

Alchemist's Bazaar - Chemistry Module

Round 1: The Alchemist's Chromatic Challenge

Color-Changing Reaction Spheres

Total Time: 2 hours

Objective: Create an "Essence Stone" that produces a specific target color when dropped into your assigned Mystery Elixir.

PART 2: THE MASTER'S CHALLENGE (90 MINUTES)

Phase 1: Get Your Mission (5 Minutes)

You receive:

- Target Color Card (your goal color)
- Mystery Elixir (your test liquid)
- 100 Spectrabucks (your money)
- Color Guide Sheet (shows what makes what colors)

Phase 2: Make Your Test Liquid (20 Minutes)

Choose ONE indicator to make:

Option 1: Red Cabbage Indicator (Cost: 25 Spectrabucks)

You receive: 1-2 small red cabbage leaves

- Tear the cabbage leaves into small pieces and place them in your mortar.
- Add one teaspoon of water.
- Grind vigorously with the pestle for 3-4 minutes, crushing the leaves to release their juice.
- Strain the dark purple liquid through a cloth into a clean cup. This is your indicator.

Option 2: Turmeric Indicator (Cost: 15 Spectrabucks)

- You receive: 1 spoon of turmeric powder.
- Add one teaspoon of rubbing alcohol to the powder.
- Mix properly.

- Let the mixture settle for 1 minute. Use your dropper to collect the clear, yellow liquid from the top. This is your indicator.

Option 3: Beetroot Indicator (Cost: 20 Spectrabucks)

You receive: 1 small cube of raw beetroot

- Chop the beetroot into the smallest pieces you can and place them in your mortar.
- Add one teaspoon of water.
- Grind vigorously for 3-4 minutes.
- Strain the deep red liquid through a cloth into a clean cup. This is your indicator.

Test Your Mystery Elixir:

- Add 3 drops of your homemade indicator to 10 drops of Mystery Elixir
- Compare the color to the Color Guide Sheet
- Write down: Acidic, Neutral, or Basic

Phase 3: Buy Materials (10 Minutes)

Available for Purchase:

DYES:

- Fresh Red Cabbage Leaves: 20 Spectrabucks
- Turmeric Powder: 15 Spectrabucks
- Fresh Beetroot Cube: 15 Spectrabucks

MODIFIERS:

- Extra Citric Acid (per spoon): 5 Spectrabucks
- Extra Baking Soda (per spoon): 10 Spectrabucks
- Crushed Tums (for cores): 15 Spectrabucks

TOOLS:

- Small Pellet Mold: 25 Spectrabucks
- Rubbing Alcohol: 10 Spectrabucks

COLOR GUIDE SHEET

What Colors Each Dye Makes:

| Your Mystery Elixir is: | Red Cabbage Dye | Turmeric Dye | Beetroot Dye |
|-------------------------|-----------------|--------------|---------------|
| ACIDIC | Red/Pink | Yellow | Deep Pink/Red |

| | | | |
|---------|------------|--------|-------------|
| NEUTRAL | Purple | Yellow | Pink |
| BASIC | Blue/Green | Brown | Faded Brown |

How to Make Your Target Color:

- FOR RED: Use Beetroot (in Acid) OR Red Cabbage (in Acid)
- FOR PINK: Use Beetroot (in Acid or Neutral)
- FOR PURPLE: Use Red Cabbage (in Neutral)
- FOR BLUE/GREEN: Use Red Cabbage (in Basic)
- FOR YELLOW: Use Turmeric (in Acid or Neutral)
- FOR BROWN: Use Turmeric (in Basic)

Phase 4: Build Your Stone (45 Minutes)

Method A: Advanced Cored Stone

Make a core pellet:

- Mix Crushed Tums OR Extra Citric Acid with 1 drop of water
- Press into a small mold (or make a pea-sized ball)
- Let it harden for 5 minutes
- Pack half of the main mixture into a large mold
- Place the core pellet in the center
- Cover with the remaining mixture
- Press the mold together very hard

PART 1: THE APPRENTICE'S TRIAL (30 MINUTES)

Goal: Make two basic Essence Stones that hold their shape.

Materials Provided (Per Team):

- 1 cup Baking Soda
- ½ cup Citric Acid
- ¼ cup Corn Starch
- ¼ cup Finely Ground Oats
- 2 teaspoons Vegetable Oil
- Spray bottle with water
- Two spherical molds
- Mixing bowl and whisk

Instructions:

1. Mix ½ cup Baking Soda + ¼ cup Citric Acid + 2 tbsp Corn Starch + 2 tbsp Ground Oats
2. In a separate cup: mix 2.5 tsp oil + 5 drops water
3. Slowly add oil mix to dry ingredients while stirring
4. Spray with water 2-3 times, mixing after each spray

5. When mixture clumps in your hand, pack firmly into molds
6. Press molds together hard
7. Wait 10 minutes before removing stones

Pass Requirement: Two solid stones that don't crumble.

Phase 5: Final Test (10 Minutes)

Drop your final stone into a clear cup of your Mystery Elixir.

Possible elixirs:

ACIDIC Elixirs: Vinegar, Lemon Juice, Club Soda, Milk. Whisked eggs, soya sauce, bread+milk puree, orange juice, whisked coffee.

NEUTRAL: Salt Water

BASIC: Baking Soda, Washing Soda, Antacid, cucumbers paste, garlic ginger paste, bananas paste, almonds/chestnut paste.

GRADING (25 Points Total)

Color Accuracy (5 points)

- 1 point: Wrong color or very muddy
- 3 points: Close to target color but not perfect
- 5 points: Perfect match for target color

Identification Correct (5 points)

- 1 point: Wrong elixir type
- 3 points: Correct (Acid/Base/Neutral) but used pre-made indicator
- 5 points: Correct using your homemade indicator

Strategy & Planning (5 points)

- 1 point: Bought the wrong materials for the target color
- 3 points: Bought the correct dye, but no strategy
- 5 points: Used modifiers/cores cleverly to achieve hard colors

Money Use (5 points)

- 1 point: Went over 110 Spectrabucks
- 3 points: Spent 90-110 Spectrabucks
- 5 points: Spent under 90 Spectrabucks

Stone Quality (5 points)

- 1 point: Fell apart before or during the test
- 3 points: Held shape but weak fizz
- 5 points: Solid stone with strong, complete reaction

WINNER: Highest total score out of 25 points.

JUDGE'S NOTES

- Check teams correctly identify their elixir before they shop
- Ensure safety with materials
- Have extra supplies for teams who make mistakes
- Use clear cups for the final test so colors are visible

MATERIAL LIST:

Materials List Per Team:

Dry Goods & Ingredients:

- Baking Soda: 1.5 cups
- Citric Acid: $\frac{3}{4}$ cup
- Corn Starch: $\frac{1}{2}$ cup
- Finely Ground Oats: $\frac{1}{2}$ cup
- Vegetable Oil: 3 teaspoons
- Turmeric Powder: 1 tablespoon
- Extra Citric Acid: 2 tablespoons (for marketplace)
- Extra Baking Soda: 2 tablespoons (for marketplace)
- Crushed Tums: 2 tablets (for marketplace)
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Fresh Produce:

- Red Cabbage: 2 small leaves
- Beetroot: 1 small cube (1-inch)

Equipment & Containers:

- Spray bottle with water: 1
- Spherical molds: 1 set (2 parts)
- Mixing bowl: 1
- Whisk: 1

- Small cups: 2
- Measuring cups/spoons: 1 set
- Mortar and pestle: 1 set
- Test tubes/small containers: 4
- Droppers/pipettes: 5
- Small funnel: 1
- Coffee filters/cheesecloth: 5 squares
- Small knife: 1
- Cutting board: 1
- Small pellet mold: 0.5 (shared between 2 teams)

Liquids & Solutions:

- Rubbing Alcohol: 30 mL
- White Vinegar (for testing): 50 mL
- Baking Soda Solution (for testing): 50 mL
- Distilled Water (for testing): 50 mL

Administrative:

- Spectrabucks currency: 100 units
- Target color cards: 1 set
- Color guide sheets: 1
- Clear plastic cups: 2
- Safety goggles: 2 pairs
- Disposable gloves: 2 pairs

Note for Logistics: Multiply quantities by the number of teams. Fresh produce should have 20% extra for waste/wrong cuts.

Round 1: Color-Changing Reaction Spheres

- Beakers
- Measuring cylinder (100 mL)
- Test tubes
- Test tube rack
- Dropper pipettes
- Funnels
- Mortar and pestle
- Digital scale
- Universal Indicator Solution - 100 mL
- White vinegar - 500 mL
- Baking soda - 200 g
- Distilled water - 1 L
- Rubbing alcohol - 100 mL

- Spherical molds
- Mixing bowls - 2
- Whisk - 1
- Spray bottle - 1

Round 2: Extracting Caffeine from Coffee

Caffeine Extraction from Coffee

- All heating steps use a **hotplate with magnetic stirrer** (or shared hotplates).
 - No Bunsen burners / open flames.
 - Solvent evaporation is done in a **fume hood** by gentle warm water bath or, preferably, a **rotary evaporator**. Never use an open hotplate in direct contact with EtOAc vapor.
 - All other chemistry (basify, liquid–liquid extraction, drying) unchanged.
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2) Per-team materials & exact amounts (hotplate version)

Per team (for 1 extraction; team size 2–3)

Chemicals

- Roasted ground coffee — **20.0 g**
- Distilled water — **200 mL**
- Sodium carbonate (Na_2CO_3) — **3.0 g** (basify)
- Ethyl acetate (EtOAc) — **3 × 25 mL = 75 mL** (reagent grade)
- Anhydrous sodium sulfate (Na_2SO_4) — **~10 g** (drying)
- Ethanol 95% — **20–30 mL** (optional recrystallization)
- (Optional) Activated charcoal — small pinch

Apparatus

- 250 mL beaker (×2)
- Hotplate with magnetic stirrer (shared or 1 per station)

- Magnetic stir bar (1 per beaker)
- Thermometer (digital/kitchen)
- 250 mL separatory funnel + ring clamp & stand
- Analytical balance (0.01 g precision)
- Funnel + filter paper or muslin cloth
- Pasteur/pipette droppers
- Pre-weighed watch glass or aluminum foil squares
- Fume hood for solvent handling and evaporation
- PPE: goggles, nitrile gloves, lab coat

Waste containers

- Organic solvent waste bottle (labelled EtOAc waste)
- Aqueous waste container (labelled, for basified aqueous waste)

3) Step-by-step procedure (hotplate + magnetic stirring)

Total time: ~60–90 min. Do all solvent steps inside the fume hood.

Work in teams. An instructor supervises hotplate and fume hood operations.

A — Aqueous extraction (hotplate + stirrer)

1. **Weigh coffee:** 20.0 g ground coffee into a 250 mL beaker.
2. **Add water:** Add **200 mL** distilled water. Put a magnetic stir bar into the beaker.
3. **Heat & stir:** Place on hotplate with magnetic stirring. Heat to **~80–85 °C** (do **not** boil vigorously), set stir at moderate speed (200–400 rpm) so solids suspend but don't splash. **Steep 10 minutes.**

4. **Turn off heat, let cool slightly** (~60 °C), then filter the mixture through muslin/filter paper into a clean beaker to remove grounds. Expect ~180–190 mL filtrate.

B — Basify the aqueous extract (room temp)

5. **Cool to ≤40 °C** (important before adding strong base). Stir on a stirrer at low speed.
6. **Add Na₂CO₃:** Weigh **3.0 g** sodium carbonate and add gradually while stirring. Monitor pH (if pH strips available) to **~9–10**. This converts any protonated caffeine to the free base for better partitioning.

C — Liquid–liquid extraction (separatory funnel; in fume hood)

7. **Transfer ~100 mL** basified aqueous extract into the separatory funnel.
8. **Add EtOAc (25 mL):** Add 25 mL ethyl acetate. Cap, invert gently and vent frequently. Shake 30–60 s, then allow layers to separate (EtOAc is **upper layer**; density ~0.90 g/mL).
9. **Collect organic layer:** Drain the lower aqueous layer into a waste beaker or back into a holding beaker; collect the upper organic layer into a clean labeled flask.
10. **Repeat:** Extract the aqueous layer **two more times** with 25 mL EtOAc each (total 3×25 mL). Combine all organic extracts.

If emulsions form, allow separations to settle longer or add a small amount of saturated brine (careful) to break emulsion. Instructor help recommended.

D — Drying & filtration

11. **Drying:** Transfer combined EtOAc extracts to a clean beaker/flask. Add **anhydrous Na₂SO₄** (~5–10 g) in portions until free-flowing (no clumping). Swirl 2–5 min.
12. **Filter** the dried organic solution (simple gravity or with filter paper) into a pre-weighed watch glass or small evaporation dish.

E — Solvent removal (NO open flame!)

Two safe options:

Option 1 — Rotary Evaporator (best):

- Place the organic solution on the rotavap. Evaporate EtOAc at **30–40 °C bath** under vacuum until solvent removed and residue visible. Collect solvent for disposal/recovery.

Option 2 — Warm water bath in fume hood (if no rotavap):

- Place the watch glass/dish in a **warm (30–40 °C) water bath** inside the fume hood (NOT on the hotplate with organic solvent present). Leave covered loosely to prevent splash but allow solvent to evaporate. This is slower (30–60+ min). Do not heat EtOAc directly with hotplate outside fume hood. Ensure good ventilation.
13. **Dry the residue** under vacuum or desiccator if available. Final residue may be oily or crystalline. Weigh the watch glass to get crude caffeine mass (subtract container mass).

F — Optional purification (recrystallization)

14. Dissolve crude residue in minimal **hot ethanol** (5–10 mL). Allow to cool slowly for crystal formation. Filter crystals and weigh.

4) Solvent handling & evaporation — safety notes (no flame)

- **EtOAc is flammable** even without flame. Never leave large open containers of EtOAc outside the fume hood.
- **Evaporate only in the fume hood.** Use rotavap if available. If using warm water bath for evaporation, keep the organic solvent dish inside the hood and water bath temp ≤ 40 °C.
- Keep all ignition sources and electronics that could spark away from hood area when solvent vapors are present. Hotplate may remain outside hood only for aqueous heating; do not place EtOAc-containing glassware on hotplate.

5) Safety & waste (emphasize)

- **PPE required at all times:** goggles, nitrile gloves, lab coat. No open-toe shoes.
 - **No eating/drinking** in lab.
 - **Label waste** clearly: EtOAc waste bottle for organic solvent. Aqueous waste in separate container. Follow institutional waste disposal.
 - **Spill kit** nearby (absorbent pads). For EtOAc spills, use sorbent and dispose in labelled waste.
 - **Supervision:** a trained instructor in charge of solvent steps and fume hood operations.
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6) Troubleshooting & tips (hotplate-specific)

- **Hotplate stirring:** use a stir bar that is not too large. If slurry of coffee clogs stir, filter before drying.
 - **Temperature control:** keep extraction ~80–85 °C — boiling too hard increases lost aqueous volume and bitterness/impurities.
 - **Layer confusion:** EtOAc should be the **upper** layer (less dense than water). If you get reversed layers, check for incorrect solvent (some labs use DCM which is denser; do not use DCM unless intended).
 - **Emulsion:** if stable emulsions form, add small volumes of brine (saturated NaCl) or allow to settle longer. Centrifuge tubes help in small setups.
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7) Quantitative/stochastic teaching points to keep (unchanged)

- Expected theoretical caffeine \approx **240 mg** from 20 g coffee (assuming 1.2% w/w). Discuss partition coefficient and predicted recovery based on extraction volumes (K value). Encourage teams to **predict** yield using the simple partition formula and compare to measured yield.

8) Judging Rubric (Total = 30 points)

Judges evaluate **technique, accuracy, safety, and scientific reasoning**.
Each team is scored out of **30 points**.

A — Laboratory Technique & Organization (10 points)

1. Workflow organization (0–4 points)

- 4 — Very organized station, clear role distribution, smooth sequencing of steps.
- 3 — Mostly organized; minor inefficiencies.
- 2 — Some disorder; unclear roles; noticeable delays.
- 1 — Disorganized workflow causing repeated mistakes/instructor intervention.
- 0 — Unsafe or chaotic workflow.

2. Technical execution (0–6 points)

Score based on how precisely students follow correct lab technique:

- **Use of hotplate + magnetic stirrer** (temperature control, avoiding boiling)
- **Proper shaking + venting of separatory funnel**
- **Layer identification accuracy** (EtOAc top layer)
- **Drying with Na₂SO₄** (correct use, no excess clumping left)
- **Filtration quality**
- **Evaporation done 100% inside the fume hood**

Points:

- 6 — Excellent technique, no corrections needed

- 4–5 — Minor corrections needed
 - 2–3 — Multiple technique issues but safe
 - 0–1 — Cannot proceed without instructor intervention
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B — Yield & Quantitative Accuracy (8 points)

(Teams do NOT need high yield; they need **scientific correctness**.)

1. Yield consistency vs theoretical (0–5 points)

Expected crude caffeine \approx **240 mg** theoretical.

Judging based on *reasonableness*, not highest amount.

- 5 — Yield within reasonable scientific range (100–350 mg) and properly recorded
- 3–4 — Yield slightly abnormal but calculation & recording correct
- 1–2 — Highly abnormal yield due to mistakes (e.g., <50 mg or >500 mg)
- 0 — No measurable yield or incorrect weighing/recording

2. Measurement accuracy (0–3 points)

- Correct weighing of coffee, Na_2CO_3 , Na_2SO_4
- Proper recording of masses, volumes, and pH

Points:

- 3 — All measurements precise
 - 2 — Small measuring errors
 - 1 — Multiple errors
 - 0 — No correct measurements recorded
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C — Safety Compliance (6 points)

Judge strictly.

Any severe violation = **zero points** in this category.

Scoring guide:

- 6 — Full PPE worn properly, no solvent outside fume hood, proper venting, good handling of glassware, tidy workspace
 - 4–5 — Minor reminders needed (gloves, goggles adjustments, etc.)
 - 2–3 — Several lapses but no major safety breaches
 - 0–1 — Unsafe behavior OR repeated reminders (e.g., shaking sep funnel without venting, touching solvent with bare hands)
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D — Scientific Reasoning & Explanation (6 points)

Judges ask **2–3 conceptual questions**.

Score based on group understanding of:

- Why the solution is **basified**
- Why **EtOAc** extracts caffeine
- Purpose of **drying agent**
- Why evaporation must be inside a fume hood
- What “free-base caffeine” means
- Partition coefficient concept (basic explanation)

Scoring:

- 6 — All answers correct, clear reasoning
- 4–5 — Mostly correct; minor conceptual gaps

- 2–3 — Basic or inconsistent understanding
 - 0–1 — No understanding of extraction principles
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Total: 30 points

- **27–30** = Outstanding
- **22–26** = Strong
- **16–21** = Acceptable
- **10–15** = Weak

0–9 = Incomplete / unsafe / major errors

ALTERNATIVE METHOD:

Alternative Caffeine Extraction from Coffee (Video Method)

Team size: 2–3 students

Total time: ~90–120 minutes

Goal: Extract caffeine from coffee using sodium carbonate and dichloromethane (DCM), with optional recrystallization.

1 Chemicals (per team, overestimated)

| Chemical | Amount | Notes |
|--|----------|---|
| Roasted ground coffee | 15–20 g | Any brand; non-instant preferred |
| Sodium carbonate (Na_2CO_3) | 5 g | Base to make caffeine more water-soluble |
| Distilled water | 100 mL | For aqueous extraction |
| Dichloromethane (DCM) | 50 mL | Organic solvent; flammable → fume hood required |
| Saturated sodium chloride (brine) | 20 mL | To remove water from organic layer |
| Molecular sieves or anhydrous Na_2SO_4 | ~5 g | Drying agent for organic layer |
| Ethanol 95% | 10–15 mL | Optional for recrystallization |

Ice / cold water

Optional To cool solvents if needed

Note: Quantities are slightly overestimated to ensure the team has enough material for all steps.

2 Apparatus

- Beakers (50–100 mL ×2–3)
- Watch glass (for covering beakers)
- Hotplate (inside fume hood)
- Magnetic stirrer + stir bars (optional for aqueous extraction)
- Separatory funnel (50–100 mL) + ring stand & clamp
- Funnels + filter paper or coffee filter
- Pasteur pipettes / droppers
- Pre-weighed watch glass or small evaporation dish
- Vacuum filtration setup (Büchner funnel + flask) for recrystallization
- Fume hood (mandatory for DCM handling)
- PPE: goggles, lab coat, nitrile gloves

- Analytical balance (0.01 g precision)
 - Small spatula or scoopula
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3 Step-by-Step Procedure

A — Aqueous extraction of coffee

1. Weigh **15–20 g ground coffee** into a 100 mL beaker.
 2. Add **5 g sodium carbonate** on top of coffee.
 3. Pour **100 mL distilled water** into the beaker.
 4. Cover loosely with a **watch glass**.
 5. Place the beaker in a **fume hood** on a **hotplate**, heat to **gentle boiling / simmer** (~80–90 °C).
 6. Keep it boiling gently for **15 minutes**, swirling occasionally to prevent foaming overflow.
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B — Filtration

1. Remove the beaker from heat and allow it to cool slightly (~60 °C).

2. Filter through **coffee filter or filter paper** into a clean beaker to remove coffee grounds.
 3. Wash remaining grounds with a small amount (~20 mL) of **hot distilled water** and combine filtrate.
 4. If needed, cover with a watch glass to **limit heat loss**.
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C — Organic extraction (DCM)

1. Transfer filtered coffee solution (~100 mL) into a **separatory funnel**.
 2. Add **15–20 mL dichloromethane (DCM)**.
 3. Cap and **gently invert** the funnel, venting frequently. Avoid vigorous shaking to prevent emulsion formation.
 4. Allow layers to separate. The **bottom layer** is DCM (caffeine-rich).
 5. Collect the DCM layer into a clean beaker.
 6. Repeat extraction **2 more times** with **15 mL and 10 mL DCM**, combining all organic layers.
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D — Drying the organic layer

1. Add **~5 g molecular sieves or anhydrous Na_2SO_4** to the combined DCM solution.
 2. Stir gently for 10–20 min.
 3. Decant or filter the dried DCM into a clean beaker.
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E — Solvent removal

1. Place the DCM solution **in a fume hood**.
 2. Evaporate solvent using **hotplate at low temperature (~30–40 °C)** or let it **air evaporate under hood airflow**.
 3. Stop evaporation once **residue remains**. Avoid overheating.
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F — Optional recrystallization

1. Dissolve residue in **10–15 mL hot 95% ethanol**.
 2. Allow solution to cool **slowly at room temperature or in a freezer**.
 3. Filter crystals under **vacuum filtration**.
 4. Dry crystals and weigh to determine crude caffeine yield.
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4 Safety Notes

- Always work in **fume hood** when handling DCM.
 - Wear **goggles, gloves, and lab coat**.
 - DCM is volatile and flammable; do **not use open flame**.
 - Dispose of DCM and aqueous waste in **labeled containers**.
 - Avoid inhalation of vapors, even in small amounts.
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5 Tips / Troubleshooting

- Foaming during boiling → reduce heat or swirl.
 - Slow filtration → keep solution warm, shake gently.
 - Emulsion formation → let separatory funnel settle longer, add small brine volume.
 - Low yield → incomplete extraction or solvent loss; do not overheat DCM.
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This procedure is **safe, overestimated, and should work for a classroom lab** while keeping steps simple.

Round 3: Chemistry Cooking

1) CARAMELIZED SUGAR / CARAMEL SHARDS

Ingredients:

Sugar – required quantity

Equipment & Utensils:

Hot plate or Bunsen burner

Metal pan

Tongs

Heatproof spatula

Parchment/butter paper

Tray for cooling

Knife (for breaking shards)

Heat-resistant gloves

2) SCRAMBLED EGGS

Ingredients:

Eggs – as required

Butter/oil – small amount

Salt – as required

Pepper – as required

Optional: cheese, herbs

Equipment & Utensils:

Hot plate or Bunsen burner

Frying pan

Whisk or fork

Spatula

Bowl

Knife

Cutting board

Plate for serving

3) PANCAKES

Ingredients:

Flour – required amount
Sugar – small amount
Egg – 1–2
Milk – required amount
Butter/oil
Salt – pinch
Baking powder – small amount
Optional: chocolate chips, syrup

Equipment & Utensils:

Hot plate
Nonstick pan
Ladle
Whisk
Mixing bowl
Spatula
Measuring cups/spoons
Plate for serving

- crepes

4) POPCORN

Ingredients:

Popcorn kernels
Oil or butter
Salt
Optional: caramel, cheese powder

Equipment & Utensils:

Hot plate or Bunsen burner
Deep pot with lid
Spatula or spoon
Bowl for serving
Heat gloves

5) MARSHMALLOWS (TOASTED)

Ingredients:

Marshmallows

Optional: chocolate sauce, biscuits

Equipment & Utensils:

Bunsen burner (primary heat source)

Tongs / skewers

Plate

Heatproof gloves

6) GRILLED CHEESE SANDWICH

Ingredients:

Bread slices

Butter

Cheese slices / grated cheese

Optional: herbs, garlic

Equipment & Utensils:

Hot plate

Frying pan / sandwich pan

Spatula

Knife

Cutting board

Plate for serving

7) HOT CHOCOLATE

Ingredients:

Milk

Cocoa powder

Sugar

Chocolate (optional)
Cream (optional)

Equipment & Utensils:

Hot plate
Saucepan
Whisk
Mug
Spoon

8) QUESADILLA

Ingredients:

Tortillas
Cheese (grated)
Optional: vegetables, chicken, sauces

Equipment & Utensils:

Hot plate
Flat pan / tawa
Spatula
Knife
Cutting board
Plate for serving

9) WHITE SAUCE PASTA (FINAL)

White Sauce Pasta

Ingredients:

Pasta
Butter
All-purpose flour
Milk
Grated cheese
Salt – as required
Black pepper – as required
Garlic – as required

Mixed herbs/oregano – as required

Chicken or vegetables – optional, as required

Equipment & Utensils:

Hot plate (lab heat source)

Cooking pot

Frying pan / saucepan

Ladle

Spatula

Whisk

Knife

Cutting board

Measuring cups/spoons

Mixing bowl

Tongs

Serving bowl/plates