CHEMICALS OF LIFE

BACKGROUND: Do you know what foods have a lot of protein? Plenty of carbohydrate? Carbohydrates, lipids, proteins, vitamins, minerals, and water are all nutrients in your food. You can detect the presence of some of these by taste. For example, all food that taste sweet contain sugar or are artificially sweetened. On the other hand, some foods, such as milk and onions, contain sugar but do not taste sweet. Therefore, scientists do not rely on taste alone to determine what nutrients a food contains. They use other tests to identify nutrients.

PURPOSE: To perform tests to detect nutrients in foods.

BIOLOGICALS: cornstarch, gelatin, corn oil, glucose, Vitamin C, Nucleic Acid, plus five Unknowns

SAFETY: Iodine can stain clothes and skin. Glass and heat will be used in lab.
WEAR EYE PROTECTION

PROCEDURE: Be sure to use clean equipment for each test. Be sure to clean your equipment after using it.

Part A: Test for Starch

1. Place 12 drops of starch solution into a well and an equal number of drops of distilled water in another well.
2. Place 4 drops of iodine into each of the two wells from step one.
3. Compare the color in the two wells.
4. What color is iodine solution?
5. What color did it turn when added to starch?
6. Why was water used in the second well?

Part B: Test for Protein

7. Place 12 drops of protein solution into a well and an equal number of drops of distilled water in another well.
8. Place 10 drops of Biuret's Solution into each of the two wells.
9. Compare the color in the two wells.
10. What color is Biuret's solution?
11. What color did it turn when added to protein?
12. Why was water used in the second well?

Part C: Test for Vitamin C

13. Place 12 drops of vitamin C solution into a well and an equal number of drops of distilled water in another well.
14. Place 4 drops of Dichloroindophenol Solution into each of the wells.
15. Compare the color in the two wells.
16. What color is Dichloroindophenol solution?
17. What color did it turn when added to vitamin C?
18. Why was water used in the second well?

Part D: Test for Lipids

19. Place one drop of the lipid onto a piece of brown paper bag and one drop of distilled water on a different spot on the same piece of paper.
20. Wait for the water to dry and the lipid to soak into the paper.
21. Hold the paper toward the lights. Can you almost see through the paper where the lipid is?
22. Compare the effect that the water had on the paper, if any.
23. Why was water used?

Part E: Test for Sugar

24. Place 8 drops of sugar solution into a well and an equal number of drops of distilled water in another well.
25. Place 12 drops of Benedict's Solution into each of the two wells.
26. Use a pipette to move the mixture of sugar and Benedict's into a microtube. Close the tube and place in the hot water bath for several minutes.
27. Compare the color in the well with the color in the microtube.
28. What color is Benedict's solution?
29. What color did it turn when added to sugar and heated?
30. Why was water used in the second well?

Part F: Test for Nucleic Acid

31. Place 8 drops of nucleic acid solution into a well and an equal number of drops of distilled water in another well.
32. Place 12 drops of Diphenylamine Solution into each of the two wells.
33. Use a pipette to move the mixture of sugar and Benedict's into a microtube. Close the tube and place in the hot water bath for several minutes.
34. Compare the color in the well with the color in the microtube.
35. What color is Diphenylamine solution?
36. What color did it turn when added to nucleic acid and heated?
37. Why was water used in the second well?

Be sure to clean your equipment before you leave the lab area.

CHEMICALS OF LIFE Day 2

RECAP OF PARTS A-F: Scientists use indicators to identify the nutrients in food. When an indicator for a particular nutrient is used and the indicator changes color as expected, the test result is positive, indicating the nutrient is present in that food. If there is no change in color, this is a negative test result and it indicates that particular nutrient is not present in the food. Use your results from yesterday's lab to fill in the following table.

Nutrient	Indicator	Color before	Color after
Starch			
Protein			
Lipid			
Sugar			
Nucleic Acid DNA **Nucleic Acid RNA**			
Vitamin C			

PURPOSE: to identify unknown foods by performing nutrient tests

BIOLOGICALS: The 5 unknowns are in solutions marked 1-5. They are (not in order of course) egg white, potato, orange juice, mineral oil, water

UNKNOWN #4 #2 #5 #3 #1

SAFETY: Iodine can stain clothes and skin.

PROCEDURE: Be sure to use clean equipment for each test. Be sure to clean your equipment after using it.

NOTE: for each beaker # on the table below, place a + sign for a positive test result and a – sign for a negative test result.

Part G: Test for the lipid first. Enter "lipid" on the table below next to the correct beaker number. **Do not use this beaker in any other test.**

Part H. Test the other 4 beakers using the indicators for starch, protein, and vitamin C.

Be sure to clean your equipment before you leave the lab area.

Organic Nutrients					
Material Tested	~~Sugar Test~~ Vitamin C Test	Starch Test	Protein Test	Fat Test	
				~~Sudan III~~	Paper
1. Unknown #1					
2. Unknown #2					
3. Unknown #3					
4. Unknown #4					
5. Unknown #5					
6					