

1. In cats, black fur (b) is a recessive trait. You have two black cats whose parents had tabby-coats (dominant).

What is the probability that their mother will have more black kittens? Show a Punnett square.

2. In peas, seed_shape and seed color are Mendelian traits found on separate chromosomes..

R is the allele for the dominant, spherical shape characteristic; r is the allele for the recessive, dented shape characteristic. **L is the allele for the dominant, yellow color** characteristic; l is the allele for the recessive, green color characteristic.

What will be the phenotypic ratio of the offspring, if a rrLl pea plant is crossed with RrLl? Show a Punnett square (4 marks)

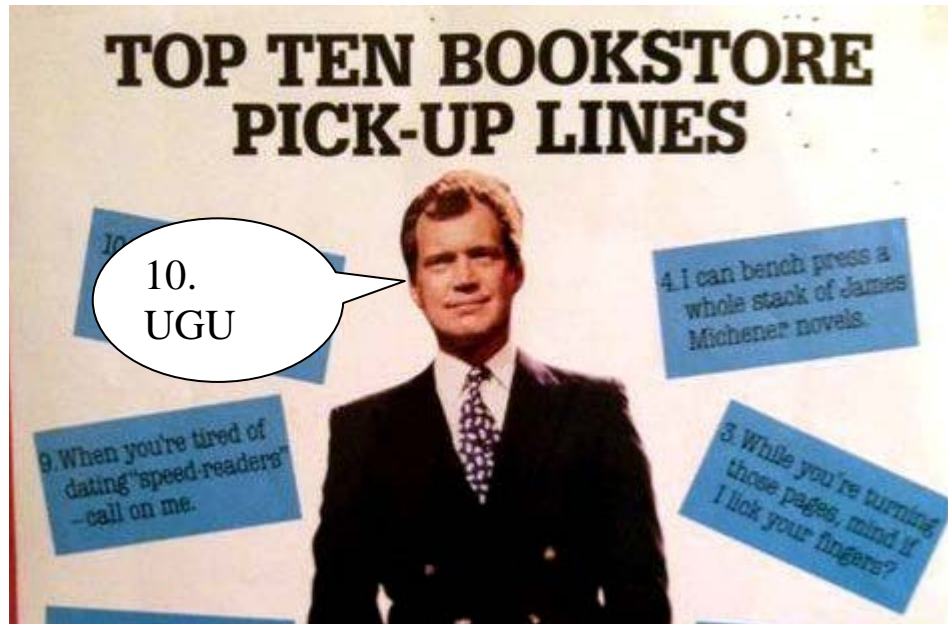
4. a) If the messenger RNA code is AAAGUGUCA, what was the corresponding DNA code?

b) Give the three transfer RNA codes matching the messenger RNA code of AAAGUGUCA.

c) What amino acids will be picked up by the transfer RNA's from question(b). See mRNA codes in table.

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

d) What is the advantage of having different codes for the same amino acid?

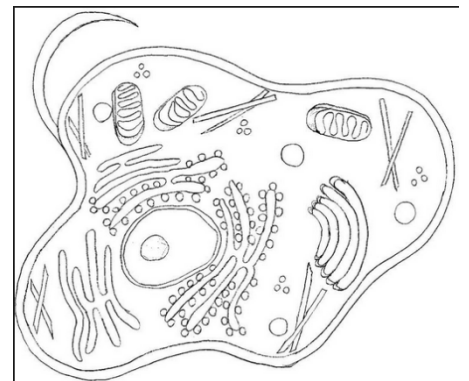


e) Which nitrogen base in the DNA probably changed if valine(val) was replaced by **aspartic acid** (asp) in the protein being made?

5. TRUE? Or FALSE?

- a) A gene is part of a chromosome that has the genetic code required to make 1 protein._____
- b) A gene is made up of DNA._____
- c) Lipids and carbohydrates consist of amino acids:
- d) The order in which amino acids are combined influences the type of protein being made.
- e) Human sex cells have 23 unpaired chromosomes

6. Show the locations of **transcription** and **translation** in the cell.



Flashback: see website

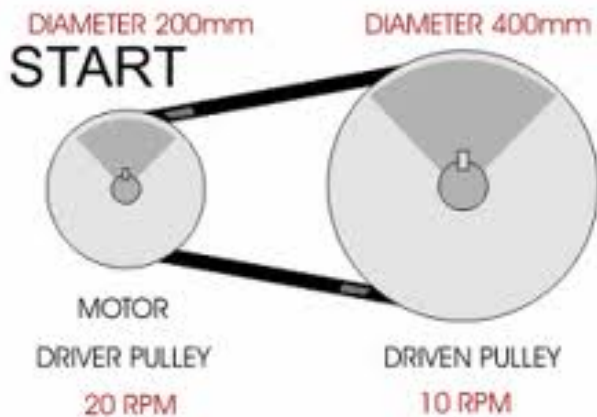
ST PART

1. a) If we turn a small gear(11 teeth) so that it make 34 turns in a certain time interval, how many turns will the large gear(17 teeth) complete?

b) How much more turning force (find the mechanical advantage) does the large gear have?

2. a) What makes the following belt-pulley system different from a chain-sprocket system? Give two differences .

b) Calculate the speed (velocity ratio) of this system.



3. You want the motor to spin a certain gear very quickly, but you want the other gear that's attached to the 1st one to move very slowly.

What kind of gear system will work best?

4. A machine requires no toothed gears, and you don't want any belts either. What kind of gear system can be used?

5. Draw a gear train where the input gear has 12 teeth, the output gear has 4 teeth, but the velocity ratio is not 3 but 36.