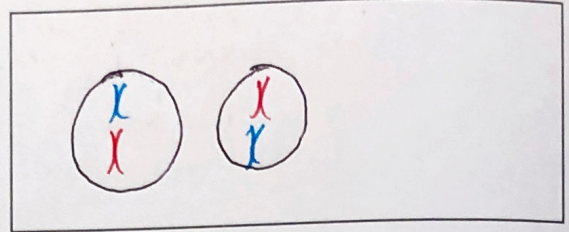


- 1) How do cells look before and after meiosis? Create two **labelled schematic drawings** for both situations, including chromosomes, **genes & alleles**. (1 P)

Before meiosis:



After meiosis:



- 2) For mutant-spiders, the allele for blue colour (B) is dominant vs. the allele for green colour; and the "glow-in-the-dark" allele (G) is dominant vs. the one that does not code for glowing. Create a crossing-scheme of the two following situations and indicate the geno- & phenotypes of all possible offspring. (1 P)

bbgg x Bbgg

BbGg x bbGg

bbgg x Bbgg

	B	b	g	g	
b	Bb	bb	bg	bg	green not glowing
b	Bb	bb	bg	bg	
g	Bg	bg	gg	gg	glowing
g	Bg	bg	gg	gg	

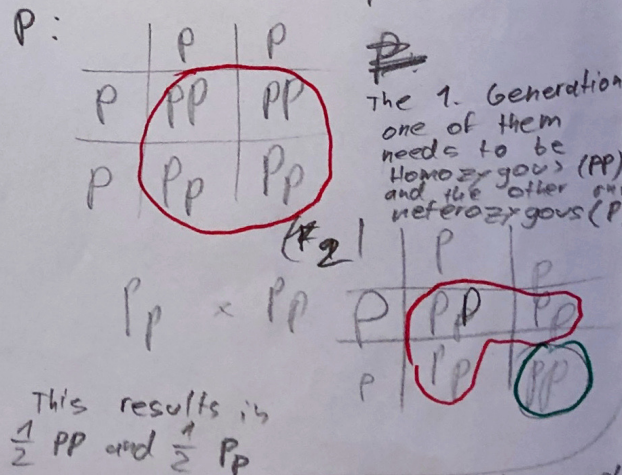
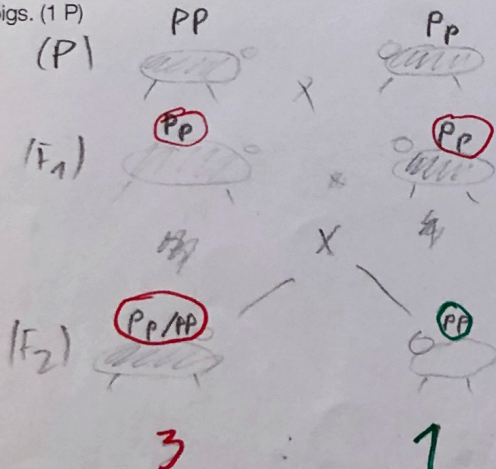
Geno: Bb, bb, bg, Bg, gg

Pheno: 4 Different genotypes

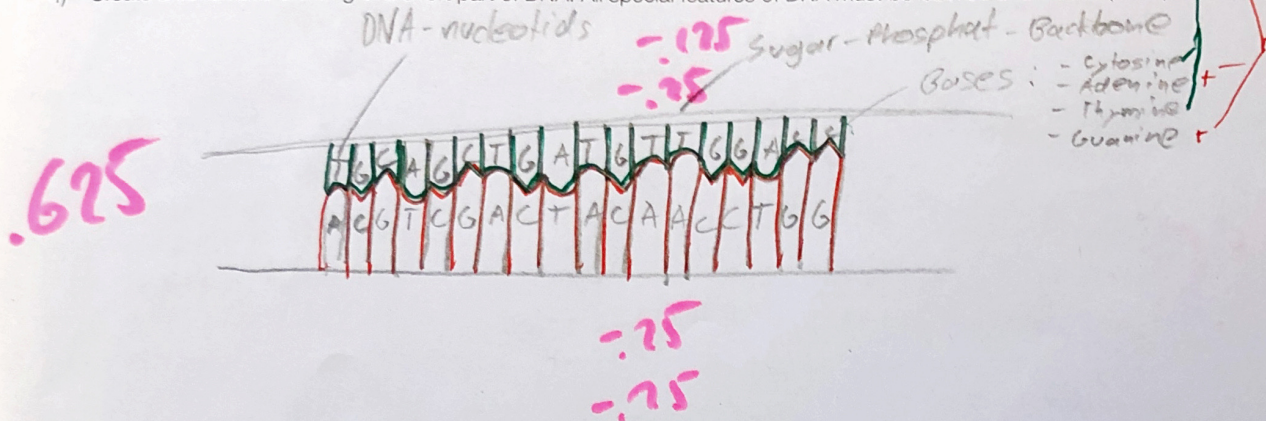
BbGg x bbGg

	B	b	G	g
B	BB	Bb	BG	Bg
b	Bb	bb	bG	bg
G	BG	bG	GG	Gg
g	Bg	bg	Gg	gg

- 3) Two pink-furred guinea pigs produced 79 offspring: 56 with pink fur and 23 with normal fur. Indicate the genotype of these guinea pigs, and also indicate possible geno- and phenotypes of the parents of the first two curly-haired guinea pigs. (1 P)



- 4) Create a schematic drawing of a short part of DNA. All special features of DNA must be labelled and visible. (1.5 P)

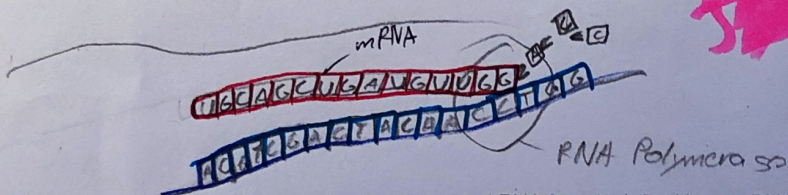


Transcribe your DNA of task 4:

ACG^U~~C~~GAC^U~~A~~CAACC^U~~G~~G

- 5) What exactly happens during transcription? List all involved structures (enzymes, consumables, etc.). (3 P)

During Transcription a RNA-Polymerase zips along a sequence of (3' to 5') DNA and attaches RNA nucleotids together, which have the corresponding Base to the original DNA strand. The part which isn't needed for a certain Protein code is cut off. When a section of DNA is finished "copying" the RNA-Polymerase detaches from the DNA and specified Guanine nucleotids bond at the front (5') of the mRNA. specified Adenine nucleotids bond at the back. The finished mRNA is now ready for translation.



- 6) Highlight all the differences between your freshly created RNA from task 5 with your DNA from task 4. (0.5 P)

- Thymine - Base in DNA strand is a V-Base in the RNA strand.
- ^H~~It~~ lacks a Oxygen group

in Pink to normal fur

* carrying a different type of amino acid

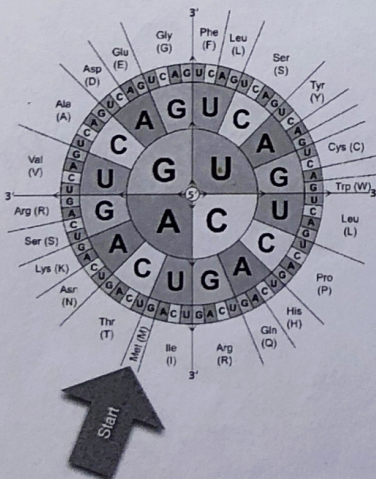
- 7) Finally, translate the following part of mRNA into a protein, and list again all the involved structures (enzymes, consumables, etc.) (3 P)

3' CAUAAUGCUGACAUACAGUACAG 5'

to the mRNA a tRNA attaches with a corresponding tRNA. another tRNA attaches and forming a ribosome. Inside this Ribosome another tRNA* with the correct anticodon attaches to the mRNA the amino acid bonds to the second amino acid forming a covalent bond. the first "empty" tRNA leaves the Ribosome and a next tRNA enters which is carrying another amino acid. This process is repeated until a stop codon is reached and the finished Protein is released.

3' stop codon CAUAAUGCUGACAUACAGUACAG 5' start

Met Thr Val Gln Ser



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