pH TEST

1. Add 5mL of water to the test vial.
2. Add 3 drops of the pH test solution (blue label) to the test vial. (add 5 drops if doing the high pH range test)
3. Shake well.
4. Hold the vial up to the pH color chart strip, find the color that best matches and record the result.
5. If reading (with blue label) is 7.6 repeat the test using the high pH range test

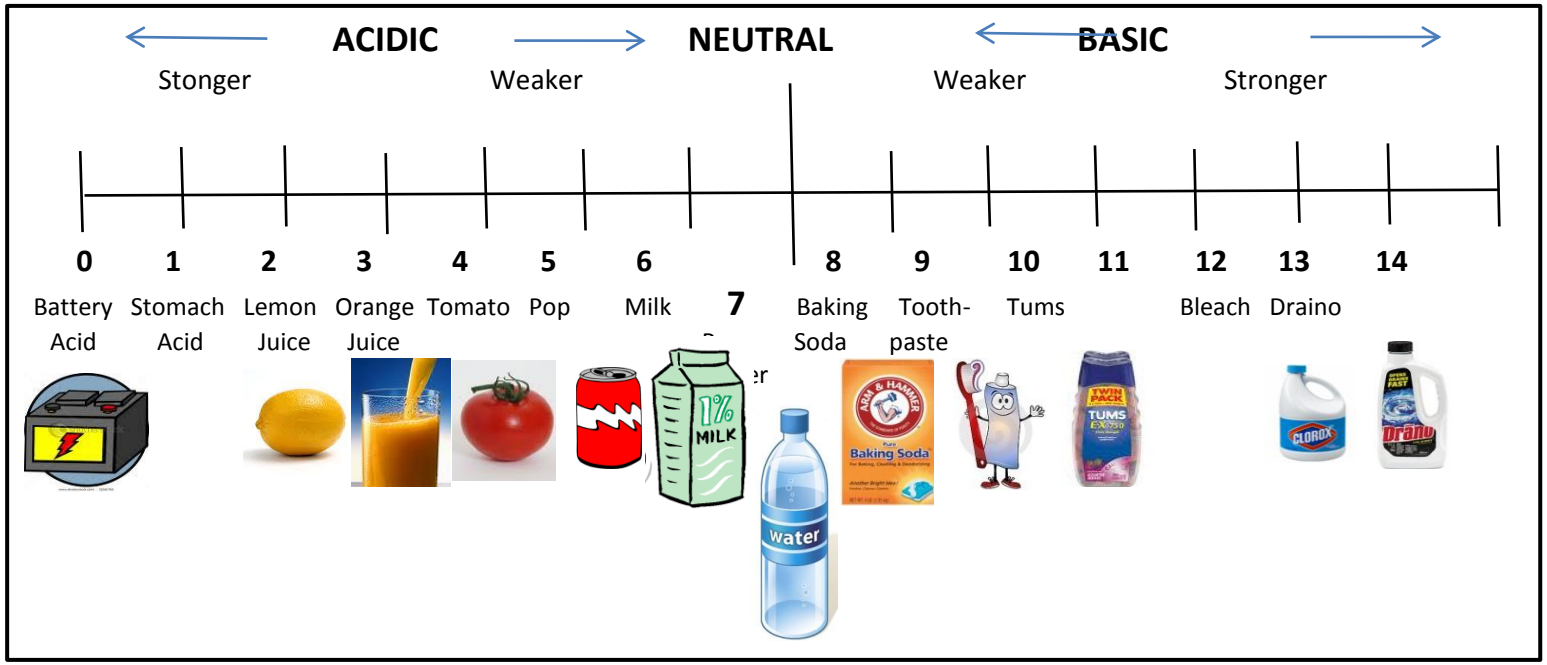
NITRITE TEST

BE CAREFUL! MAKE SURE YOU ARE DOING THE RIGHT TEST!

1. Add 5mL of water to the test vial.
2. Add 5 drops of Nitrite test solution to the test vial.
3. Shake well.
4. Wait 5 minutes.
5. Read your results using the color chart for Nitrites.

NITRATE TEST

1. Add 5 mL of water to the test vial.
2. Add 10 drops of the nitrate test #1 solution to the test vial.
3. Shake well.
4. Shake the nitrate test solution #2 and add 10 drops to the test vial.
5. Shake for one minute.
6. Wait 5 minutes.
7. Read your results using the color chart for Nitrates.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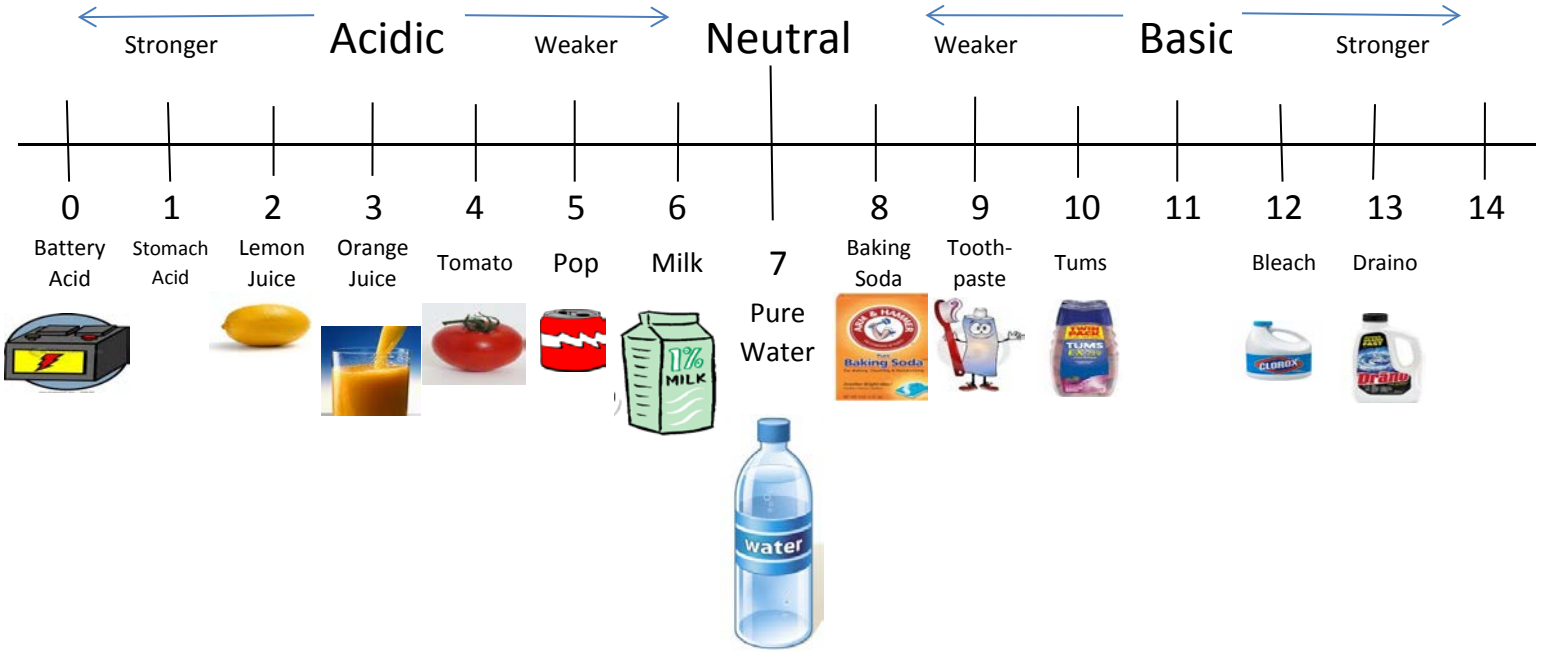
12
13
14
Battery Acid
Stomach Acid
Lemon Juice
Orange Juice
Tomato
Pop
Milk
Baking Soda
Tooth-paste
Tums
Bleach
Draino
1% MILK
water
Baking Soda
TUMS
CLOROX
Drano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Tomato
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Pop
6
Milk
7
Pure Water
8
Baking Soda
9
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Draino
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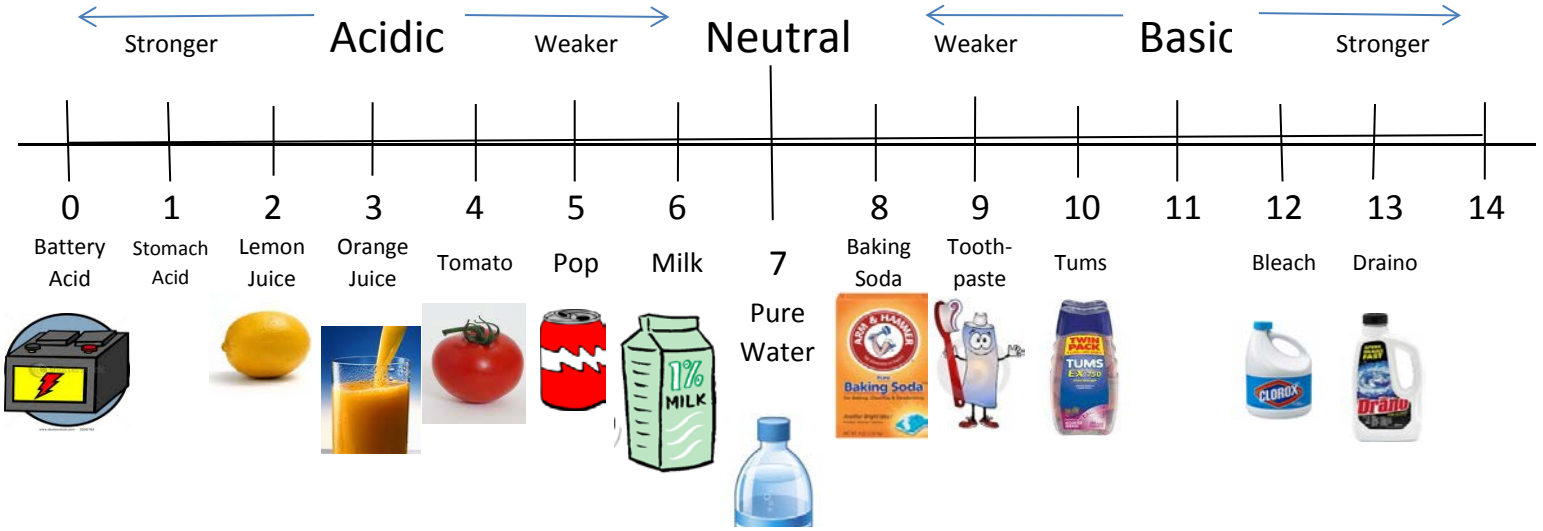
1% MILK
water
CLOROX
Baking Soda
TUMS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Tomato
5
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6
Milk
7
Pure Water
8
Baking Soda
9
Tooth-paste
10
Tums
11
12
Bleach
13
Draino
14
1% MILK
CLOROX
Baking Soda
TUMS

ACIDIC ← Stonger — Weaker → **NEUTRAL** ← Weaker — Stronger → **BASIC**

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Battery Acid	Stomach Acid	Lemon Juice	Orange Juice	Tomato	Pop	Milk		Baking Soda	Tooth-paste	Tums		Bleach	Draino	






Name:_____ Date: _____

Teacher:_____ Period: _____

Trout in Classroom: Water Chemistry Lab

Water Chemistry to be tested/ monitored

Chlorine: used in tap water to remove harmful bacteria. Chlorine is lethal to trout and the good bacteria in the tank.

Temperature: Brook trout live in cold water habitats. The ideal temperature for the tank is between 48^0F and 52^0F.

- Too cold (below 38^0F)- Trout digestive process slows and they don't feel like eating… fish can starve to death
- Too warm (above 68^0F)- won't digest their food completely, and water holds less oxygen so fish may suffocate

Dissolved Oxygen (DO): The amount of oxygen that will dissolve in water at a given temperature. Trout use a lot of oxygen as they are very active fish. The ideal DO level for the water is 10-12 ppm.

- Low DO- Reduce feeding, crowd incoming water flow, swim near surface with gaping mouths, and display fast gill cover movement …. fish mortality , until problem fixed
- High DO-Trout will circle the aquarium and begin heading to surface. Leads to harmful changes in blood cell chemistry… result in fish death

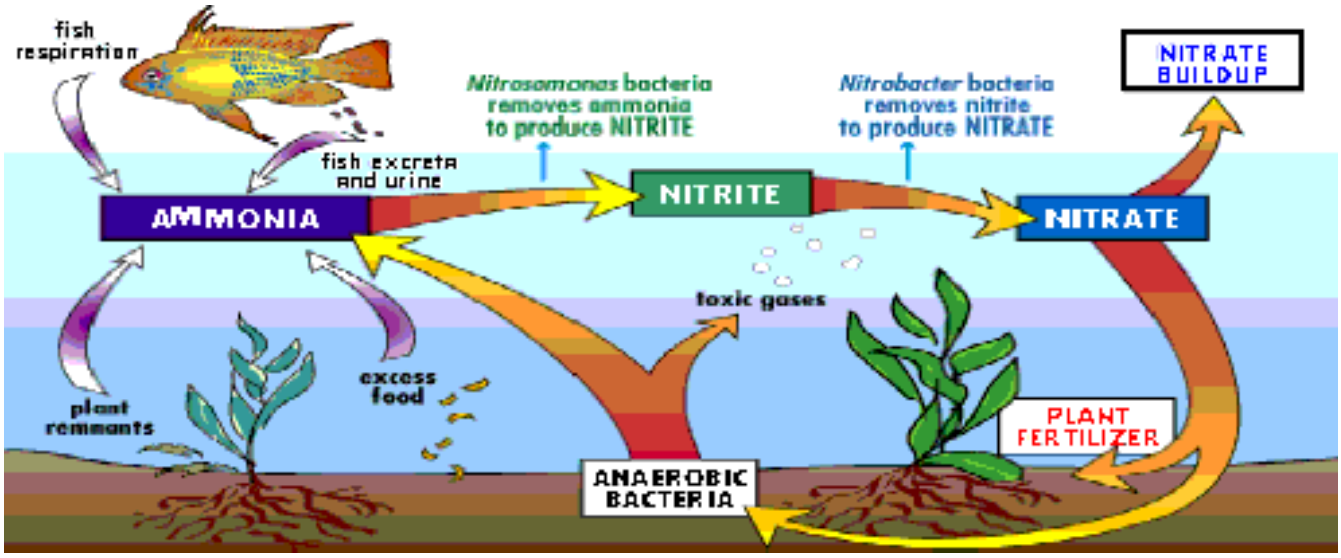
pH: It is a scale between 0-14 that measures if a liquid is acidic or basic. The tank's water should be between a pH of 6.0 and 8.2

- A rapid pH change causes severe stress or death of fish. In extreme cases trout may become very excited, jumping out of water or racing back and forth in aquarium. In mild cases, fish may become sluggish and stay near the water surface

pH Scale

use scissors and tape a copy of pH scale to space before making copies (see pH file)

Nitrogen Cycle in the Aquarium



(from PA Trout in Classroom Aquarium Resource Guide)

In Lab

Complete the charts below by carrying out the appropriate chemistry test for each water sample. MAKE SURE to take the water sample from the beaker labeled the same as on the chart, and to use the corresponding pipette.

Water Chemistry Test

Test	Result
Nitr**A**tes	
Nitr**I**tes	
pH test (blue bottle)	
High Range pH test (red bottle) if necessary	

What is a limitation of the pH testing equipment?

What could be a source of error with the color cards?

Clean Up

- Pour liquid from test vials down the sink, and rinse the vials/caps with tap water.
- Place all test solutions, test vials, and caps back in the Freshwater Masters Kit.
- Make sure lab table is clean and neat.
- WASH HANDS

Water Chemistry Lab Lesson Plan (must be done BEFORE eggs arrive)

Audience: All classrooms/students who will be involved with Trout in the Classroom (all seventh grade students)

Duration: 1 -40 min. period (need the entire period)

Objectives:

- Students will be able to understand why we test certain chemicals in the trout tank and how excess amounts of these chemicals can harm the trout.
- Students will be able to check the water chemistry in their brook trout aquarium by using the Freshwater Test Kit correctly and safely.

Materials:

- Lab worksheet for each student
- Each lab group
    - Freshwater Master Kit (for today remove test bottles/cards that will not be used just to eliminate some confusion)
- At each lab table (multiple groups can share)
    - 3-6 Pipettes
    - Laminated testing instructions
    - Water sample in a beaker: Sample of water from the classroom's tank. (helpful if the water is cycling through the nitrogen cycle)

Procedures

- Distribute Water chemistry lab worksheet
    - Review worksheet chlorine, temperature, DO, pH, Nitrogen Cycle… Do this quickly in about 10-15 min.
- Discuss chemical testing procedure
    - Show students the Master Freshwater Kit
        - Point out bottles (bottle 1 vs. bottle 2 with ammonia and nitrate test), pH differences, drop number on bottle
    - How to use Kit
        - How to open bottle
        - Hold bottle completely upside down when making drops
        - Close bottle before opening a new one (don't want to confuse caps-contamination)
        - How to shake test vial gently (invert test tube)
        - During the reaction time, store test tubes in test tube slots on the black plastic base of kit… this will eliminate test tubes being knocked over
        - Color Cards… using correct card or column when taking reading
            - Hold tube up to white background of card

        - When finished with test, empty solution down the sink drain and rinse test vial and cap with tap water.
    - STRESS reading directions carefully… Nitrates v. Nitrites are very similar words

- At lab tables
    - Test nitrate as a class… this test has the most steps and can be confusing. It also takes the longest so do it first
        - Read step 1 while students follow along with their direction sheets.
        - Students will do step one
        - Repeat for remainder of steps
        - Stress the word Nitrate, with "A" and bottle 1 verse bottle 2, it makes a difference which one is used first
        - Walk around the classroom assisting when necessary
    - Have students than test for nitrites then pH (nitrites have 5 min. reaction time so do this test second)
    - Record results on worksheet
    - Clean up lab area and wash hands

Summary and Closure

- Have students return to their desks and answer the two questions on the worksheet
- Discuss the answer to those two questions
- Ask if anyone has questions about the chemical testing