

QUAL

	<u>Amount Per Cart</u>
Drawer Cards	1 set of 24
"Freshman Lab Policies"	24
Contact Lens Policy	24
Drawer Equipment Lists	24
QUAL Kit Lists	24
Goggles	24
Syllabuses	24
Class Roster	1 (check room #)

CHECK ROOM & SECTION NUMBERS

QUAL Exp #2 [Spectroscopy I]

	<u>Amount per cart</u>
Reagents:	
Standard solution Congo Red - *Room 310/306 Bromocresol Green - *Room 308/304	1 L
Unknowns for correct room	24
Equipment:	
Spectrophotometers (Genesys 20®)	5 per room
Kim Wipes	2 boxes
Labels	sheets
Waste container for QUAL	1
"Empty Used Vials Only" container	1
Student sign-out (per team):	
Cuvets	2
Burets	2

*The stated rooms are not mandatory. The only requirement is that the standard and unknowns match (i.e. Congo Red standard with Congo Red unknowns).

QUAL Waste Disposal

Exp #2 [Spectroscopy 1]

- **Empty Lab Waste container and used unknowns into Aqueous Waste**

QUAL Exp #3 [Spectroscopy 2]

	<u>Amount per cart</u>
Reagents:	
Reference W solution	1 L
Reference Z solution	1L
Unknowns	24
Equipment:	
Spectrophotometers	5 per room
Kim Wipes	Box
Waste container	1
Student Sign-Out (per team):	
Cuvets	2
Burets	2

Note: Standard solutions should be labeled with λ_{\max} in nm and [Chromophore] in mol/L.

QUAL Waste Disposal

Exp #3 [Spectroscopy 2]

- Empty Lab Waste container and used unknowns into Aqueous Waste

QUAL Exp #1A [Group I Cations]

#	Reagent	Formula	[X]
1	Potassium chromate	K_2CrO_4	0.5 M
2	Silver Nitrate, Ag^+	$AgNO_3$	0.1 M
3	Lead Nitrate, Pb^{2+}	$Pb(NO_3)_2$	0.1 M
4	Mercury (I) nitrate, Hg_2^{2+}	$Hg_2(NO_3)_2$	0.1 M
9	Tin(II) chloride	$SnCl_2$	0.1 M
89	Acetic acid	CH_3COOH	6.0 M
90	Ammonia, aqueous	$NH_3(aq)$	6.0 M
91	Hydrochloric acid	HCl	6.0 M
93	Nitric acid	HNO_3	6.0 M
Miscellaneous:			
	24 Unknowns		
	5- $\frac{3}{4}$ " Glass Pipets (1-Box)		
	2 ml Pipet Bulbs (1-Box)		
	Label Tape		
	Waste container		

QUAL Waste Disposal
Exp #1A [Group I Cations]

- Empty Lab Waste container and used unknown vials into MERCURY WASTE container. Wear goggles and gloves.
- Rinse and scrub vials with a test tube brush. Soak in detergent. Wear goggles and gloves.

QUAL Exp #1B [Group II Cations]

#	Label	Formula	[X]
5	Thioacetamide	CH ₃ CSNH ₂	1.0 M
6	Ammonium chloride	NH ₄ Cl	1.0 M
7	Potassium ferrocyanide	K ₄ Fe(CN) ₆	0.2 M
8	Sodium acetate	NaC ₂ H ₃ O ₂	0.5 M
9	Tin(II) chloride	SnCl ₂	0.1 M
10	Mercury(II) chloride	HgCl ₂	0.1 M
11	Hydrogen peroxide	H ₂ O ₂	3%
12	Potassium iodide	KI	0.1 M
13	Sodium hydrosulfite	Na ₂ S ₂ O ₄	solid
14	Oxalic acid	(COOH) ₂	solid
15	Aluminum	Al	wire
16	Methyl violet indicator		
18	Group II known solution		
19	Sn ⁴⁺		
20	Sb ³⁺		
21	Cu ²⁺		
22	Bi ³⁺		
90	Ammonia, aqueous	NH ₃ (aq)	6.0 M
91	Hydrochloric acid	HCl	6.0 M
92	Hydrochloric acid	HCl	12.0 M
93	Nitric acid	HNO ₃	6.0 M
94	Sodium hydroxide	NaOH	6.0 M
95	Sulfuric acid	H ₂ SO ₄	3.0 M
96	Ammonia, aqueous	NH ₃ (aq)	15 M
109	Sodium hydroxide	NaOH	1.0 M
Miscellaneous:			
	Filter paper, 11.0-cm		
	5- $\frac{3}{4}$ " Glass Pipets (1-Box)		
	2 ml Pipet Bulbs (1-Box)		
	Unknowns		
	Used Vials container		
	Label Tape		
	Waste Container		

QUAL Waste Disposal
Exp #1B [Group II Cations]

- Empty **ONLY** the bottle labeled **MERCURY WASTE** into the **MERCURY WASTE** container.
-
- Empty unknown vials and the other waste container into the **AQUEOUS WASTE** container.

- Rinse and scrub vials with a test tube brush. Soak in detergent. Wear goggles and gloves

QUAL Exp #1C [Group III Cations]

#	Label	Formula	[X]
5	Thioacetamide*	CH ₃ CSNH ₂	1.0 M
6	Ammonium chloride	NH ₄ Cl	1.0 M
7	Potassium ferrocyanide	K ₄ Fe(CN) ₆	0.2 M
11	Hydrogen peroxide	H ₂ O ₂	3%
28	Ethanol	CH ₃ CH ₂ OH	95%
29	Potassium thiocyanate	KSCN	0.5 M
31	Dimethylglyoxime	(CH ₃ CNOH) ₂	1%
34	Ammonium thiocyanate	NH ₄ SCN	solid
35	Group III known solution		
36	Iron (III) nitrate (Fe ³⁺)	Fe(NO ₃) ₃	0.1 M
37	Aluminum Nitrate, Al ³⁺	Al(NO ₃) ₃	0.1 M
38	Zinc Nitrate, Zn ²⁺	Zn(NO ₃) ₂	0.1 M
41	Cobalt (II) Nitrate, Co ²⁺	Co(NO ₃) ₂	0.1 M
42	Nickel Nitrate, Ni ²⁺	Ni(NO ₃) ₂	0.1 M
89	Acetic acid	CH ₃ COOH	6.0 M
90	Ammonia, aqueous	NH ₃ (aq)	6.0 M
91	Hydrochloric acid	HCl	6.0 M
93	Nitric acid	HNO ₃	6.0 M
94	Sodium hydroxide	NaOH	6.0 M
95	Sulfuric acid	H ₂ SO ₄	3.0 M
110	Sodium hypochlorite	NaOCl	1.0 M
111	Sulfuric acid	H ₂ SO ₄	6.0 M
112	Catechol violet indicator*		
Miscellaneous:			
	Waste Container		
	Unknowns		
	Used Unknowns Vials Containers		
	5- $\frac{3}{4}$ " Glass Pipets (1-Box)		
	2 ml Pipet Bulbs (1-Box)		
	Label Tape		
	*NOTE: Check dates on thioacetamide (5) and catechol violet indicator (112). Stable for 1 month.		

QUAL Waste Disposal
Exp #1C [Group III Cations]

- Empty Unknowns and Waste container into **AQUEOUS WASTE**. Rinse vials and caps with H_2O , soak in detergent, remove labels, rinse with deionized H_2O .

QUAL Exp #1D [General Cation]

N°	Label	Formula	[X]
1	Potassium chromate	K_2CrO_4	0.5 M
2	Silver Nitrate, Ag^+	$AgNO_3$	0.1 M
3	Lead Nitrate, Pb^{2+}	$Pb(NO_3)_2$	0.1 M
4	Mercury (I) nitrate dihydrate, Hg_2^{2+} *	$Hg_2(NO_3)_2$	0.1 M
5	Thioacetamide*	CH_3CSNH_2	1.0 M
6	Ammonium chloride	NH_4Cl	1.0 M
7	Potassium ferrocyanide	$K_4Fe(CN)_6$	0.2 M
8	Sodium acetate	$NaC_2H_3O_2$	0.5 M
9	Tin(II) chloride	$SnCl_2$	0.1 M
10	Mercury(II) chloride	$HgCl_2$	0.1 M
11	Hydrogen peroxide	H_2O_2	3%
12	Potassium iodide	KI	0.1 M
13	Sodium hydrosulfite	$Na_2S_2O_4$	solid
14	Oxalic acid	$(COOH)_2$	solid
15	Aluminum	Al	wire
16	Methyl violet indicator		
19	Tin (IV) Chloride, Sn^{4+}	$SnCl_4$	0.1 M
20	Antimony Trichloride, Sb^{3+}	$SbCl_3$	0.1 M
21	Copper (II) Nitrate, Cu^{2+}	$Cu(NO_3)_2$	0.1 M
22	Bismuth Nitrate, Bi^{3+}	$Bi(NO_3)_3$	0.1 M
28	Ethanol	CH_3CH_2OH	95%
29	Potassium thiocyanate	KSCN	0.5 M
31	Dimethylglyoxime	$(CH_3CNOH)_2$	1%
34	Ammonium thiocyanate	NH_4SCN	solid
36	Iron (III) nitrate (Fe^{3+})	$Fe(NO_3)_3$	0.1 M
37	Aluminum Nitrate, Al^{3+}	$Al(NO_3)_3$	0.1 M
38	Zinc Nitrate, Zn^{2+}	$Zn(NO_3)_2$	0.1 M
41	Cobalt (II) Nitrate, Co^{2+}	$Co(NO_3)_2$	0.1 M
42	Nickel Nitrate, Ni^{2+}	$Ni(NO_3)_2$	0.1 M
89	Acetic acid	CH_3COOH	6.0 M
90	Ammonia, aqueous	$NH_3(aq)$	6.0 M
91	Hydrochloric acid	HCl	6.0 M
92	Hydrochloric acid	HCl	12.0 M
93	Nitric acid	HNO_3	6.0 M
94	Sodium hydroxide	NaOH	6.0 M
95	Sulfuric acid	H_2SO_4	3.0 M
96	Ammonia, aqueous	NH_3	15 M
109	Sodium Hydroxide	NaOH	1.0 M
110	Sodium hypochlorite	NaOCl	1.0 M
111	Sulfuric acid	H_2SO_4	6.0 M
112	Catechol violet indicator*		

Miscellaneous:

Waste container + Unknown + Used Unknowns Vials Containers

Filter paper 11.0cm + 5- $\frac{3}{4}$ " Glass Pipets + 2 ml Pipet Bulbs + Label Tape

*NOTE: Check dates on thioacetamide (5) and catechol violet indicator (112).

Stable for 1 month.

QUAL Waste Disposal
Exp #1D [General Cation]

- Empty **ONLY** the bottle labeled **MERCURY WASTE** into the **MERCURY WASTE** container.
-
- Empty unknown vials and the other waste container into the **AQUEOUS WASTE** container.

- Rinse and scrub vials with a test tube brush. Soak in detergent. Wear goggles and gloves

QUAL Exp #13 [Phys. Prop. Water]

	<u>Amount per cart</u>
Reagents:	
Rock salt (<i>not</i> reagent NaCl)	1 kg
Equipment:	
Styrofoam cups	12
Student sign-out (group of 2):	
Temperature probe (bag)	1
USB flash drive	1
LabQuest handheld	1

QUAL Waste Disposal
Exp #13 [Phys. Prop. Water]

- No waste container needed.

QUAL Exp #4 [Chemical Kinetics]

	<u>Amount per cart</u>
Reagents:	
0.010 <i>M</i> Potassium iodide	1 L
0.0010 <i>M</i> Sodium thiosulfate	1 L
0.040 <i>M</i> Potassium bromate	1 L
0.10 <i>M</i> Hydrochloric acid	1 L
1% Starch indicator	Dropper bottle
Equipment:	
Label tape	roll
Rubber stoppers, #0	24
Pasteur pipets	box of 48
Disposable syringes, 3-mL	box of 48
Latex tubing, $\frac{3}{8}$ " OD \times $\frac{1}{4}$ " ID \times 1" L	48*
Waste container	
Student sign-out (group of 2):	
Stopwatch	1

QUAL Waste Disposal
Exp #4 [Chemical Kinetics]

- Empty Lab Waste container into AQUEOUS waste container.

QUAL Exp #5 [Equilibrium Constant]

	Amount per cart
Reagents:	
0.0025 <i>M</i> Iron (III) nitrate in 0.15 (0.10) <i>M</i> nitric acid	1 L
0.0025 <i>M</i> Potassium thiocyanate	1 L
0.500 <i>M</i> Potassium thiocyanate	1 L
0.10 <i>M</i> Nitric acid	1 L
Equipment:	
Spectrophotometers (Genesys 20®)	4-5
Kim Wipes	box
Label tape	roll
Waste container	
Student sign-out (group of 2):	
50-mL Beakers	2
25-mL Volumetric flasks	2
100-mL Volumetric flask	1
5-mL Volumetric pipets	2
Cuvets	2

QUAL Waste Disposal
Exp #5 [Equilibrium Constant]

- Empty Lab Waste container into AQUEOUS waste container.

QUAL Exp #6 [Acid-Base Titration]

	Amount per cart
Reagents:	
0.1000 <i>M</i> Potassium hydrogen phthalate	1 L
NaOH pellets	25 g
Unknown weak acid ~0.1 <i>M</i>	1 L
Buffer, pH 4	bottle
Buffer, pH 10	bottle
Equipment:	
Waste container	
Kim Wipes	box
Student sign-out (group of 2):	
LabQuest	1
Buret	1
pH probe	1
50-mL Beaker	1
30-mL Beakers	1

QUAL Waste Disposal
Exp #6 [Acid-Base Titration]

- Flush waste down sink

QUAL Exp #8 [Equil. & Thermo.]

	Amount per cart
Reagents:	
Sodium tetraborate (borax)	500 g
Bromocresol Green indicator	dropper bottle
~0.200 M HCl (0.195-0.205 M)	4.0 L
Equipment:	
Permanent Markers	6
Weighing dishes (plastic)	18
Label tape	roll
Student sign-out (group of 2):	
Buret	1
5-mL Mohr pipet	1

QUAL Waste Disposal
Exp #8 [Equil. & Thermo]

- Empty Lab Waste container into **AQUEOUS** waste container.

QUAL Exp #7 [Conductivities]

	Amount per cart
Reagents:	
Sodium chloride	≥ 75 g
Sodium nitrate	≥ 75 g
Sodium acetate trihydrate	≥ 150 g
Sodium sulfate (anhydrous)	≥ 150 g
Calcium chloride (anhydrous)	≥ 75 g
Glucose (anhydrous)	≥ 75 g
Acetic acid, 1.00 M	dropper bottle
Equipment:	
Milligram balances	optional
Waste container (1-L)	
Student sign-out (group of 2):	
25-mL Volumetric flasks	2
LabQuest Handheld	1
Conductivity probe	1

QUAL Waste Disposal
Exp #7 [Conductivities]

- Flush waste down sink.

QUAL Exp #11 [Voltaic Cells]

	Amount per cart
Reagents:	
0.100 <i>M</i> Silver Nitrate	500 mL
0.100 <i>M</i> Copper Nitrate	500 mL
0.100 <i>M</i> Zinc Nitrate	500 mL
0.100 <i>M</i> Potassium nitrate	dropper bottle
Equipment:	
Wire electrodes, 3 to 4 cm (Ag, Cu, and Zn)	bottle of each
Fine sandpaper	
Label tape	roll
Chromatography paper strips, 2 × 8 cm, in envelope	48
Waste container	1
Student sign-out (group of 2):	
LabQuest Handheld	1
Voltage probe	1
30-mL Beaker	1

QUAL Waste Disposal
Exp #11 [Voltaic Cells]

- Empty Lab Waste container into AQUEOUS waste container.

QUAL Exp #9 [Prep. of Aspirin]

	Amount per cart
Reagents:	
Salicylic acid	75 g
Acetic anhydride	dropper bottle
85% Phosphoric acid	dropper bottle
0.025 M Iron (III) nitrate	500 mL
95% Ethanol	1 L
Standard: 1.25×10^{-3} M Salicylic acid	1 L
Equipment:	
Spectrophotometers (Genesys 20®)	4-5
Kim Wipes	3 boxes
Filter paper, Whatman #2, 7.0-cm	box
Weighing dishes (plastic)	50
Microwave ovens	2 per room
Milligram balances	optional
Solid waste container	1
Student sign-out (group of 2):	
Cuvets	2
5-mL Volumetric pipet	1
25-mL Volumetric flask + stopper	1
Büchner funnel + filter flask + vacuum tubing	1

QUAL Waste Disposal
Exp #9 [Prep. of Aspirin]

- Empty Lab Waste container into AQUEOUS waste container.

QUAL Exp #12 PART I
[Coordination Compound]

	Amount per cart
Reagents:	
Cobalt(II) nitrate	100 g
Ammonium nitrate	100 g
3% Hydrogen peroxide	dropper bottle
16 M (conc.) Nitric acid (CAUTION)	Dispenser
95% Ethanol	2 L
6.0 M Ammonia	dropper bottle
Equipment:	
Milligram balances	2 per room
Filter paper, Whatman #2, 2.5-cm	box
Waste container	1
Label tape	roll
Student sign-out (group of 2):	
Hirsch funnel + filter flask + vacuum tubing	1

QUAL Waste Disposal

Exp #12 PART I [Coordination Compound]

- Empty Lab Waste container into AQUEOUS waste container.

QUAL Exp #12 PART II
[Coordination Compound]

	Amount per cart
Reagents:	
Acetone	1.0 L
0.500 mM Tetrathiocyanatocobalt(II) stock	1.0 L
40% Ammonium thiocyanate	dropper bottle
6.0 M Sodium hydroxide	dropper bottle
6.0 M Hydrochloric acid	dropper bottle
Equipment:	
Milligram balances	2
Spectrophotometers (Genesys 20®)	4-5
Kimwipes	box
Corks (#11) for 125-mL Erlenmeyer flasks	12 in box
Label tape	3 rolls
Waste container	1
Student sign-out (group of 2):	
Buret	1
5-mL Mohr pipet	1
Cuvets	2
25-mL Volumetric flasks	2

QUAL Waste Disposal

Exp #12 PART II [Coordination Compound]

- Empty Lab Waste container into AQUEOUS waste container.

QUAL Exp #15

[Synthesis/Color of Inorg. Pigments]

Reagents:	
1.00 <i>M</i> Ammonium sulfide	500 mL
1.00 <i>M</i> Copper(II) nitrate	500 mL
1.00 <i>M</i> Strontium nitrate	500 mL
1.00 <i>M</i> Sodium chromate	500 mL
1.00 <i>M</i> Zinc nitrate	500 mL
Equipment:	
Sample kit(s) [reference pigments]	
Filter paper, Whatman #2, 2.5-cm	box
Label tape	3 rolls
Waste container	1
Student sign-out (group of 2):	
Hirsch funnel + filter flask + vacuum tubing	
Color wheel	

QUAL Waste Disposal

Exp#15 [Synthesis/Color of Inorg. Pigments]

- Empty Lab Waste container into AQUEOUS waste container.

QUAL Exp #17

[Synthesis/Color of Inorg. Pigments]

#	Reagents:	
155	1.00 M Sodium vanadate	500 mL
153	1.00 M Sodium chromate	500 mL
156	1.00 M Sodium molybdate	500 mL
157	1.00 M Sodium tungstate	500 mL
158	0.40 M Potassium permanganate	500 mL
150	1.00 M Ammonium sulfide	500 mL
159	1.00 M Sodium sulfate	500 mL
160	1.00 M Sodium chloride	500 mL
82	1.00 M Sodium bromide	500 mL
113	1.00 M Potassium iodide	500 mL
154	1.00 M Zinc nitrate	500 mL
152	1.00 M Strontium nitrate	500 mL
161	0.30 M Barium nitrate	500 mL
162	1.00 M Iron (III) nitrate	500 mL
163	1.00 M Silver nitrate	500 mL
58	1.00 M Calcium chloride	500 mL
151	1.00 M Copper (II) nitrate	500 mL
164	1.00 M Cobalt (II) nitrate	500 mL
165	0.50 M Tin (II) chloride	500 mL
166	0.50 M Bismuth nitrate	500 mL
	Equipment:	
	Filter paper, Whatman #2, 2.5-cm	box
	Label tape	roll
	Sample vials (3- or 4-dram) in PE bin	24
	Solid Waste Container	1
	Liquid Waste container	1
	Student sign-out (per group of 2):	
	Hirsch funnel + filter flask + vacuum tubing	
	Color wheel	

QUAL Waste Disposal

Exp#15 [Synthesis/Color of Inorg. Pigments]

- Empty liquid lab waste container into **AQUEOUS** waste container.
- Empty solid lab waste container into **SOLID** waste container

QUAL Exp #18

[Water Quality]

#	REAGENTS:	
	pH 4 buffer	500 ml
	pH 10 buffer	500 ml
211	TDS standard solution 500 mg/L	4 L
213	Nitrate standard solution HIGH 100 mg/L (NO_3^- -N)	4 L
212	Nitrate standard solution LOW 1 mg/L (NO_3^- -N)	4 L
219	Ammonium standard HIGH 100 mg/L (NH_4^+ -N)	4 L
218	Ammonium standard LOW 1 mg/L (NH_4^+ -N)	4 L
217	Calcium standard HIGH 1000 mg/L (Ca_2^+)	4 L
216	Calcium standard LOW 10 mg/L (Ca_2^+)	4 L
215	Chloride standard HIGH 1000 mg/L (Cl^-)	4 L
214	Chloride standard LOW 10 mg/L (Cl^-)	4 L
222	Phosphate standard 10.0 mg/L (PO_4)	4 L
	PhosVer 3 Phosphate Powder Pillows	36
	Potassium Persulfate/Sulfate Powder Pillows	12
98	0.1 M HCl	1 L
220	2.63 M H_2SO_4	1 L
221	5.0 M NaOH	1 L
	EQUIPMENT:	
	Kimwipes	4 boxes
	Spectrophotometers	5 per room
	STUDENT SIGN-OUT (PER GROUP OF 4):	
	LabQuest Handheld	1
	pH probe	1
	Conductivity probe	1
	Nitrate ISE	1
	Ammonium ISE	1
	Calcium ISE	1
	Chloride ISE	1
	Burets	2
	Cuvets	2

QUAL Waste Disposal
Exp#18 [Water Quality]