Answer Key

Activity 1: Learn the Tests

Test	Sample Used	Reagent(s)	Positive Result (colour change)
Benedict's Test	Apple juice	Benedict's solution	Blue → brick-red (large amount)
Iodine Test	Potato extract	Iodine solution	Orange-brown → blue-black
Ethanol Emulsion Test	Olive oil	Ethanol + water	Clear → cloudy white emulsion
Biuret Test	Egg white solution	NaOH + $CuSO_4$	Blue → violet

Activity 2: Mystery Samples

Sample	Real Identity	Nutrients Present
Mystery Sample A	Honey solution	Reducing sugars
Mystery Sample B	Bread extract	Starch and proteins
Mystery Sample C	Milk	Reducing sugars, fats and proteins

Activity 3: Procedures (correct order)

Benedict's Test for Reducing Sugars

- 1. Add equal volume of Benedict's reagent to 2 cm^3 of sample
- 2. Shake the mixture thoroughly
- 3. Heat beaker of water until it boils
- 4. Leave test tube in boiling water bath for 2 minutes
- 5. Observe for colour changes from blue to green/yellow/orange/brick-red

Biuret Test for Proteins

- 1. Add 2 cm^3 of sodium hydroxide (NaOH) to food sample
- 2. Shake mixture thoroughly
- 3. Add 1% copper(II) sulfate solution drop by drop
- 4. Shake after every drop added
- 5. Continue until violet colour appears (if proteins present)

Ethanol Emulsion Test for Fats

- 1. Cut and grind food sample into small pieces
- 2. Add 2 cm^3 of ethanol and shake thoroughly
- 3. Allow solid particles to settle for a few minutes
- 4. Decant ethanol into test tube with 2 cm^3 distilled water
- 5. Observe for cloudy white emulsion formation

Activity 4: Vomit Lab

Case 1: The Salad Lie

Benedict's	Iodine	Ethanol Emulsion	Biuret
Orange (positive)	Blue-black (positive)	Cloudy (positive)	Violet (positive)

Correct meal: Cheeseburger & Fries

All four tests came back positive - starch and protein from the bun and patty, fat from the fries, and a touch of sugar from the ketchup. That's not salad.

Case 2: The Cafeteria Mystery

Benedict's	Iodine	Ethanol Emulsion	Biuret
Green - faint (positive)	Orange-brown (negative)	Cloudy (positive)	Blue (negative)

Correct meal: Ice Cream

Positive for fat and a faint trace of sugar, but no starch and no protein - that rules out the pizza (starch) and the nuggets (protein).

Case 3: Late-Night Snack Confession

Benedict's	Iodine	Ethanol Emulsion	Biuret
Orange (positive)	Blue-black (positive)	Clear (negative)	Blue (negative)

Correct meal: Potato Chips & Candy Bar

Starch from the chips, reducing sugars from the candy, and no protein or fat at all - that rules out the peanuts and the jerky.

Activity 5: Check Your Understanding

1. Correct answer: A) Blue to brick-red

A brick-red precipitate indicates a large amount of reducing sugars; green/yellow/orange indicate smaller amounts.

2. Correct answer: B) Orange-brown to blue-black

Iodine solution is orange-brown; in the presence of starch it turns blue-black.

3. Correct answer: A) A cloudy white emulsion forms

When water is added to an ethanol-fat mixture, a cloudy white emulsion forms if fats are present.

4. Correct answer: B) Sodium hydroxide, then copper(II) sulfate drop by drop

NaOH is added first to make the solution alkaline, then $CuSO_4$ is added drop by drop until a colour change is observed.

5. Correct answer: A) Reducing sugars are present, but no starch or protein

A positive Benedict's result with negative Iodine and Biuret results means only reducing sugars are present.