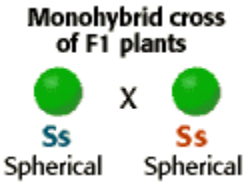
1. In pea plants, spherical seeds (S) are dominant to dented seeds (s). In a genetic cross of two plants that are heterozygous(Ss) for the seed shape trait, what fraction of the offspring should have spherical seeds?



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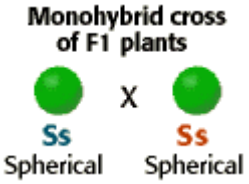


	S	s
S	SS	Ss
s	Ss	ss

¾ or 75% will have spherical seeds(SS or Ss)

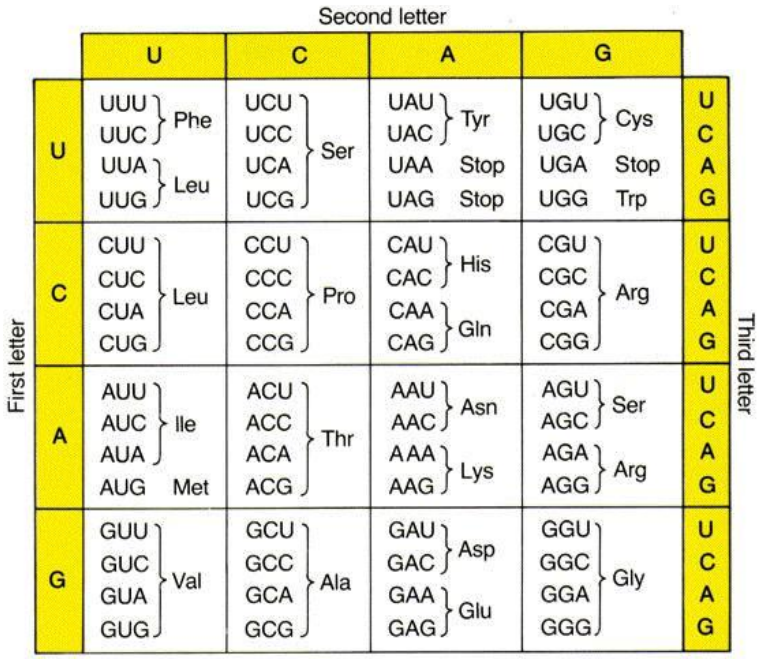
2. One pea plant has only *recessive genes* for both seed shape and seed color. S is the allele for the dominant, spherical shape characteristic; s is the allele for the recessive, dented shape characteristic. Y is the allele for the dominant, yellow color characteristic; y is the allele for the recessive, green color characteristic. What will be the phenotypic ratios of the offspring, if this pea plant is crossed with SsYy?

	sy	sy	sy	sy
SY	SsYy	SsYy	SsYy	SsYy
Sy	Ssyy	Ssyy	Ssyy	Ssyy
sY	ssYy	ssYy	ssYy	ssYy
sy	ssyy	ssyy	ssyy	ssyy

The entire first row = spherical and yellow 4/16 = 1/4
The entire 2nd row = spherical and green 4/16 = 1/4
The entire 3rd row = dented and yellow 4/16 = 1/4
The entire 4th row = dented and green 4/16 = 1/4

3. a) Which specific amino acid will bond to a transfer RNA with the code UCC? Serine
   b) To which messenger RNA code will UCC attach itself to? AGG

c) Where did the mRNA get the code from? From DNA
d) What was the DNA code that trancribed itself to this mRNA code?TCC
e) Was this the only code of the gene that coded for the protein? Why or why not?
No. There are many other codes because proteins consist of many amino acids.



4. TRUE? Or FALSE?
a) There could be many genes found on the same chromosome.

TRUE. See graph given in class.

b) Intelligence is controlled by a single gene.

FALSE. Intelligence, like height and many other traits are controlled by many genes and their expression is also influenced by environment.

c) Each base in DNA corresponds to 1 amino acid.

FALSE. You need a code of three bases to create enough combinations for the 20 amino acids and the start and stop signs. The code also has to be redundant (you need different codes for the same amino acid) to protect against mutations.

d) The order in which amino acids are combined influences the type of protein being made.

TRUE.

5. Use Q = mcΔT and c = 4.19 J/(g ^{o}C) to figure out what mass of water will absorb 20000 J as it rises from 22.2 ^{o}C to 33.9 ^{o}C.

20 000 = m (4.19)(33.9 – 22.2)
m = 408 g

if your paper read 2000 J , then the answer is 40.8 g.

6. What maximum temperature will 230 g of water reach if a 12 g block of copper(c = 0.39 J/(g ^{o}C) at 200^{o}C is dropped into the 20^{o} C water?

$-Q_{hot} = Q_{cold}$

$-(mc\Delta T)_{hot} = (mc\Delta T)_{cold}$

$-12(0.39)(x - 200) = 230(4.19)(x - 20)$

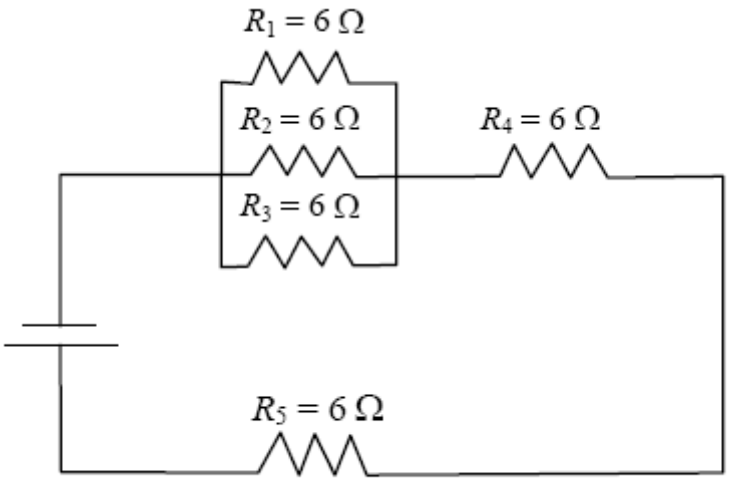
$x = 20.9\ ^{o}C$

7. If a 12 V heating coil is placed in 200.0 g of 20.0 ^{o}C water for 20.0 minutes, will the water come to a boil? Assume that a constant current of 2.0 A flows through the coil and that no heat escapes from the water.

VIt = mcΔT
12J/C(2 C/s)(20min*60s/min) = 200g*4.19 J/(g ^{o}C)(x-20)
x = 54^{o}C
So, no. The water will not come to a boil. Water boils at 100 C.

Flashback.

8. Find the **total resistance** and then the **voltage of the power source** if 1A flows through each of the resistors in parallel.



The total resistance = $(6^{-1} + 6^{-1} + 6^{-1})^{-1} + 6 + 6 = 14\ \Omega$.
Total current = 1+1+1= 3A because they all join up again when they come out of the parallel circuit.
Total voltage = IR = 3(14) = 42 V

9. **Beta$^-$ decay occurs for isotopes with an excess of neutrons. What occurs is that the neutron is converted into a proton (thereby changing the element) while releasing an electron and another elementary particle that we don't have to worry about.**

Write an equation to show how ^{137}Cs undergoes beta decay. It is one of the radioactive isotopes being released in Japan's nuclear accident. Show the new element and the beta particle.

$$^{137}_{55}Cs \rightarrow {}^{0}_{-1}e + {}^{x}_{y}z$$

137 = 0 + x
X = 137
-1 +y = 55
y =56
Z = Ba from the periodic table tie you gave me as a gift

So final answer:

$$^{137}_{55}Cs \rightarrow {}^{0}_{-1}e + {}^{137}_{56}Ba$$

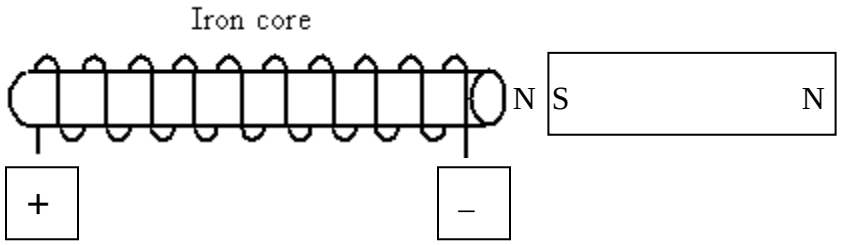
10. **Given: ^{238}U → ^{234}Th + ^{4}He**

How many grams of alpha particles(^{4}He) will be released if 0.0010 moles of ^{238}U decay?

Ratio is 1:1 so there are also 0.010 moles of ^{4}He produced.

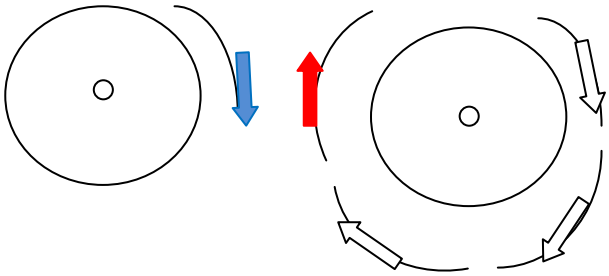
0.010 moles of ^{4}He(4 g/mole) = 0.040 g

11. Draw a permanent bar magnet being attracted to the right hand side of the electromagnet. Show the N and S poles on the bar magnet.



Use left hand rule to discover that the N pole of the electromagnet is on the right. So it will attract the opposite pole

12. Why do two parallel wires carrying a strong current in the same direction attract each other? Use the left hand rule and a drawing to convince yourself.



Look at the coloured arrows which reveal the direction of the magnetic field from using the left hand rule for each wire.

The North end is next to the south end, so there is attraction.