

STE REVIEW 4

1. Give the names and formulas of four different compounds that Ca^{+2} could form with:

nitrate	NO_3^-
hydroxide	OH^-
sulphate	SO_4^{-2}
phosphate	PO_4^{-3}

2. Use dot structures to show the difference between the bonding of carbon dioxide with that of calcium oxide.
3. If you add 2.0 L of 20 g/L solution of NaOH to a 1.0 L solution containing 2.0 moles of NaOH/L, what will the new concentration in moles/L become?
4. What is the difference between transcription and translation? Mention molecules involved and location within the cell.
5. A pet store owner mated two black guinea pigs with the following results
-mostly black offspring
-a few white offspring
He then mated two of the white offspring and got the following results:
-all white offspring
a) What is the genotype of the parents used in the first cross?
b) What is the genotype of the parents used in the second cross?
c) What is the chance of obtaining a totally homozygous offspring in the second cross?
6. What is the genotypic ratio obtained from crossing $\text{RrYy} \times \text{RrYy}$



R = round
Y = yellow

7. a) How many chromosomes contain the allelic gene pair Rr?
b) How many genes from "Rr" does a sex cell get from the parent?

8. a) Two boxes are dropped from the same height. X is $\frac{2}{3}$ rd as heavy as box Y?
Which hits the ground first?
b) What is the ratio of the masses Y/X?
c) What happens to that ratio of masses on the moon?
9. For each of the following x-y relationships, describe if they are linear or parabolic.

y	x
Kinetic energy	mass
Kinetic energy	speed(velocity)
work	force
work	displacement
weight	mass

10. An effective force of 300 N along the horizontal is what results after a horse applies a 400 N at a certain angle with the horizontal.

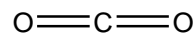


- a) What is the angle between the handle of the wagon and the horizontal?
- b) What is the *minimum* weight of the wagon if it does not lift off the ground?

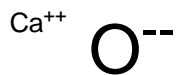
ANSWERS

1. Calcium nitrate $\text{Ca}(\text{NO}_3)_2$ The sum of positive and negative ions must be zero.
Calcium hydroxide $\text{Ca}(\text{OH})_2$
Calcium sulphate CaSO_4
Calcium phosphate $\text{Ca}_3(\text{PO}_4)_2$

2.



carbon dioxide There are four remaining valence electrons on each oxygen atom.



calcium oxide

Calcium's original two valence electrons have been transferred to oxygen. Oxygen now has 8 valence electrons, for a total of 10 electrons. Only oxygen's two excess electrons are represented. But you could show all eight, provided that you indicate the -2 charge.

3. $20 \text{ g/L NaOH (mole/40 g)} = 0.50 \text{ moles/L}$ but we have 2 L of such a solution, so $n = CV = 0.50 \text{ moles/L} * 2 \text{ L} = 1.0 \text{ mole}$ of NaOH being added.

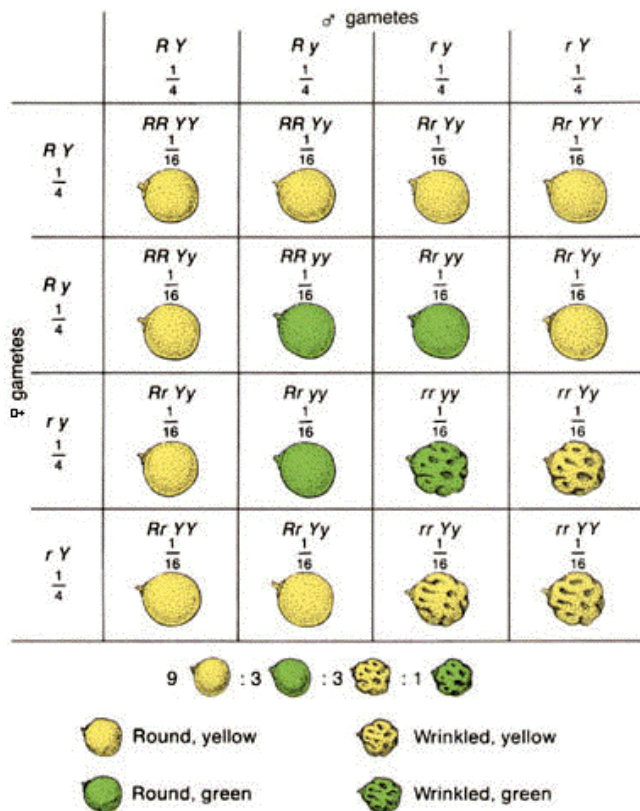
Other solution has $n = CV = 1.0 \text{ L} * 2.0 \text{ moles/L} = 2 \text{ moles}$

$C = n_{\text{total}}/V_{\text{total}} = (1.0 \text{ moles} + 2 \text{ moles})/(1 + 2 \text{ L}) = 1 \text{ mole/L}$

4. Transcription is the process by which genetic information is transmitted in the nucleus when mRNA forms on the surface of unwound DNA. The mRNA codes match up to the codes of the DNA and enough are copied so that the information of one gene is “copied”.

Translation is the process that assembles the protein from amino acids. The mRNA is attached to a ribosome and the amino acids are collected from the cytoplasm.

5. a) Bb, where B = dominant black gene: b = white recessive
 - b) bb
 - c) 100% and they will be all white.
- 6.



7. a) 2
7.

a)

y	x	
Kinetic energy	mass	Linear because $E_k = 0.5m^1v^2$
Kinetic energy	speed(velocity)	Parabolic because $E_k = 0.5m^1v^2$
work	force	Linear since $W = F*d$
work	displacement	Linear since $W = F*d$
weight	mass	Linear since $F = m*g$

8. a) They hit the ground at the same time. Gravitational acceleration is not dependent on mass.
 b) $F_Y/F_X = m_y g / m_x g = 3g/2g = 3/2$
 c) the mass ratio will remain the same.

9. a) $\theta = \cos^{-1}(300/400) = 41.4^\circ$

- b) $F_{\text{upward}} = F_{\text{applied}} \sin \theta$
 $= 400 \text{ N} \sin(41.4^\circ) = 265 \text{ N}$. This perfectly cancels the minimum weight of 265 N. If the weight was anything less than the upward force, the wagon would have been lifted.