Food Science and High Oleic Oil E-learning Key

Name_____ Date_____

Review:

1. What is the difference between a polar and non-polar molecule?

polar molecules cannot dissolve non-polar molecules and vice versa
electrons in a non polar molecule are distributed more equally

2. How can you determine the shape of a molecule by its chemical formula?

use Lewis dot structures to show bonds between electrons
use VSPER to predict molecular shape

Essential question:

How does the shape of a molecule affect its function?

3. Draw the shape of a saturated fatty acid and the shape of an unsaturated fatty acid.

4.

	Saturated	Mono-unsaturated	Poly-unsaturated	Omega 3	Trans Fats
Solid/liquid at room temperature	Solid	liquid	liquid	liquid	solid
Bonds (cis/trans)/ shape	All single/ straight	One double bond/ cis	Multiple double bonds / cis	Double bond 3C's from end/ cis	Hydrogenated bonds / trans (Changes unsaturated to saturated)
Likely to break down during frying	No	Not as much as poly	Yes	Yes	No
Heart healthy	No	Yes	Yes	Yes	No

5. Identify what type of fatty acid is described by the following "names" and where is the double bond, if present

a. C18:2n6 polyunsaturated / two double bonds, 1st one after 6th C from end

High-Oleic Oil

b. C12:0 saturated / no double bonds

c. C15:1n6 monounsaturated / one double bond after 6th C

d. C18:1n9 (oleic acid) monounsaturated / one double bond after 9th C

6. What is the difference between a cis bond and a trans bond?
cis bonds have C chains linked on the same side
trans bonds have C chains linked on opposite sides

7. What is the function of hydrogenating a fatty acid?
when it is more saturated, it holds up to heating better
the more double bonds a fatty acid has, the shorter the shelf life

8. What are the characteristics of an ideal oil for food?
good taste, long shelf life, heart healthy, withstand high temperatures

9. Study the table below. a) Circle the ***two most heat resistant*** oils. b) How do these compare to other vegetable oils in terms of desirable healthy characteristics?
High-oleic 1 and high-oleic 2 should be circled

Vegetable Oils and their Typical Fatty Acid Compositions %s				
Oil	Saturated All C-C	Mono-Unsaturated (1 C=C)	Polyunsaturated (2 C=C)	Polyunsaturated (3 C=C)
Soybean (Vegetable Oil)	15.6	24	7	53.4
High-Oleic Soybean Oil 1	7	72.5	18	2.5
High-Oleic Soybean Oil 2	10-11	75	7	2.5
Canola	7	64	20	9
Corn	14	29	56	1
Sunflower	12	30	58	0.1
Peanut	18	49	33	0

10. What are the benefits of high oleic soybean oil?
stable at room temp
can withstand up to 3X more frying than other oils
heart healthy
flavorful

11. Write three ideas you have for an experiment that will allow you to test the claims of high oleic oils?