

Exam Preparation for Science and Social Studies Program

EXPRESS

June 8 through June 19
2009

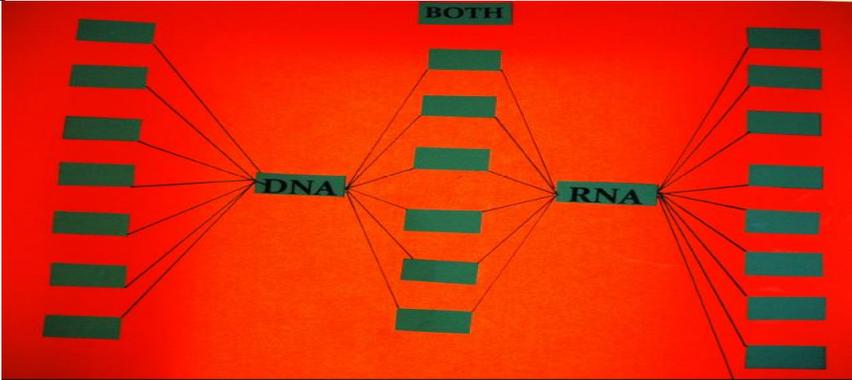
TEACHER

Tuesday, June 9

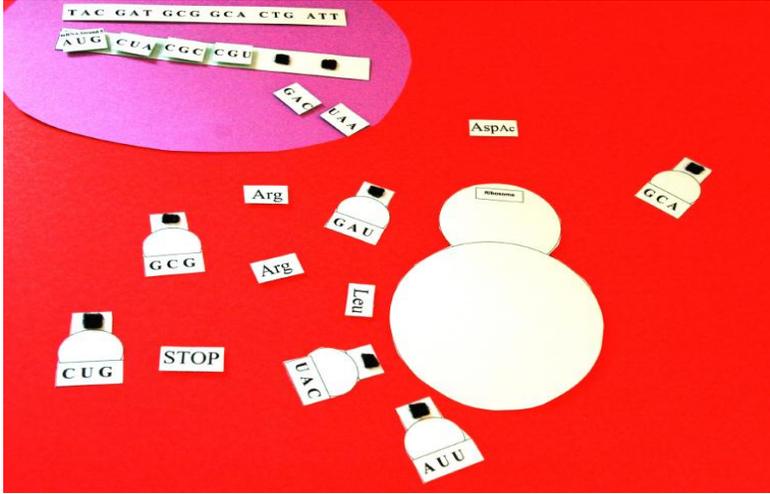
Objective

Domain: Cells and Heredity

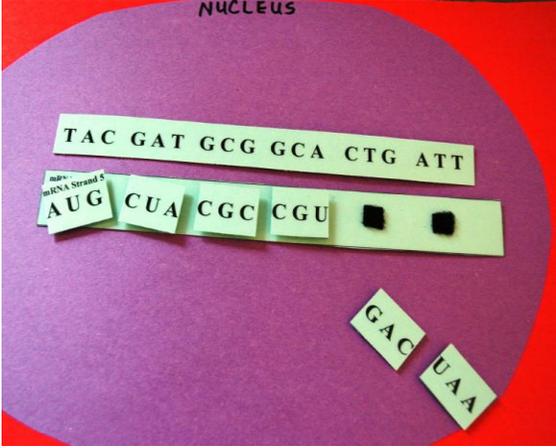
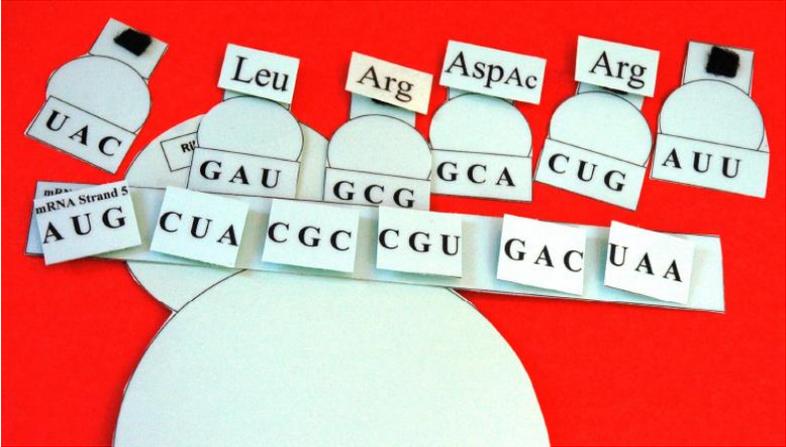
- Students explain the process of inheritance of genetic traits.
 - Students differentiate between DNA and RNA, recognizing the role of each in heredity.

Time	Activity/Task	Assessment
10 min	<p><i>Guiding Questions – DNA and RNA</i></p> <p>The teacher asks students three questions (see Warm-up Index Cards questions for biology day 2 in the Tuesday materials section) and gives students enough time to write their answers on three different index cards (one for each question).</p> <p>The teacher asks for two or three volunteers to share their answers and write these answers on a bulletin board to be visited again after the activity is completed.</p>	Students complete all index cards.
10 min	<p><i>Exploring students ideas: DNA and RNA Anticipation Guide</i></p> <p>Ask the students to complete the anticipation guide Facts on DNA and RNA (see Facts in DNA and RNA on the Tuesday materials section).</p>	Completion of the anticipation guide.
25 min	<p><i>DNA and RNA Activity Cards</i></p> <p>Provide students with a poster board as the one shown on the picture below.</p>  <p>Ask the students to place each word in the correct box if it only describes DNA, only describes RNA or in the center boxes if it describes both molecules.</p> <p>After the students complete the table they should write a short rationale of the reasons for which the words were placed in any particular category. (See Rationale for Classification in the Tuesday materials section).</p> <p><i>Teacher Notes: Materials for this activity are provided for you and there is also an electronic copy of all the materials on the Tuesday materials section of this instructional booklet.</i></p>	Rationale for Classification handout. Students completing the chart.

Tuesday, June 9 (continuation)

Time	Activity/Task	Assessment
20 min	<p><i>DNA replication and Protein Synthesis</i> Provide students with background information about how DNA is replicated. Watch the Unitedstreaming video Transcription of DNA to Messenger RNA (first six segments plus segments nine and ten). Conduct a round table discussion of the video and ask the students to the Video Viewing Summary handout. (See Video Viewing Summary handout in the Tuesday materials section.)</p>	Complete the Video Viewing Summary handout.
25min	<p><i>DNA replication and Protein Synthesis</i> Open the protein synthesis photo so you can see how the manipulative is assembled. All the strands will be on a different color this keeps students from getting them mixed up and if one is found on the floor you easily know which baggie it goes back into. Cut out each strand of DNA, mRNA, tRNA, and amino acids and place in a plastic baggie. Be careful! Do not cut the DNA strand or the mRNA holder into smaller pieces. All other pieces, (mRNA, tRNA, & amino acids) are cut out by individual codons, anti-codons, & amino acids, respectively. (See Protein Synthesis materials in the Tuesday materials section.) Assign groups of students to different strands and allow them to correctly assemble the process. Students may swap strands for practice. Ask students to empty the baggie and find the DNA strand and place it in the nucleus.</p> 	Reflection paper.

Tuesday, June 9 (continuation)

Time	Activity/Task	Assessment
Continuation from previous row	<p>Place the mRNA holder beneath the DNA strand and match the appropriate codons.</p> 	
	<p>Move the completed mRNA strand out of the nucleus. Find the correct tRNA anticodons and pair them with the mRNA codons.</p>  <p>Using the amino acid chart, find the correct amino acid sequence that would be brought to the ribosome for assembly of a polypeptide. When the students have completed the exercise, ask them to write a reflection of what they have learned about how the genetic information is transcribed and proteins synthesized.</p>	

Tuesday, June 9 (continuation)

Time	Activity/Task	Assessment
20 min	<i>Review Questions 3</i> Provide students with a set of questions (see Review Questions 3 handout in the Tuesday materials section) on the differences between DNA and RNA and the role of each in heredity. Give them 15 minutes to answer the questions individually. Conduct a group discussion of the answer to the questions and ask the students to correct their own answer if necessary and to write an explanation of why the answer needed to be corrected. The explanation must state the original reason the student choose the wrong answer and what makes the correct answer correct.	Student questionnaire
10 min	<i>Closing for Biology Day 2</i> Review the original answers to the warm-up questions and write the correct answer on the bulletin board.	

Tuesday, June 9 (continuation)

Objective

Domain: Structure and Properties of Matter

- Students apply the properties of solutions, analyzing solutions in terms of solutes and solvents.

Time	Activity/Task	Assessment
10 min	<p><i>Guiding Questions – Solutions</i></p> <p>The teacher asks students three questions (see Warm-up Index Cards questions for physical science in the Tuesday materials section) and gives students enough time to write their answers on three different index cards (one for each question).</p> <p>The teacher asks for two or three volunteers to share their answers and write these answers on a bulletin board to be visited again after the activity is completed.</p>	Students complete all index cards.
20 min	<p><i>General Review –Jeopardy Game 1</i></p> <p>Form groups of three or four students and used the Jeopardy Physical science –Part 1 EOCT Review game to re-visit some of the ideas discussed on Monday.</p> <p>Note to the teacher: It is not important if you complete the game. However, it is important to ask the students not just for the correct but to justify their answers and also to explain why the other choices are not correct.</p> <p>The Jeopardy Physical science –Part 1 EOCT is on the ExPreSS CD resources that come with this guide.</p>	Students answer questions. Participation on the Jeopardy game.
15 min	<p><i>Solutions –Solvents and Solutes Discussion</i></p> <p>Divide the students in groups of three, ask them to copy in a large sheet of paper the Solution graphic organizer (see Solution graphic organizer in the Tuesday materials section) and complete it by recording the group’s understanding of each one of the concepts.</p> <p>Depending of time the teacher may assign a different concept to each group and then ask each group to present their information.</p>	Completion of the graphic organizer
20 min	<p><i>Solubility Videos</i></p> <p>Watch the video segments on solubility from Discovery Education and ask the students to complete the Solubility handout. (see Solubility handout in the Tuesday materials section)</p> <p>Review with the students the answer to the guiding questions and ask them to revise their previous understanding of mixtures as recorded on their groups’ previously completed organizer.</p>	Completion of the Solubility handout.

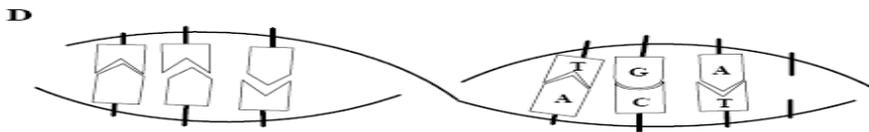
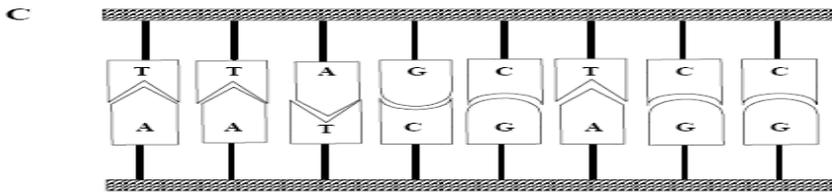
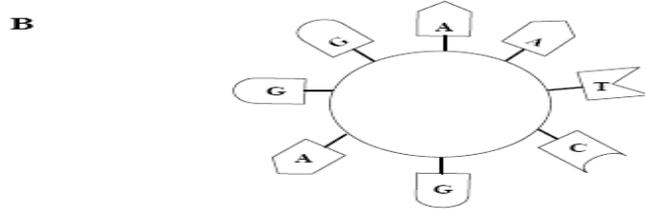
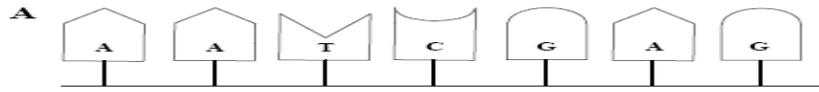
Tuesday, June 9 (continuation)		
Time	Activity/Task	Assessment
25 min	<p><i>An Advertisement for a New Solution Task</i></p> <p>Introduce the students to the scenario An Advertisement for a New Solution (see An Advertisement for a New Solution handout in the Tuesday materials section).</p> <p>Make sure that the students understand the purpose of the activity and how it relates to the standard. Use the following questions to guide the discussion</p> <ol style="list-style-type: none"> 1. How does our understanding of the properties of acids and bases help us in our everyday lives? 2. How does our understanding of the properties of solutions help us in our everyday lives? If time allows the teacher may decided to include information to address the question below 3. Why do solutions that contain ionic compounds have different characteristics from covalent compounds? <p>Note to the teacher; it is best if you pair the students to complete this activity.</p>	Student's advertisement campaign
20 min	<p><i>Review Questions 4</i></p> <p>Provide students with a set of questions (see Review Questions 4 handout in the Tuesday materials section) about the properties of solutions. Give them 15 minutes to answer the questions individually.</p> <p>Conduct a group discussion of the answer to the questions and ask the students to correct their own answer if necessary and to write an explanation of why the answer needed to be corrected. The explanation must state the original reason the student choose the wrong answer and what makes the correct answer correct.</p>	Student questionnaire
10 min	<p><i>Closing for Physical Science Day 2</i></p> <p>Review the original answers to the warm-up questions and write the correct answer on the bulletin board.</p>	

Tuesday's Materials Section

Possible Index Card Warm-Up Questions –Biology Day 2

1. Our understanding of the structure and function of DNA (deoxyribonucleic acid) has increased considerably in the last two decades. In some instances it is now possible to insert a segment of DNA (a gene) from one organism into the DNA of another organism. This process is called recombinant gene technology. Recombining gene technology is comparable to:
 - A. Cloning a cell.
 - B. Rearranging DNA in the same cell.
 - C. Adding a new sentence to a paragraph.
 - D. Videotaping a television program on a blank tape.
2. Mutations are changes in the sequence of bases in a gene. Which of the following may produce mutations in genes?
 - I. Pollution
 - II. Viruses
 - III. Ultraviolet light
 - A. I only
 - B. II only
 - C. III only
 - D. I, II, and III
3. The observed trait that appears in an organism as a result of its genetic makeup is called the organism's
 - A. allele
 - B. genotype
 - C. phenotype
 - D. Karyotype
4. The process by which the order of bases in messenger RNA (mRNA) codes for the order of amino acids in a protein is called
 - A. translation
 - B. transcription
 - C. replication
 - D. nondisjunction
5. Which of the following shows how information is transformed to make a protein?
 - A. DNA → RNA → protein
 - B. Gene → chromosome → protein
 - C. Cell respiration → ATP → protein
 - D. ATP → amino acid → protein

6. Which of the following correctly shows the shape of a DNA molecule?



Anticipation Guide: Facts on DNA and RNA

Instructions:

In the column labeled me, place a check next to any statement with which you agree. After the classroom discussion, compare your opinions with those presented during the lesson.

Me	After the lesson	Statements
		i. DNA is the hereditary material in humans and almost all other organisms.
		ii. Nearly every cell in a person's body has the same DNA.
		iii. Most DNA is located in the cell nucleus (where it is called nuclear DNA), but a small amount of DNA can also be found in the mitochondria (where is called mitochondrial DNA)
		iv. DNA bases pair up with each other, Adenine with Thymine and Cytosine with Guanine, to form units called base pairs. Each base is also attached to a sugar molecule and a phosphate molecule.
		v. Each strand of DNA in the double helix can serve as a pattern for duplicating the sequence of bases.
		vi. RNA serves as a temporary copy of genes that is use as a template for protein synthesis.
		vii. RNA molecules are built from three basic components: ribose, phosphate, and a family of four bases guanine, adenine, cytosine, and uracil.
		viii. The RNA molecule is single stranded, and folded in various shapes.
		ix. RNA and DNA are both nucleic acids
		x. RNA can carry genetic information.

Rationale for Classification

Phrase	Where was placed?	Rationale
Contains thymine		
Contains adenine		
Contains guanine		
Contains cytosine		
Contains uracil		
Double stranded		
Single stranded		
Deoxyribose sugar		
Ribose sugar		

Rationale for Classification (2)

Stays in the nucleus		
Leaves the nucleus		
Involved in transcription		
Involved in translation		
Attaches to ribosomes		
Provides genetic code		
Nucleic Acid		
Messenger, transfer, & ribosomal		
“Read” the genetic code		

Rationale for Classification (3)

Made up of nucleotides		
Double helix		

Video Viewing Summary

Name: _____

Date: _____

Instructions:

Write your answer to the following questions based on the Transcription of DNA to Messenger RNA video that you just watched.

What is the structure of DNA?	
How is RNA different from DNA?	
How do the nitrogen basis pair?	
What is a nucleotide?	
What is transcription?	
How transcription does happen?	
What is a codon?	

DNA Sequence 1

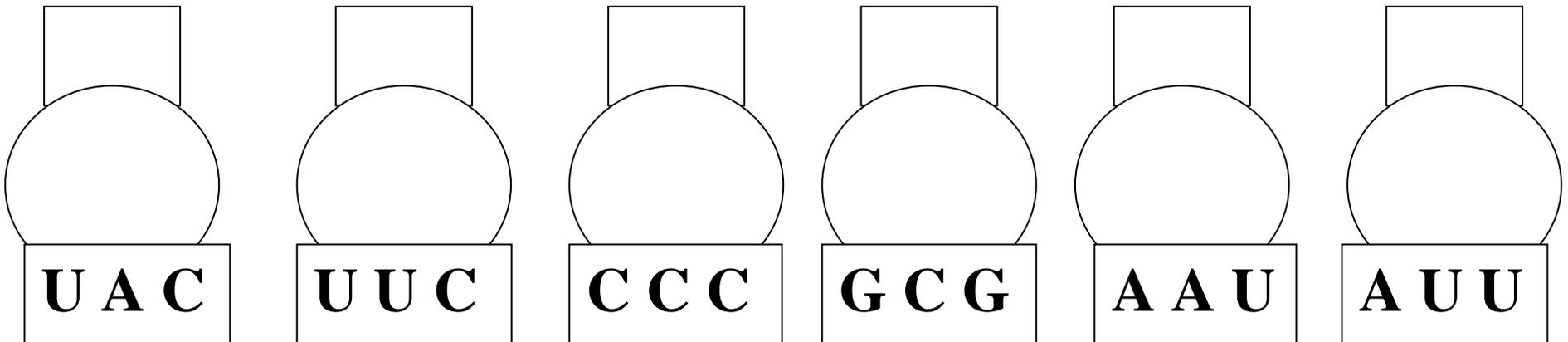
T A C T T C C C C G C G A A T A T T

Strand 1-mRNA

A U G A A G G G G C G C U U A U A A

mRNA holder

Strand 1 tRNA



1st mRNA Strand amino acids

Met Lys Gly Arg Leu STOP

DNA Sequence 2

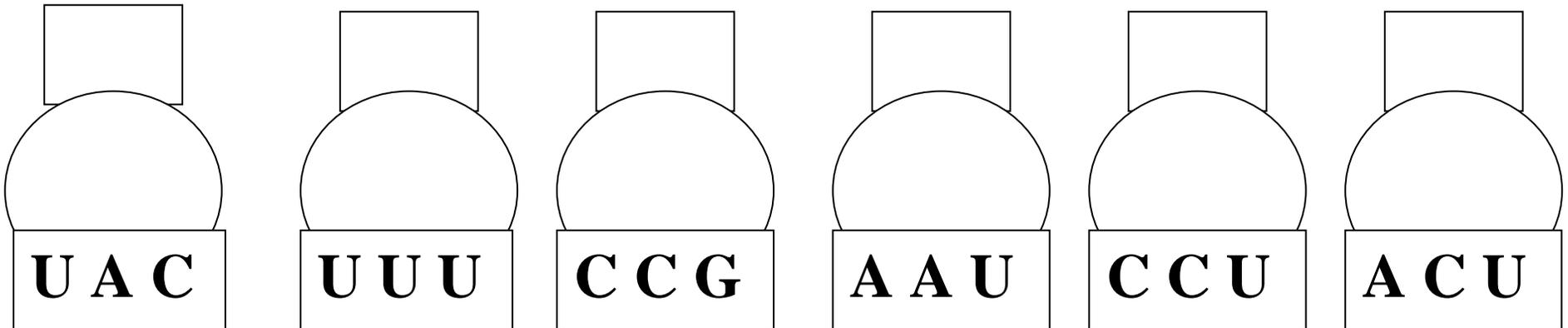
T A C T T T C C G A A T C C T A C T

Strand 2-mRNA

A U G A A A G G C U U A G G A U G A

mRNA holder

Strand 2 tRNA



2nd mRNA Strand amino acids

Met Lys Gly Leu Gly STOP

DNA Sequence 3

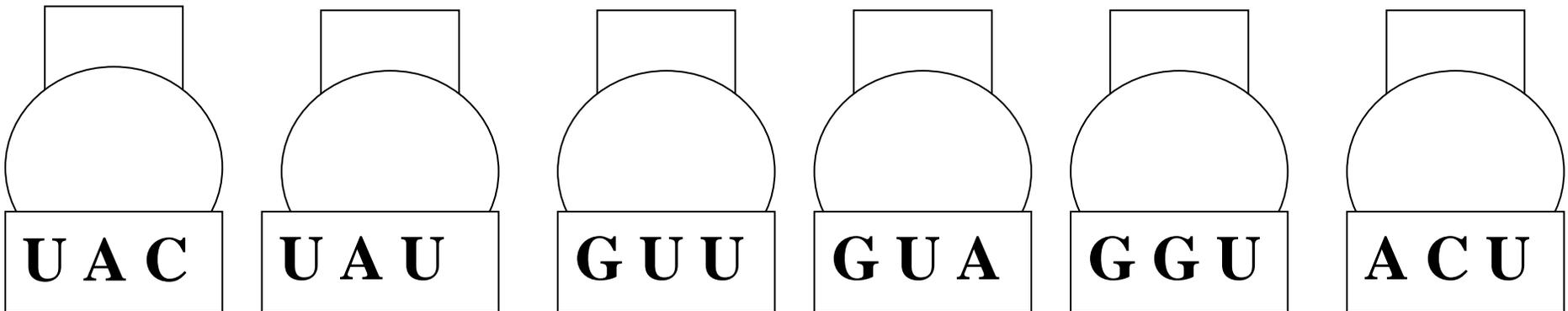
T A C T A T G T T G T A G G T A C T

mRNA Strand 3

A U G A U A C A A C A U C C A U G A

mRNA holder

tRNA strand 3



3rd mRNA Strand amino acids

Met Iso Glu His Pro STOP

DNA Sequence 4

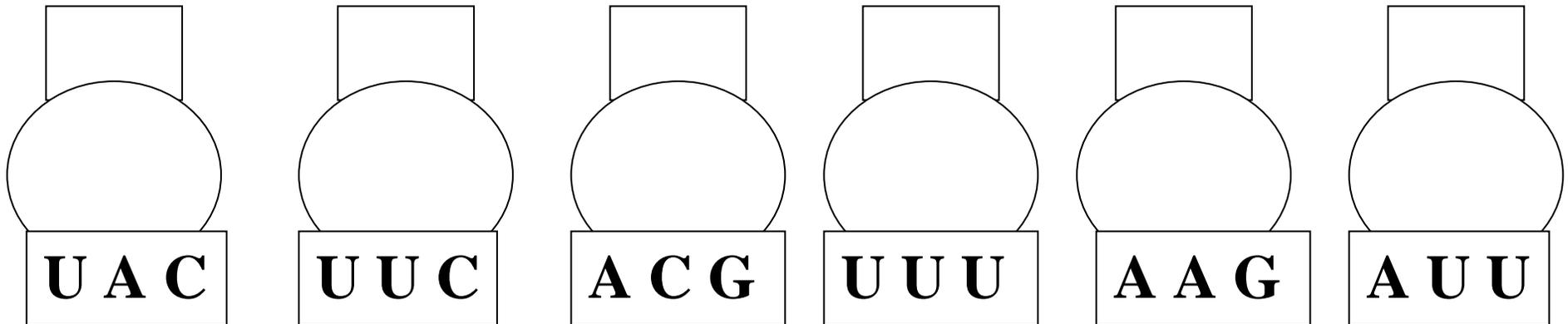
T A C T T C A C G T T T A A G A T T

mRNA Strand 4

A U G A A G U G C A A A U U C U A A

mRNA

tRNA Strand 4



4th mRNA Strand amino acids

Met Lys Cys Lys Phen STOP

DNA Sequence 5

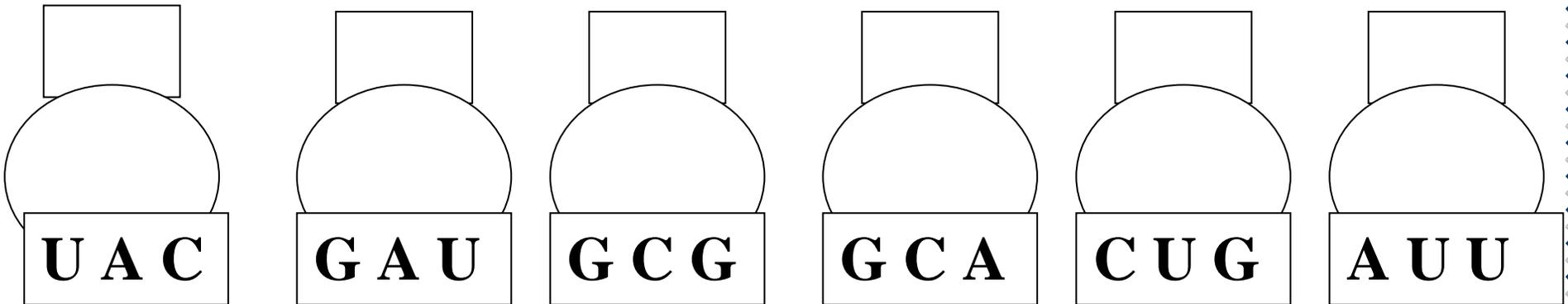
T A C G A T G C G G C A C T G A T T

mRNA Strand 5

A U G C U A C G C C G U G A C U A A

mRNA holder

tRNA strand 5



5th mRNA Strand amino acids

Met Leu Arg Arg AspAc STOP

DNA Sequence 6

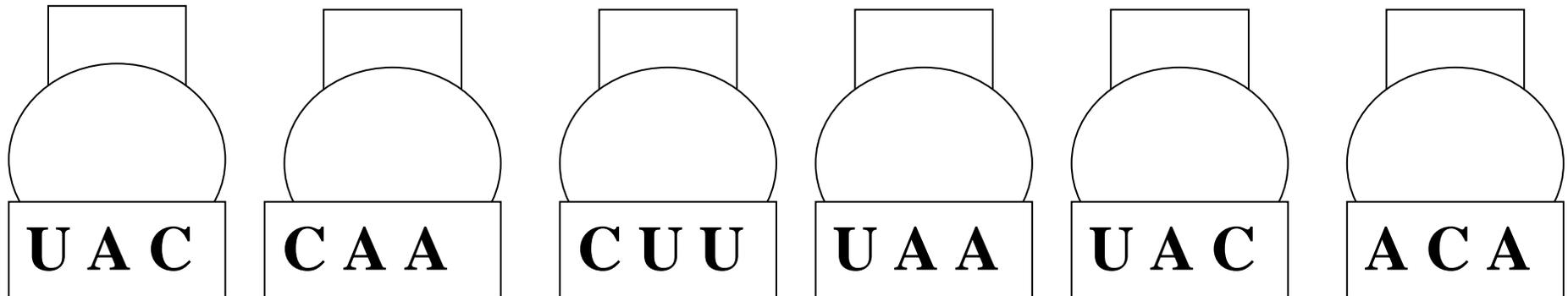
T A C C A A C T T T A A T A C A C A

mRNA Strand 6

A U G G U U G A A A U U A U G U G U

mRNA

tRNA strand 6



6th mRNA Strand amino acids

Met Val GluAc Iso Met STOP

Protein Synthesis Manipulative Answer Key

Strand 1

mRNA codon	tRNA anticodon	Amino acid tRNA carries
AUG	UAC	Met
AAG	UUC	Phe
GGG	CCC	Pro
CGC	GCG	Ala
UUA	AAU	Asp
UAA	AUU	Stop

Strand 2

mRNA codon	tRNA anticodon	Amino acid tRNA carries
AUG	UAC	Met
AAA	UUU	Lys
GGC	CCG	Gly
UUA	AAU	Leu
GGA	CCU	Gly
ACU	UGA	Stop

Strand 3

mRNA codon	tRNA anticodon	Amino acid tRNA carries
AUG	UAC	Met
AUA	UAU	Iso
CAA	GUU	Glu
CAU	GUA	His
CCA	GGU	Pro
UGU	ACA	Stop

Strand 4

mRNA codon	tRNA anticodon	Amino acid tRNA carries
AUG	UAC	Met
AAG	UUC	Lys
UGC	ACG	Cys
AAA	UUU	Lys
UUC	AAG	Phe
UAA	AUU	Stop

Strand 5

mRNA codon	tRNA anticodon	Amino acid tRNA carries
AUG	UAC	Met
CUA	GAU	Leu
CGC	GCG	Arg
CGU	GCA	Arg
GAC	CUG	Asp Acid
UAA	AUU	Stop

Strand 6

mRNA codon	tRNA anticodon	Amino acid tRNA carries
AUG	UAC	Met
GUU	CAA	Val
GAA	CUU	Glu Acid
AUU	UAA	Iso
AUG	UAC	Met
UGU	ACA	Stop

Strand 1

AUG AAG GGG CGC UUA UAA

Strand 2

AUG AAA GGC UUA GGA ACU

Strand 3

AUG AUA CAA CAU CCA UGU

Strand 4

AUG AAG UGC AAA UUC UAA

Strand 5

AUG CUA CGC CGU GAC UAA

Strand 6

AUG GUU GAA AUU AUG UGU

1st mRNA Strand amino acids

Met Phe Pro Ala Asp STOP

2nd mRNA Strand amino acids

Met Lys Gly Leu Gly STOP

3rd mRNA Strand amino acids

Met Iso Glu His Pro STOP

4th mRNA Strand amino acids

Met Lys Cys Lys Phen STOP

5th mRNA Strand amino acids

Met Leu Arg Arg Asp A STOP

6th mRNA Strand amino acids

Met Val GluAc Iso Met STOP

Teacher note: Keep one copy of this together to have as an answer sheet for each strand.

Review Questions 3
DNA and RNA and Their Role in Heredity

1. Which process reduces the number of chromosomes in a cell?
 - A. binary fission
 - B. crossing over
 - C. meiosis
 - D. mitosis

2. Which **best** shows the proper code-structure sequence in protein synthesis?
 - A. DNA, mRNA, mRNA, polypeptide, enzyme
 - B. DNA, mRNA, tRNA, polypeptide, enzyme
 - C. enzyme, polypeptide, mRNA, mRNA, DNA
 - D. mRNA, DNA, mRNA, enzyme, polypeptide

3. As each section of the genetic code on DNA is transcribed to mRNA, the two strands of DNA rejoin. Then the mRNA moves into the cytoplasm through a pore in the nuclear membrane. Ribosomes attach to the mRNA, in the cytoplasm, to carry out the formation of a protein. What is this process called?
 - A. mutation
 - B. synthesis
 - C. translation
 - D. transference

4. Cells secrete proteins, often as enzymes, that have been engineered or directed by the DNA in the nucleus. Which processes are involved in protein synthesis?
 - A. transfer to RNA, then to amino acids
 - B. transcription into RNA, then translation into amino acids
 - C. replication of DNA, then transcription into enzymes
 - D. translation into RNA, then replication into DNA

5. In living things, whether plant or animal, the carrier of hereditary instructions is
 - A. DNA.
 - B. genetic vacuole
 - C. messenger RNA
 - D. mitochondria in animals, chloroplasts in plants

6. Proteins are built up or synthesized by the code stored in the DNA molecules. Which concept about protein synthesis in an organism is NOT correct?
 - A. The DNA code of nitrogen bases is the same as the protein code.
 - B. RNA is a chemical that acts as a messenger for DNA.
 - C. The ribosomes are the parts of cells where proteins are manufactured.
 - D. The sequence of DNA bases determines the arrangement of amino acids in a protein.

7. If the sequence of nucleotides were AGC on a strand of DNA, what would be the nucleotide sequence on a strand of mRNA formed during transcription?
- A. ACG
 - B. UCG
 - C. TGC
 - D. TCG
8. The function of mRNA is to
- A. carry genetic information from the nucleus to the site of protein synthesis.
 - B. begin the "unzipping" of the DNA molecule.
 - C. maintain homeostasis within the cell during mitosis.
 - D. direct the movement of centrosomes during meiosis.
9. During meiosis how many times is the DNA replicated?
- A. zero times
 - B. one time
 - C. two times
 - D. four times
10. Cells secrete proteins, often as enzymes, that have been engineered or directed by the DNA in the nucleus. Which processes are involved in protein synthesis?
- A. transfer to RNA, then to amino acids
 - B. transcription into RNA, then translation into amino acids
 - C. replication of DNA, then transcription into enzymes
 - D. translation into RNA, then replication into DNA
11. What kind of bonds is found between nitrogen bases in a DNA molecule?
- A. Hydrogen
 - B. Nitrogen
 - C. Oxygen
 - D. Phosphate
12. If the sequence of nucleotides were AGC on a strand of DNA, what would be the nucleotide sequence on a strand of mRNA formed during transcription?
- A. ACG
 - B. UCG
 - C. TGC
 - D. TCG
13. All chromosomes are composed of
- A. DNA and lipids
 - B. DNA and protein
 - C. RNA and lipids
 - D. RNA and protein
14. During meiosis how many times is the DNA replicated?
- A. Zero times
 - B. One time
 - C. Two times
 - D. Four times
15. Which is in the shape of a double helix?
- A. Amino acid
 - B. Deoxyribonucleic acid
 - C. Enzyme
 - D. Protein

16. Messenger RNA carries genetic information in groups of three bases known as

- A. Amino acids
- B. Codons
- C. Enzymes
- D. Helixes

17. As each section of the genetic code on DNA is transcribed to mRNA, the two strands of DNA rejoin. Then the mRNA moves into the cytoplasm through a pore in the nuclear membrane. Ribosomes attach to the mRNA, in the cytoplasm, to carry out the formation of a protein. What is this process called?

- A. Mutation
- B. Synthesis
- C. Translation
- D. Transference

18. Which **best** shows the proper code-structure sequence in protein synthesis?

- A. DNA, mRNA, mRNA, polypeptide, enzyme.
- B. DNA, mRNA, tRNA, polypeptide, enzyme
- C. Enzyme, polypeptide, mRNA, mRNA, DNA
- D. mRNA, DNA, mRNA, enzyme, polypeptide

19. Which of the following DNA base pairs are correct?

- A. A - A
C - C
- B. A - T
T - A
- C. A - T
G - A
- D. A - T
T - G

20. In living things, whether plant or animal, the carrier of hereditary instructions is

- A. DNA
- B. Genetic vacuole
- C. Messenger RNA
- D. Mitochondria in animals, chloroplasts in plants

DNA and RNA Activity Cards

Tiles for Titles of the Plastic Bags

DNA

RNA

BOTH

DNA and RNA Activity Cards

Contains thymine	Contains adenine	Contains guanine	Contains cytosine
Contains uracil	Double stranded	Single stranded	Deoxyribose sugar
Ribose sugar	Stays in the nucleus	Leaves the nucleus	Involved in transcription
Involved in translation	Attaches to ribosomes	Provides genetic code	Nucleic Acid
Messenger, transfer, & ribosomal	“Reads” the genetic code	Made up of nucleotides	Double Helix

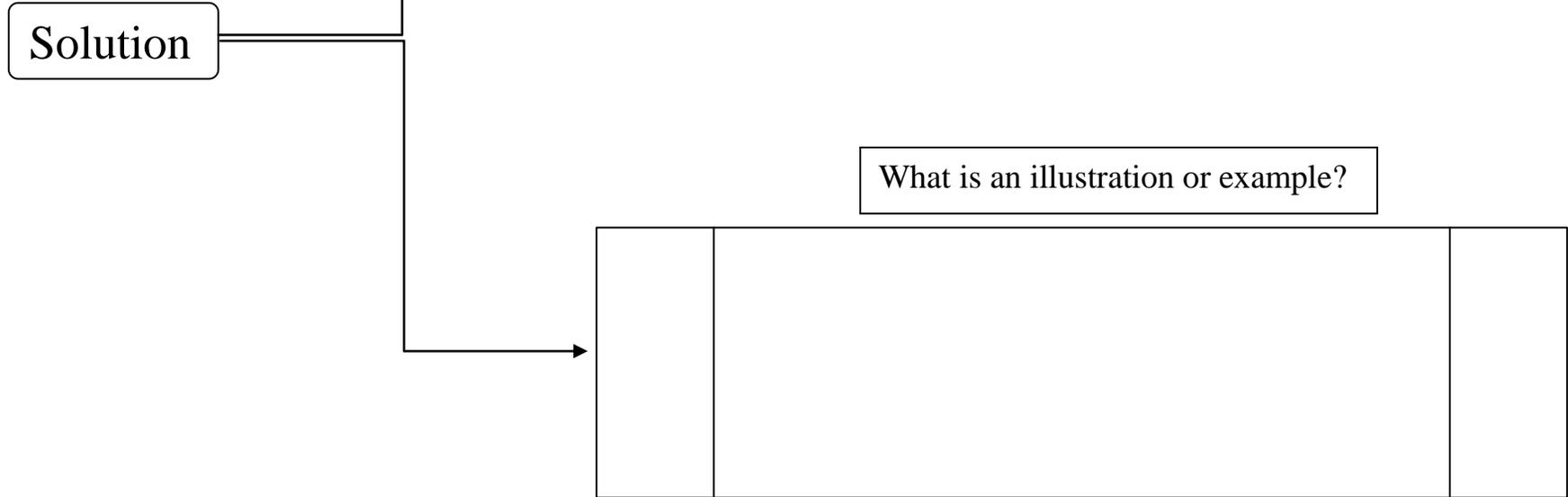
Possible Index Card Warm-Up Questions –Physical Science Day 2

1. A pot containing salt water is boiled until the water is gone, leaving a salt crust on the bottom of the pot. The salt water would be considered a
 - A. Substance
 - B. Compound
 - C. Element
 - D. Mixture
2. A compound differs from a mixture in that a compound always has a
 - A. homogeneous composition
 - B. maximum of two components
 - C. minimum of three components
 - D. heterogeneous composition
3. In a solution the substance that does the dissolving is called
 - A. soluble
 - B. the solute
 - C. the solvent
 - D. an ion
4. Many laboratory preparations of solutions call for stirring the solvent while adding the solute. Which of the following is always an effect of this procedure?
 - A. It decreases the reactivity of the solute.
 - B. It decreases the solubility of the solute.
 - C. It brings the solute and solvent rapidly into contact
 - D. It produces a chemical reaction.
5. What factors affect the rate of solution?

Solution Concept Map

Instruction:

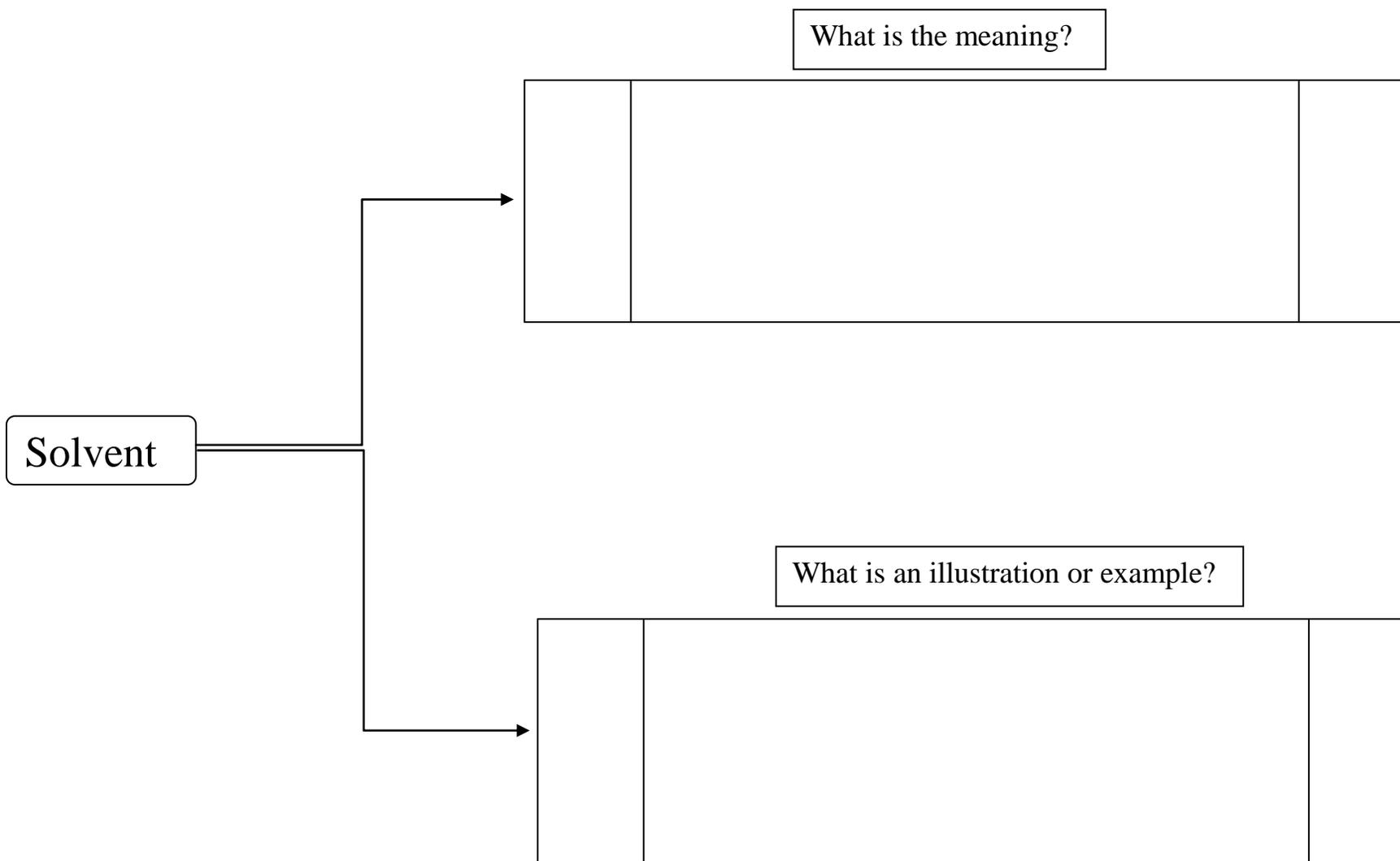
In the boxes to the right provide an explanation and give an illustration/example of the concept on the left.



Solvent Concept Map

Instruction:

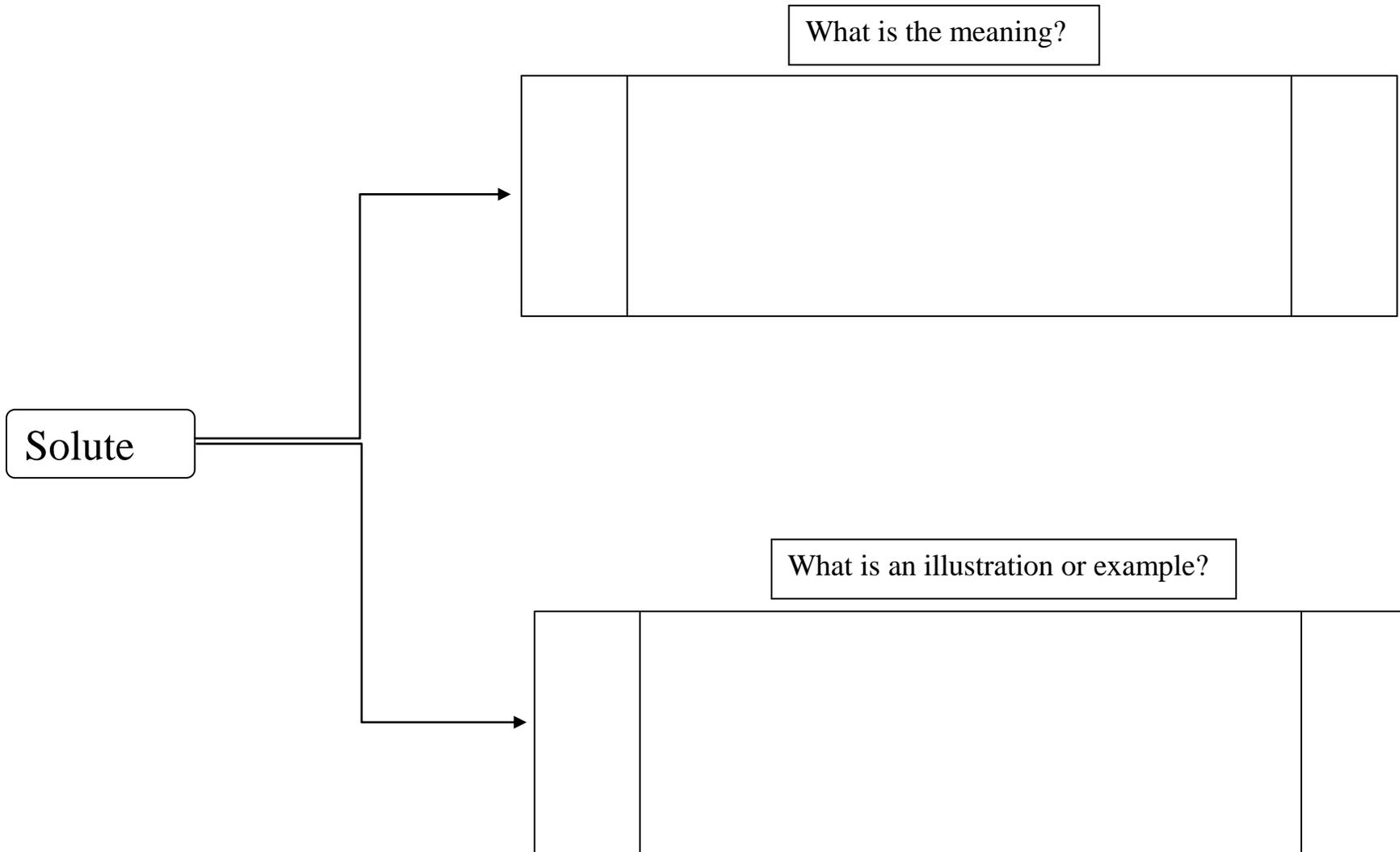
In the boxes to the right provide an explanation and give an illustration/example of the concept on the left.



Solute Concept Map

Instruction:

In the boxes to the right provide an explanation and give an illustration/example of the concept on the left.



Video Viewing Summary

Name: _____

Date: _____

Instructions:

Write your answer to the following questions based on the Solubility videos that you just watched.

What needs to happen for a reaction to occur in a solution?	
What is solubility?	
What does it mean that a substance is completely soluble in water?	
What is one example of the use of knowing the solubility of a substance?	
Why smaller particles dissolved faster than larger ones?	
What factors affect the solubility of a substance?	

General Task
An Advertisement for a New Solution

Pre-Assessment: Use the KWL chart to discuss with the class the following questions: What is an electrolyte? What is conductivity? What substances are good conductors of electricity?

	K	W	L
Question	What do you THINK you know?	What do you WANT to know?	What did you LEARN ?
What is an electrolyte?			
What is conductivity?			
What substances are good conductors of electricity?			

Outcome / Performance Expectations:	Develop an advertisement and label (optional) for a new chemical solution.
Teacher Directions with activity	<p>This is a GRASP Activity. Explain the following task, giving students oral and written instructions.</p> <p>Goal: Students will develop a two minute advertisement campaign for a newly developed product that is a solution. (Optional- students can also develop a product label.)</p> <p>Role: Students take the role of an advertising agency employee for a company that specializes in advertising chemical products such as cosmetics, cleaners, beverages, etc. (This solution will be the hypothetical creation of the student).</p> <p>Audience: general public/ consumers</p> <p>Scenario: The advertising agency has gotten the account for a major chemical industry. The job is to develop an ad campaign for one of their new products.</p> <p>Product: The product is a two minute commercial advertisement that describes the solute/solvent components and its physical state at room temperature. The commercial should tell whether the solution is a poor or good conductor of electricity and how its conductivity (or lack of conductivity) makes it a useful product. The commercial should include whether the solution is acidic, basic, or neutral and how its hydrogen or hydroxide ion concentration makes it useful. (Optional second product would be a product label.)</p> <p>NOTE: If possible provide students with access to a computer or the library to find some of the information that needs to be included in the advertisement. The teacher should circulate through the groups and provide content assistance.</p>
Students Directions	<p>Develop a two-minute advertisement for a newly developed solution. In the advertisement describe the solute/solvent components.</p> <p>Answer the following questions or complete the following task before you begin writing your commercial.</p> <ol style="list-style-type: none"> 1. What is the name of your solution? 2. What is the primary compound/substance that is dissolved in this solution? 3. What is this compound's formula? 4. Describe your solution's physical state at room temperature. 5. Tell whether the solution is a poor or good conductor of electricity and how its conductivity (or lack of conductivity) makes it a useful product. 6. What is your product's pH? Tell whether the solution is acidic, basic, or neutral and how its hydrogen or hydroxide ion concentration makes it useful?

Materials Needed:	Paper, pens. Markers
Instructional Task Accommodations for ELL Students:	Speak slowly and enunciate clearly. Restate sentences and phrases if necessary. Plan for group work. Present tasks from easy to hard. Highlight key points.
Instructional Task Accommodations for Students with Specific Disabilities:	Give simple, clear directions. Task analysis-break the task down into small steps. Provide sample work.
Instructional Task Accommodations for Gifted Students:	Allow student choices to provide options for class activities. Encourage the students to develop leadership skills

Review Questions 4 Solutions

1. In the solution we call seawater which of the following is the solvent?

- A. Water
- B. oxygen gas
- C. salt
- D. all of these are solvents

2. Air is a solution which includes many substances. See the composition of air chart below.

GAS	% in AIR
Nitrogen	78%
Oxygen	20.95%
Carbon Dioxide	0.03%
Argon	Less than 0.01%

Based on the information in this chart, which statement is FALSE?

- A. Nitrogen gas is a solute in air.
 - B. Carbon dioxide gas is a solute in air.
 - C. Oxygen gas is a solute in air.
 - D. Argon is a solute in air.
3. A compound differs from a mixture in that a _____ compound always has a _____
- A. homogeneous composition
 - B. maximum of two components
 - C. minimum of three components
 - D. heterogeneous composition

4. Many laboratory preparations of solutions call for stirring the solvent while adding the solute. Which of the following is always an effect of this procedure?

- A. It decreases the reactivity of the solute.
- B. It decreases the solubility of the solute.
- C. It brings the solute and solvent rapidly into contact.
- D. It produces a chemical reaction.

5. A solution in which the crystallizing and dissolving rates of the solute are equal is

- A. saturated
- B. unsaturated
- C. concentrated
- D. dilute

6. The _____ is the part of the solution that is present in the greater amount.

- A. solute
- B. solvent
- C. ion
- D. electrolyte

7. A solution in which more solute can dissolve is

- A. Saturated
- B. Unsaturated
- C. Supersaturated
- D. Concentrated

8. If you **decrease** the temperature, what happens to the dissolving rate of NaCl in water?
- A. The dissolving rate increases because more collisions occur between solute and solvent.
 - B. The dissolving rate decreases because fewer collisions occur between solute and solvent.
 - C. The dissolving rate decreases because more collisions occur between solute and solvent.
 - D. No collisions occur between solute and solvent, so the rate goes to zero.
9. Which of the following statements shows the correct relationship between temperature and the solubility of a gas in a liquid?
- A. Dissolved oxygen in a pond decreases when the water temperature increases.
 - B. Dissolved oxygen in a pond decreases when the water temperature decreases.
 - C. More sodium chloride can be dissolved in cold water than in hot water.
 - D. Carbon dioxide escapes from solution when you open a soda can.
10. What does it mean when a mixture is said to have reached saturation at a given temperature and pressure?
- A. A dilute solution has been formed.
 - B. There is more solute than solvent in the mixture.
 - C. As much solute as possible is dissolved in the solvent.
 - D. The solute and solvent have formed a heterogeneous mixture.
11. Vinegar is a liquid solution containing acetic acid and water. It could be accurately classified as which of the following?
- A. A colloid
 - B. A compound
 - C. A homogeneous mixture
 - D. A heterogeneous mixture
12. The salinity, or salt concentration, of tidal rivers flowing into the ocean increases as you travel down river approaching the mouth of the river. Describe in terms of solute and solvent this increase in salinity
- A. The solvent is increasing greater than the solute
 - B. The solute is increasing greater than the solvent.
 - C. The solute and solvent are increasing in equal amounts.
 - D. The solute and solvent are both decreasing in equal amounts.
13. In all solutions, solutes and solvents
- A. Are always found as liquids
 - B. Are found in the same amounts
 - C. Can be separated by visible means.
 - D. Are found in the same state of matter.

14. Carbon steel, usually simply called steel, is made by melting iron metal and adding a small amount of carbon to the liquid metal. In doing this, the alloy (solution of these metals) becomes much stronger and can be used for everything from automobile parts to I-beams found in skyscrapers. What is the solvent in steel?

- A. Carbon
- B. Carbon steel
- C. Iron
- D. Steel

15. E85 is an alcohol fuel mixture of 85% ethyl alcohol and 15% gasoline by volume. It is becoming more common in the Midwestern United States where corn (the source of ethyl alcohol) can be found.

Identify the solvent in this mixture.

- A. Ethyl alcohol
- B. Gasoline
- C. Water
- D. E85