situation as a learning opportunity or as a threat. It truly is our choice and our children will follow our lead."

– Hannaford (2005, p. 186)<sup>30</sup>

**Slide 79) Stress Reactions: Fight or Flight**

- ▶ Mobilizes body resources in response to the PERCEPTION of a threat

- ▶ **Natural defense mechanism, but chronic elicitation of Fight or Flight response has detrimental effects on the body**

**Slide 80)**

**Discuss with a partner:**

- **What do you find stressful?**
- **What are some things that may create stress for your students?**

**Slide 81) Stress and Learning**

- **Eyes look peripherally**
- **Activation of Tendon Guard Reflex**
- **Decrease in dopamine levels**
- **Decrease in receptiveness of thalamus to incoming sensory information**
- **May cause tension in neck and shoulders, reducing blood flow to the eyes, resulting in a decrease in visual functioning.**

**Slide 82) Stress and Learning**

- ▶ **Decrease in blood flow to digestive system and cerebral cortex of brain, especially non-dominant hemisphere and frontal lobes**
- ▶ **Brain “downshifts” into survival mode**
- ▶ **Incoherent heart frequencies and brain wave patterns in frontal lobe**

**Slide 83) Review and Discuss**

- ▶ **What are the implications, for classroom learning and teaching, of the effects of stress?**

**Slide 84) Reducing Stress**

- ▶ **Sixty-beat/minute music**
- ▶ **Slow, rhythmic breathing**
- ▶ **Visualization exercises**
- ▶ **Self-talk**
- ▶ **Positive mental attitude, affirmation**
- ▶ **Environmental changes**

**Slide 85)**

- ▶ **When practicing stress reduction, be sure you are in a safe environment.**
- ▶ **Avoid activities that require your attention, such as driving a car.**
- ▶ **Allow yourself time after relaxing to become fully alert before doing things that require attention.**

**Slide 86) Stress Reduction Exercise**

**Slide 87) Adolescent Issues**

- ▶ **Hormonal changes**
- ▶ **Physical awkwardness**

- ▶ Sexuality
- ▶ Drugs & alcohol...

Slide 88)

... can put adolescents in  
Jeopardy

For the answers in the next 5 slides, click on the star below each question.

Slide 89)

For 10 points

Alcohol	Tobacco	Marijuana	Name That Drug	Etc.
Part of body most affected by alcohol	Main cancer-causing ingredient	THC stays in the body for 1 month. Why?	This substance is the # 1 killer in the U.S.	This drug causes a sharp increase in internal body temp.



Slide 90)

For 20 points

Alcohol	Tobacco	Marijuana	Name That Drug	Etc.
Length of time it takes the liver to metabolize 1 drink	Poison in cigarette smoke that replaces O <sub>2</sub> in the blood	What effect can marijuana have on female reproductive system?	A prescription pain-killer for cancer; widely abused by teens	Highly addictive stimulant made in home labs



\* For pictures showing the effects of meth, go to  
<http://www.drugfree.org/Portal/DrugIssue/MethResources/faces/index.html> and  
<http://www.facesofmeth.us/main.htm#>

Slide 91)

### For 30 points

Alcohol	Tobacco	Marijuana	Name That Drug	Etc.
Very first function of your brain that alcohol affects	Approx. annual cost of smoking 1 pack of cigarettes per day	Learning process often impaired after marijuana use	<b>Short, intense high followed by a long, intense crash.</b>	Odorless, colorless tasteless date rape drug
Judgment & ability to reason	Almost \$2,000	Memory	Cocaine	Rohypnol Or GHB*

\* GHB is colorless; however, rohypnol will turn blue in a drink. Students should be cautioned to never leave any type of drink unattended.

### Slide 92)

### For 40 points

Alcohol	Tobacco	Marijuana	Name That Drug	Etc.
Very 1 <sup>st</sup> warning sign of alcohol poisoning	Amt of tar left in your lungs after smoking 1 pack/day for 1 year	Name 3 cancers that smoking marijuana can contribute to	This drug, when combined with alcohol, can shut off vomiting reflex	Symptom of what drug? Jaundice, swelling of feet & hands; aching joints
Vomiting	Quart*	Mouth, lung, throat, bladder, pancreas	Marijuana	Steroids

\*This tar is the same as that found on roads, playgrounds, parking lots, etc. You can create a visual by showing students a quart of dark molasses to simulate the tar. Also note: a person in late stages of emphysema will cough up 2 cups of phlegm per day and will most likely be on oxygen 24/7. To create a simulated phlegm visual, mix 1 cup yellow hair gel and 1 cup green hair gel and put in a jar.

### Slide 93)

**For 50 points**

Alcohol	Tobacco	Marijuana	Name That Drug	Etc.
Alcohol is classified as what type of drug & why?	Chemical in cigarettes that makes it hard to get O <sub>2</sub> to parts of body	Plant name for marijuana	Can leave chemical odor on breath or clothing	Prescription stimulant; if misused can cause heart attack & toxicity
Depressants slows CNS	Nicotine	Cannibus sativa	Inhalant	Aderal (Also, Ritalin)

**Slide 94) Credits, Sources, and Resources**

Materials compiled by Lisbeth K. Justice, Ph.D.

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Special thanks to:

Advanced Brain Technologies (ABT)

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[www.advancedbrain.com](http://www.advancedbrain.com)

(888) 228-1798

for permission to use selections from The Sound Health Series (ABT, 1999) produced by Richard Lawrence and Joshua Leeds and performed by The Arcangelos Chamber Ensemble in association with the Center for Psychoacoustic Research:

Music for Thinking CD

Music to De-Stress CD

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**Slide 96) Sources**

<sup>1</sup>Ormrod, J.E. (2009). *Essentials of educational psychology, 2<sup>nd</sup> ed.* Upper Saddle River, NJ: Pearson Education.

<sup>2</sup>Zull, J. E. (2002). *The art of changing the brain: Enriching the practice of teaching by exploring the biology of learning.* Sterling, VA: Stylus.

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<sup>4</sup> Watson, J.B. (1930). *Behaviorism, revised ed.* Chicago: University of Chicago Press. Retrieved January 16, 2010, from <http://education.stateuniversity.com/pages/2543/Watson-John-B-1878-1958.html>

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