

STE: In Class-Activity

1. To prepare a fertilizer for plants, you dissolve 1.00 g of K_3PO_4 in 3.00 L of water.
- a) What will the plants synthesize with the help of PO_4^{3-} ion after their roots absorb it? List four different organic compounds. Use the hint given below each structure.

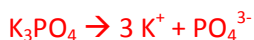
In membranes = phospholipid	Won't have the energy to move without this = ATP
In nucleus and has genes= DNA	Binds to DNA in nucleus during transcription RNA

- b) Calculate the concentration of K_3PO_4 in g/L.

$$1.00 \text{ g}/3.00 \text{ L} = 0.33 \text{ g/L}$$

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- c) Calculate the concentration of K^+ only in g/L. You'll need an equation first showing what happens when K_3PO_4 dissolves in water.



$$1.00 \text{ g } K_3PO_4 / (212 \text{ g/mole}) = 0.00472 \text{ moles of } K_3PO_4$$

$$0.00472 \text{ moles of } K_3PO_4 (3 K^+ / 1 K_3PO_4) = 0.01415 \text{ moles } K^+$$

$$0.01415 \text{ moles } K^+ (39 \text{ g/mole}) = 0.552 \text{ g}$$

$$0.552 \text{ g} / 3 \text{ L} = 0.18 \text{ g/L}$$

- d) Calculate the concentration of PO_4^{3-} only in g/L, ppm and moles/L .



$$0.00472 \text{ moles of } K_3PO_4 = 0.00472 \text{ moles of } PO_4^{3-} \text{ (see 1: 1 ratio in equation)}$$

$$0.00472 \text{ moles of } PO_4^{3-} (97 \text{ g /mole}) = 0.458 \text{ g}$$

$$0.458 \text{ g} / 3.00 \text{ L} = 0.153 \text{ g/L (or you could have subtracted the answers from (a) and (b). Check! It works.}$$

$$= 153 \text{ mg/L} = 153 \text{ ppm}$$

$$\text{Using moles from above: } 0.00472 \text{ moles of } PO_4^{3-} / 3.00 \text{ L} = 0.00157 \text{ mole/L}$$

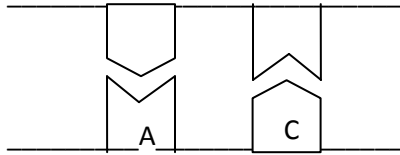
2. TRUE or FALSE?

- a) Humans usually have 46 chromosomes T
 b) The nitrogenous bases(adenine, thymine, etc) are the "steps" in the DNA ladder. T
 c) There's 1 gene in each chromosome F, there are lots more.

3. Chromatin looks like a messy strand. Then at a certain point it contracts to form chromosomes. When does that happen?

Just prior to cell division.

4.



- a) In the above DNA, place the missing nitrogenous bases. **T, G**
- b) If the above represented transcription, what messenger RNA bases would match up DNA's adenine and cytosine shown?

U and G

5. Where does messenger RNA attach itself after leaving the nucleus?
ribosomes

6. What attaches itself to mRNA?

Transfer RNA

7. What does each transfer RNA bring to the mRNA?

A specific amino acid

8. Here is a sequence of t-RNA codes:

AUG GAU CGU UCC GAA UAA ACU

- a) What amino acid sequence will the synthesized protein have after translation? Show work. Consult table of messenger RNA codes.

1st, here are the messenger RNA codes UAC--CUA-GCA-AGG-CUU-AUU- UGA

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		Second letter					
		U	C	A	G		
First letter	U	UUU } Phe UUC } UUA } Leu UUG }	UCU } UCC } Ser UCA } UCG }	UAU } Tyr UAC } UAA Stop UAG Stop	UGU } Cys UGC } UGA Stop UGG Trp	U C A G	
	C	CUU } CUC } Leu CUA } CUG }	CCU } CCC } Pro CCA } CCG }	CAU } His CAC } CAA } Gln CAG }	CGU } CGC } Arg CGA } CGG }	U C A G	
	A	AUU } AUC } Ile AUA } AUG Met	ACU } ACC } Thr ACA } ACG }	AAU } Asn AAC } AAA } Lys AAG }	AGU } Ser AGC } AGA } Arg AGG }	U C A G	
	G	GUU } GUC } Val GUA } GUG }	GCU } GCC } Ala GCA } GCG }	GAU } Asp GAC } GAA } Glu GAG }	GGU } GGC } Gly GGA } GGG }	U C A G	

Using the chart above

messenger RNA codes UAC--CUA-GCA-AGG-CUU-AUU- UGA correspond to the amino acid sequence of tyr- leu-ala-arg-leu-Ile-STOP

b) What was the original DNA sequence used for the transcription of this code?

ATG GATCGTTCCGAATAA ACT

9. a) A black sheep has the genotype Bb. The B= black gene is dominant. What percentage of its sex cells will receive the "B" gene?

50%

b) If a heterozygous sheep mates with a white one, what percent of the offspring will be black? Show work.

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	B	b
b	Bb	bb
b	Bb	bb

50% will be Bb and therefore black.

10. If the genes for size(L) and color(G) are in separate chromosome pairs, what are the possible genotypes for the sex cells (gametes) of a plant with the genotype GgLI?

FOIL : GL, Gl, gL and gl