UIL Biology
2018-2019

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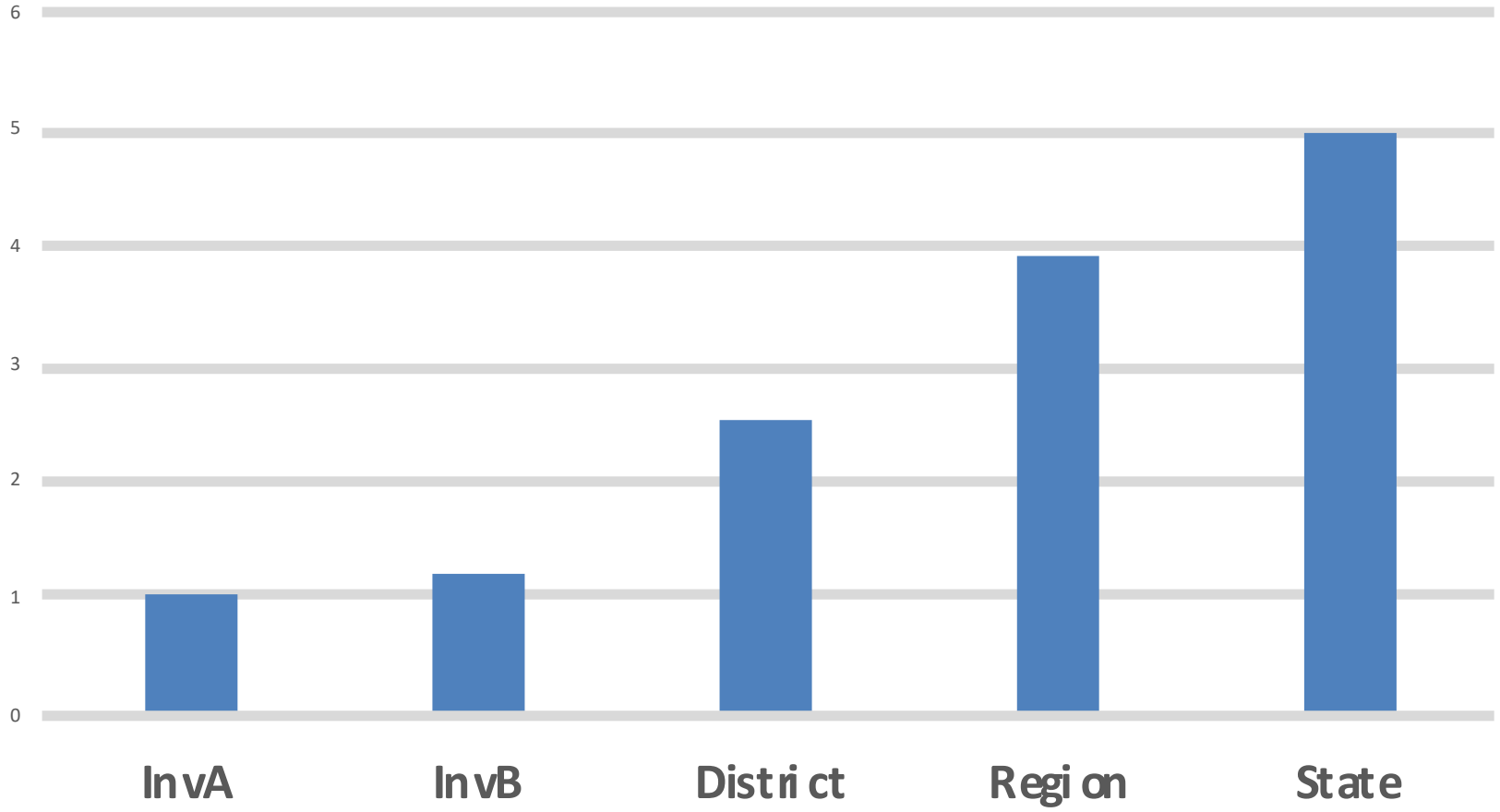
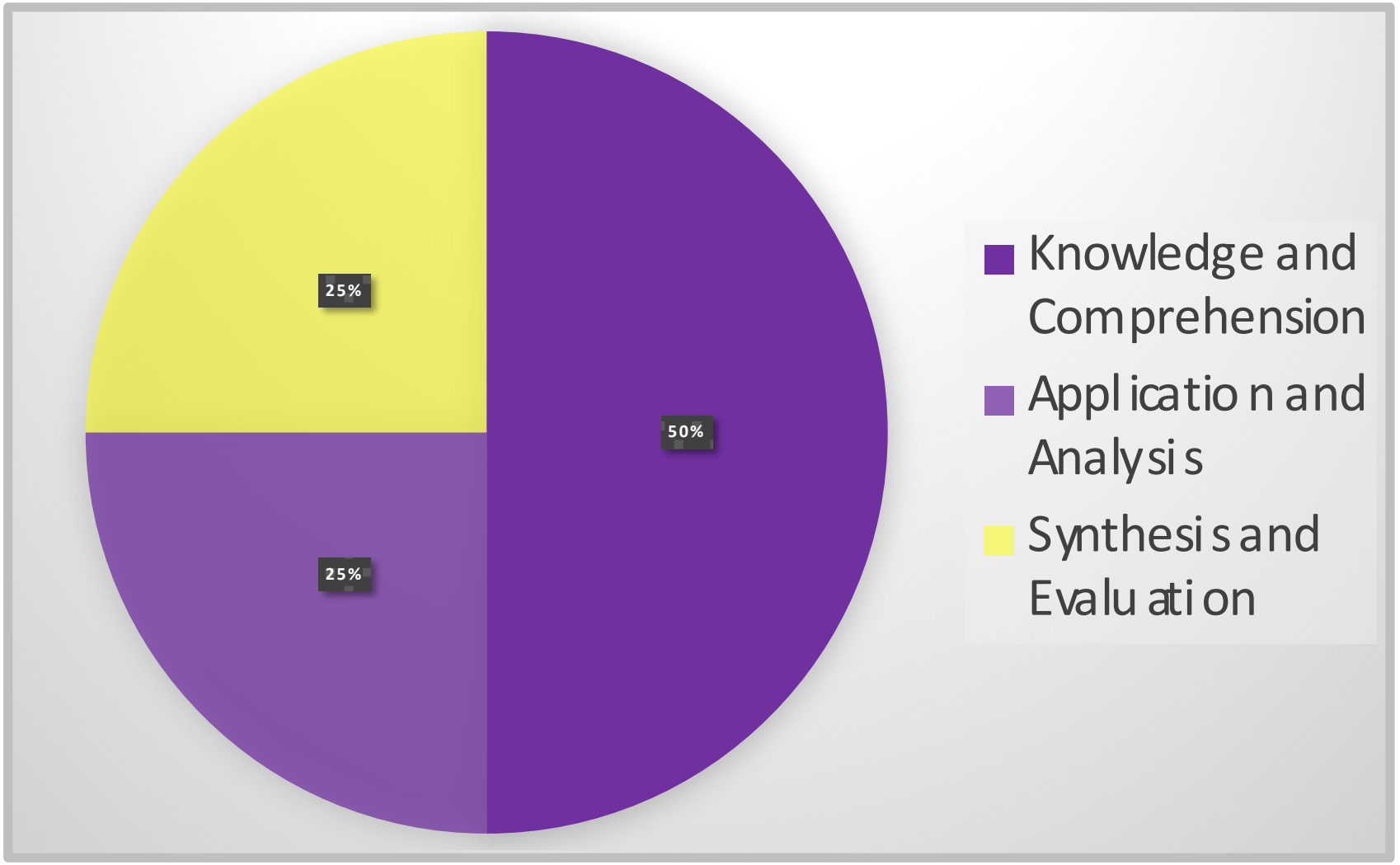
Each Test Increases in Difficulty



Question Difficulty Levels



Ten Main Topics

1. **Relationship Between Structure and Function**
   - Basic biochemistry, cell biology, biological membranes, membrane transport, structure and function of organic macromolecules

2. **Cellular and Acellular Replication**
   - Cell cycle, regulation of the cell cycle, DNA replication, genome structure, meiosis and sexual reproduction, viral replication

Ten Main Topics

3. **Energy Transformations**
   - Metabolism, cellular respiration, photosynthesis, enzymes

4. **Gene Expression**
   - Protein synthesis, regulation of gene expression, effects of mutations

5. **Genetics and Inheritance**
   - Mendelian inheritance, non-Mendelian inheritance, genetic crosses, DNA technology

Ten Main Topics

6. **Evolution**
   - Natural selection, reproductive success, microevolution (selection, mutation, recombination migration, genetic drift, gene flow), evidence of macroevolution (speciation, extinction), evidence for unity in diversity

7. **Origin and Diversity of life**
   - Taxonomy, domains of life, animal and plant behavior, biological hierarchy

Ten Main Topics

8. **Ecology and the Environment**
   - Population biology, community dynamics, organism relationships, biogeochemical cycles, ecosystem stability

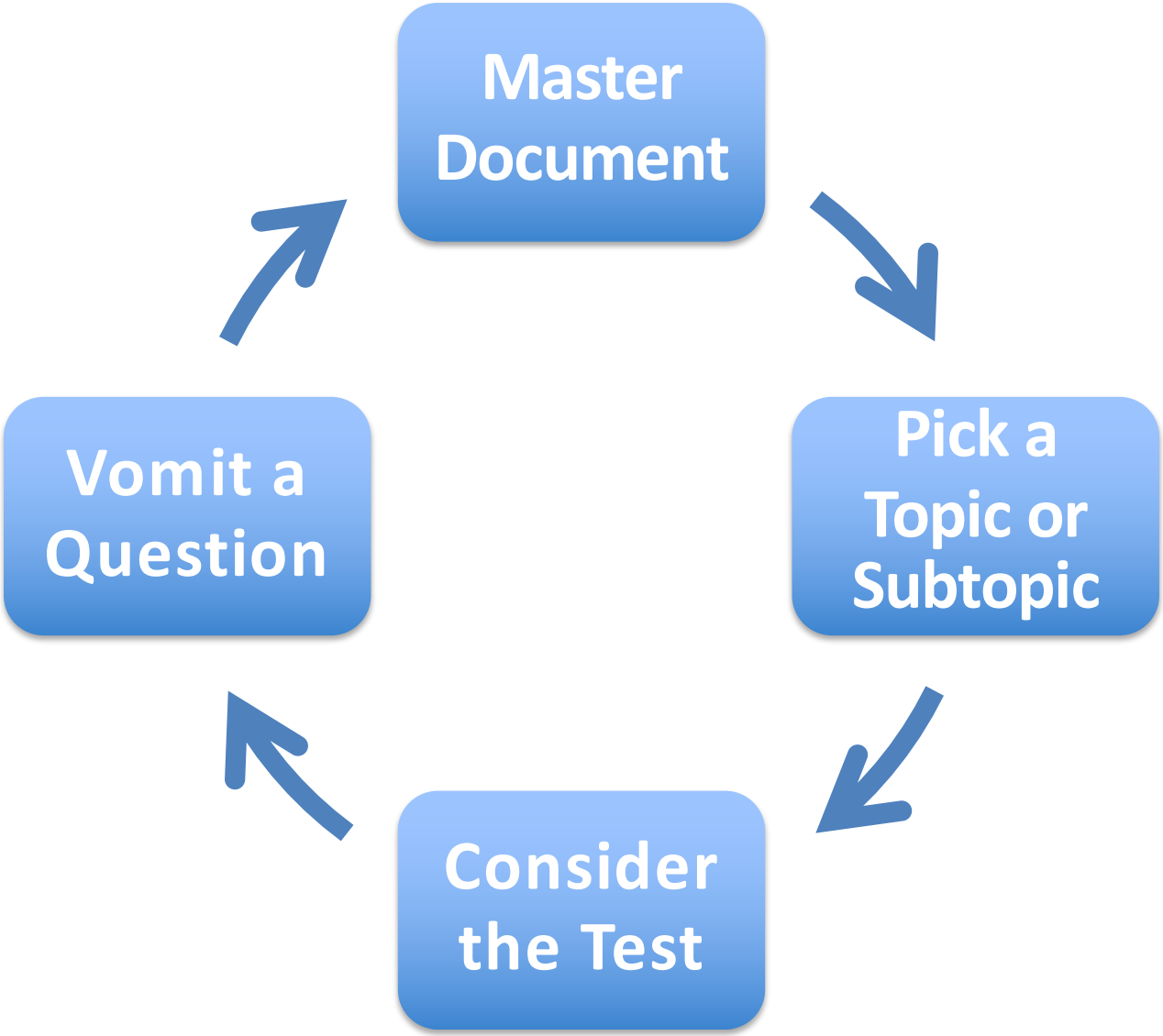
9. **Basic Human Anatomy & Physiology**
   - Specialized cells (blood, muscle, and epithelial), homeostasis (regulation, effects of imbalance), select organ systems involved in regulation, nutrient absorption, reproduction, and defense

Ten Main Topics

10. Diseases

- Parasitology, microbial pathogenesis, etiologic agents, and diseases

The “Process”


Master Document
Pick a Topic or Subtopic
Consider the Test
Vomit a Question

Sample Questions

Relationship Between Structure and Function

- Basic biochemistry, cell biology, biological membranes, membrane transport, structure and function of organic macromolecules

Example Question – Level 1

Phospholipids are found in_____ .

A) membranes
B) DNA
C) the cytosol
D) proteins

Example Question – Level 2

Molecule X is polar and at a higher concentration within the interstitial fluid than within the cytosol of a cell. Movement of X into the cell will likely occur via_____ .

A) active transport
B) simple diffusion
C) facilitated diffusion
D) secondary active transport
E) a pump

Example Question – Level 3

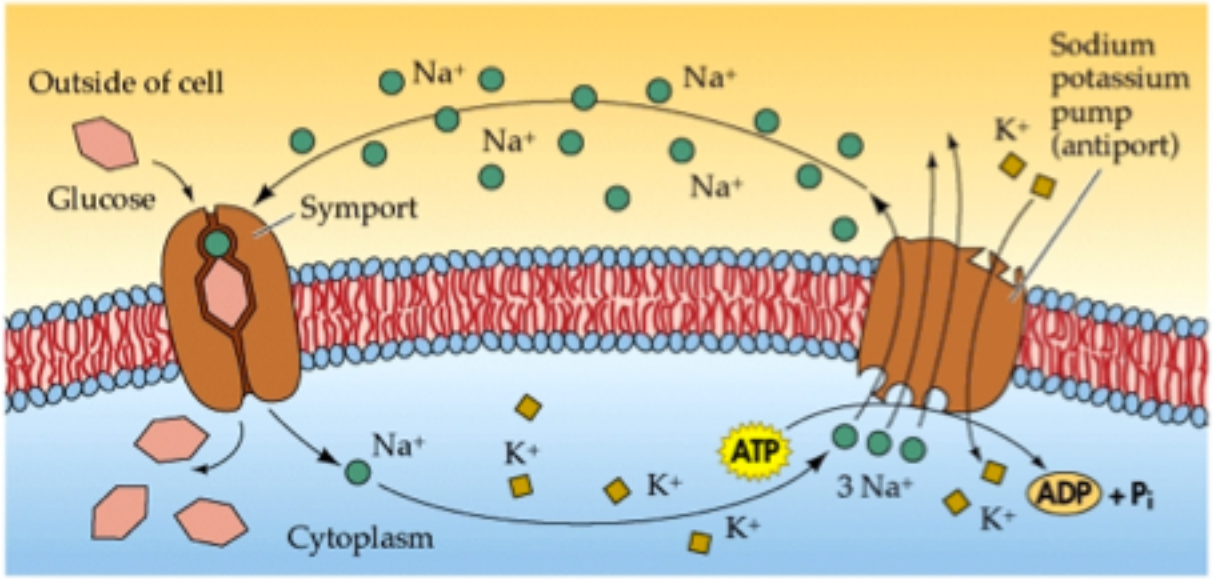
Examine the image. If export of Na^+ could be blocked, which of the following would be an effect?

A) Glucose would decrease inside the cell.

B) More ATP would be hydrolyzed.

C) K^+ would increase in the cytosol.

D) Na^+ would easily diffuse across the membrane.



Sample Questions

Gene Expression

- Protein synthesis, regulation of gene expression, effects of mutations

Example Question – Level 1

A mutation that replaces an adenine with a cytosine in DNA would be called a____ .

A. frameshift
B. deletion
C. insertion
D. substitution
E. reversion

Example Question – Level 2/3

Compare the two DNA template sequences and determine the consequence of the mutation.

wild type 3’-TACAAAATAGCA-5’

mutation 3’-TACAAAATTGCA-5’

A) Silent
B) Nonsense
C) Missense
D) Frameshift
E) Deletion

A genetic code table would be provided, in most cases.

Example Question – Level 3

A mutation was introduced within the gene that codes for peptidyltransferase activity of the ribosome. Select the most immediate effect of this mutation.

A) tRNAs would not be able to bind to the ribosome.
B) The ribosome would not translocate.
C) Codons would be prevented from binding to anticodons.
D) Peptide bond formation would cease.
E) The two subunits of the ribosome would disassociate.

Sample Questions

Gene Expression

- Protein synthesis, regulation of gene expression, effects of mutations

Example Question – Level 1

The DNA strand that is the same sequence as the mRNA, except that thymine in DNA is replaced by uracil in RNA, is called the_____ .

A) noncoding strand
B) messenger strand
C) template strand
D) coding strand

Example Question – Level 2

Which of the following would generate a start codon?

A) 5’-TAC-3’
B) 3’-ATG-5’
C) 5’-ATG-3’
D) 3’-CAT-5’

Example Question – Level 3

Transcribe and translate this DNA *template* strand. Assume the transcriptional start site is on the end.

3’-ATACATGCTCTTAATTCAT-5’

A) Met-Tyr-Val-Arg-Glu-Leu-Ser

B) Tyr-Val-Arg-Glu-Leu-Ser

C) Met-Tyr-Glu-Asn

D) Met-Asn

E) Met-Leu

	U	C	A	G	
U	Phe	Ser	Tyr	Cys	U
	Phe	Ser	Tyr	Cys	C
	Leu	Ser	STOP	STOP	A
	Leu	Ser	STOP	Trp	G
C	Leu	Pro	His	Arg	U
	Leu	Pro	His	Arg	C
	Leu	Pro	Gln	Arg	A
	Leu	Pro	Gln	Arg	G
A	Ile	Thr	Asn	Ser	U
	Ile	Thr	Asn	Ser	C
	Ile	Thr	Lys	Arg	A
	Met	Thr	Lys	Arg	G
G	Val	Ala	Asp	Gly	U
	Val	Ala	Asp	Gly	C
	Val	Ala	Glu	Gly	A
	Val	Ala	Glu	Gly	G

HINTS!!

- ***Usually*** two from each main topic
  - Almost never from the same subtopic in a single test
  - Attempt to spread subtopics across tests
- Questions sometimes piggy back on content from other tests, including from TMSCA
- Bolded words in textbooks are super helpful
- Diseases
  - Vaccination schedules
  - In the news…CDC, WHO, NIH, public health…