Chemicals Important to Life
Physical and Chemical Tests for Macronutrients

Term 1, Week 1 Date: _____

Background
All animals must eat. Explain why.

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Aim
In this practical session you will conduct and remember tests to identify the important macronutrients glucose, starch, lipids (fats) and proteins. You will conduct both physical and chemical tests.

Equipment
Each pair of students is provided with the following chemicals and apparatus;

- separate samples of **glucose** powder, **starch** powder, **olive oil** and **egg white** (a protein)
- white dimple tray
- 4x test tubes
- test tube rack
- 2x plastic pipettes
- 4 petri dishes
- binocular microscope
- 10mL measuring cylinder
- Arrhenius spatula
- bunsen burner
- matches
- Iodine Solution
- Benedict"s Solution
- brown paper
- Biuret's Solution

Safety
A summary of safety notes on how to safely and respectfully use the equipment and chemicals.

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Follow the instructions carefully. Explain how this was done.

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Method

1. **Observation of physical properties.**
    a. Using the Arrhenius spatula place very small quantities of each nutrient powder in a petri dish and observe each beneath a binocular microscope.
    b. Using a pipette measure 2mL of the liquids onto two different petri dishes and observe each beneath a binocular microscope.
    c. Record observations of colour, state, shape at room temperature. Test for solubility in water.
    d. Add 10mL of water to each sample in the petri dish, stir and observe again under the binocular microscope.

2. **Chemical Tests**
    a. Pour the **glucose** solution from the petri dish into a test tube. Add one squirt of Benedict's solution and heat very gently. Record any colour **change** in the Table 1: Results Table.
    b. Add one squirt of Iodine Solution to the **starch** solution in the petri dish. Record any colour **change.**
    c. Take a piece of brown paper and smear a small quantity of **oil** across the paper. Record any changes to the paper.
    d. Add one squirt of Biuret's Solution to 2mL of egg white solution in the petri dish. Record any colour **change.**

Results

1. **Observation of physical properties.**

Table 1: Table _____

Nutrient	Microscope Observations	Solubility
Glucose a monosaccharide a simple carbohydrate		
Starch a polysaccharide a complex carbohydrate		
Oil a lipid		
Egg white Protein		

Table 2: _____

Nutrient	Indicator	Positive test
Glucose a monosaccharide a simple carbohydrate	Add crushed sample and **Benedict's solution** to a test tube and heat gently.	
Starch a polysaccharide a complex carbohydrate	Add crushed sample and **Iodine solution** in a petri dish	
Oil a lipid	Smear a small sample of oil onto brown paper	
Egg white Protein	Add 2mL sample and **Biuret's Solution** in a petri dish	

Conclusion

1. State the positive test for glucose.

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2. State the positive test for starch.

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3. State the positive test for lipids (fats).

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4. State the positive test for proteins.

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Learn the tests: The reagent and the positive test.

Research:

1. Provide three examples of foods that contain;
    a. glucose

- _____
- _____
- _____

    b. starch

- _____
- _____
- _____

    c. lipids

- _____
- _____
- _____

    d. protein

- _____
- _____
- _____

2. Briefly describe the function of each nutrient in the body.

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