SI Chemistry - Full Discipline Demo

Macromolecules of Life - Lipids

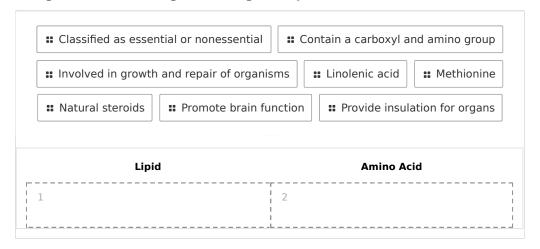
Final Report - Answer Guide

InstitutionScience Interactive UniversitySessionSI Chemistry - Full Discipline DemoCourseSI Chemistry - Full Discipline Demo

Instructor Sales SI Demo

Test Your Knowledge

Categorize the following as relating to a lipid or an amino acid.



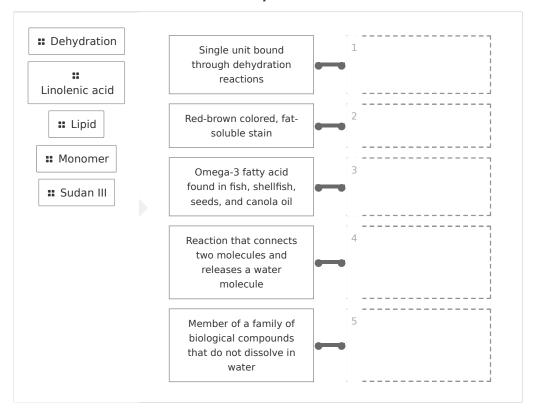
Correct answers:

Linolenic acid

- 1 Promote brain function Provide insulation for organs Natural steroids
- Involved in growth and repair of organisms Methionine
 Contain a carboxyl and amino group Classified as essential or nonessential



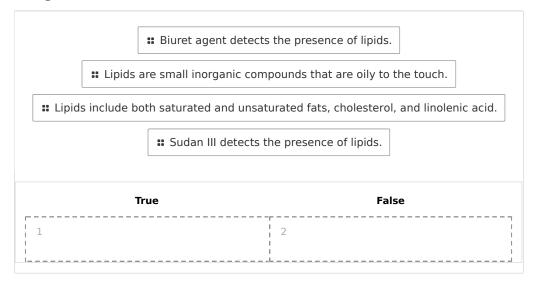
Match each term with the best description.



Correct answers:

- 1 Monomer 2 Sudan III 3 Linolenic acid 4 Dehydration
- 5 Lipid

Categorize each statement as true or false.



Correct answers:

1

Lipids include both saturated and unsaturated fats, cholesterol, and linolenic acid.

Sudan III detects the presence of lipids.

2 Biuret agent detects the presence of lipids.

Lipids are small inorganic compounds that are oily to the touch.

Exploration

A ____ reaction releases a water molecule from two monomers creating a bond.

	hydration
	dehydration
	combination
	carboxylation



macromolecules.	
True	
False	✓
Lipids include	
waxes	
fat-soluble vitamins	
steroids	
triglycerides	
All of the above	~
Lipids are	
 composed of nucleic acids 	
 formed from ionic reactions 	
involved in human body function	✓
All of the above	
Sudan III indicates the presence of lipids by	
 bleeding across the filter paper 	~
 not bleeding across the filter paper 	
None of the above	

Lipids, amino acids, monomers, and carbohydrates are the four classes of

Exercise 1



Eggs are known to contain cholesterol which is a lipid. Did your experiment results indicate a presence of lipids in the egg white? Think about this result and where cholesterol is present in eggs to explain how your results support or reject the cholesterol content in eggs. How could you test this? Explain the experiment that you would perform to test this.		
Eggs are known to contain cholesterol, yet the experiment results for albumen suggest that the egg white (albumen) does not contain lipids. The cholesterol in eggs is found primarily, if not entirely, in the egg yolk and not the egg white. To test this further, one would perform the Sudan III test with egg yolk, to determine if the cholesterol in the egg yolk is able to dissolve the Sudan III, allowing it to bleed outside of the pencil line.		
Which of the substances tested positive for lipids? Are you surprised by the results? Explain your answer.		

The oil and mayonnaise tested positive for lipids. Student answers will vary, but they should use their results and predictions to explain their answers.

Data Table 1: Lipid Tests with Sudan III (SAMPLE ANSWER BELOW)

Substance	Lipid Prediction (Yes or No)	Distance Sudan III Traveled Outside of Circle after 1 hr (mm)	Distance Sudan III Traveled Outside of Circle after 24 hrs (mm)	Test Results for Lipids
Distilled Water	Student answers will vary	0	0	Negative
Vegetable Oil	Student answers will vary	6	12	Positive
Beaten Egg White	Student answers will vary	0	0	Negative
Mayonnaise	Student answers will vary	0	3	Positive
Liquid Coffee Creamer	Student answers will vary	0	0	Negative

Competency Review

A macromolecule is	
 a large molecule composed of smaller molecules similar to a monomer an organic compound with an amino group and carboxyl group an essential amino acid 	•
Macromolecules include lipids, proteins, carbohydrates, and nucleic acid True False	ds. ✓
Lipids promote brain function. True False	~
Lipids are monomers are composed of amino acids aid reproductive functions All of the above	~
Sudan III is able to detect certain chemicals due to its ability to break bonds properties of solubility	~



causes Sudan III to travel the greatest distance across filter paper	•
Distilled water	
Oil	✓
Beaten egg white	
○ Coffee Mate [®]	
Mayonnaise causes Sudan III to bleed across filter paper because mayo	
 contains proteins 	
 does not contain proteins 	
o contains lipids	~
odoes not contain lipids	
What observation could be expected when testing distilled water for th presence lipids?	e
 Sudan III bleeds across the filter paper. 	
 Sudan III does not bleed across the filter paper. 	✓
None of the above	

Extension Questions

Jan hears about a new diet plan that she is very excited about as it promises that she will lose weight very quickly. The plan excludes almost all fat from the diet. Based on what you have learned about lipids, what advice would you give to Jan concerning this diet?

(SAMPLE ANSWER BELOW)

This diet is likely to have effects beyond losing weight as the extremely low fat content will probably not provide sufficient essential lipids to be healthy. Lack of essential lipids could disrupt

the immune system, brain function, etc.

Chad is looking for a snack that would contain lipids. He went to the market and was debating between a snack of peanut butter, orange juice, celery, or an apple. What snack should Chad purchase to meet his nutritional needs? Explain your answer using your experience with the exercises performed in this experiment. (SAMPLE ANSWER BELOW)

Chad should choose the peanut butter as it contains lipids in the peanut oil. The peanut butter would cause the Sudan III to solubilize.



