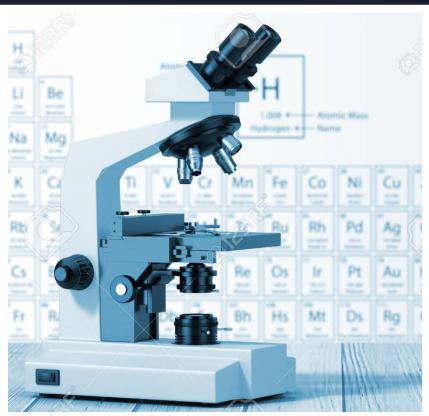




Idaho Division of Public Health

Well Water

Testing Flow Charts



IDAHO DEPARTMENT OF
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DIVISION OF PUBLIC HEALTH

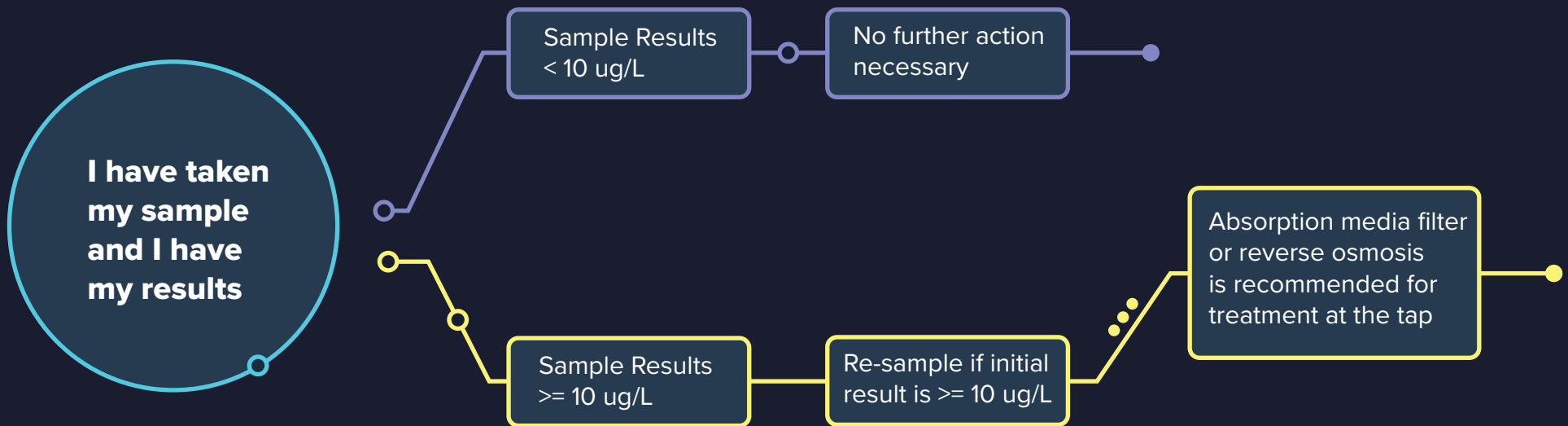
ARSENIC

Inorganic arsenic compounds are found in soils, sediments, and groundwater. These compounds occur either naturally or because of mining, ore smelting, and industrial use of arsenic.

Sample for arsenic: When you move into a home and every 3-5 years.

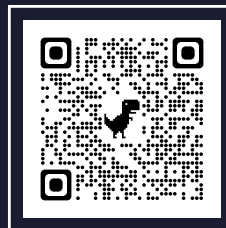
Important Tips:

1. Call a qualified water professional for maintenance and repair.
2. Do not boil water before drinking. Boiling concentrates arsenic.



Visit Environmental Health (EH) website:

<https://healthandwelfare.idaho.gov/health-wellness/environmental-health/drinking-water> for instructional how-to videos and recommendations.



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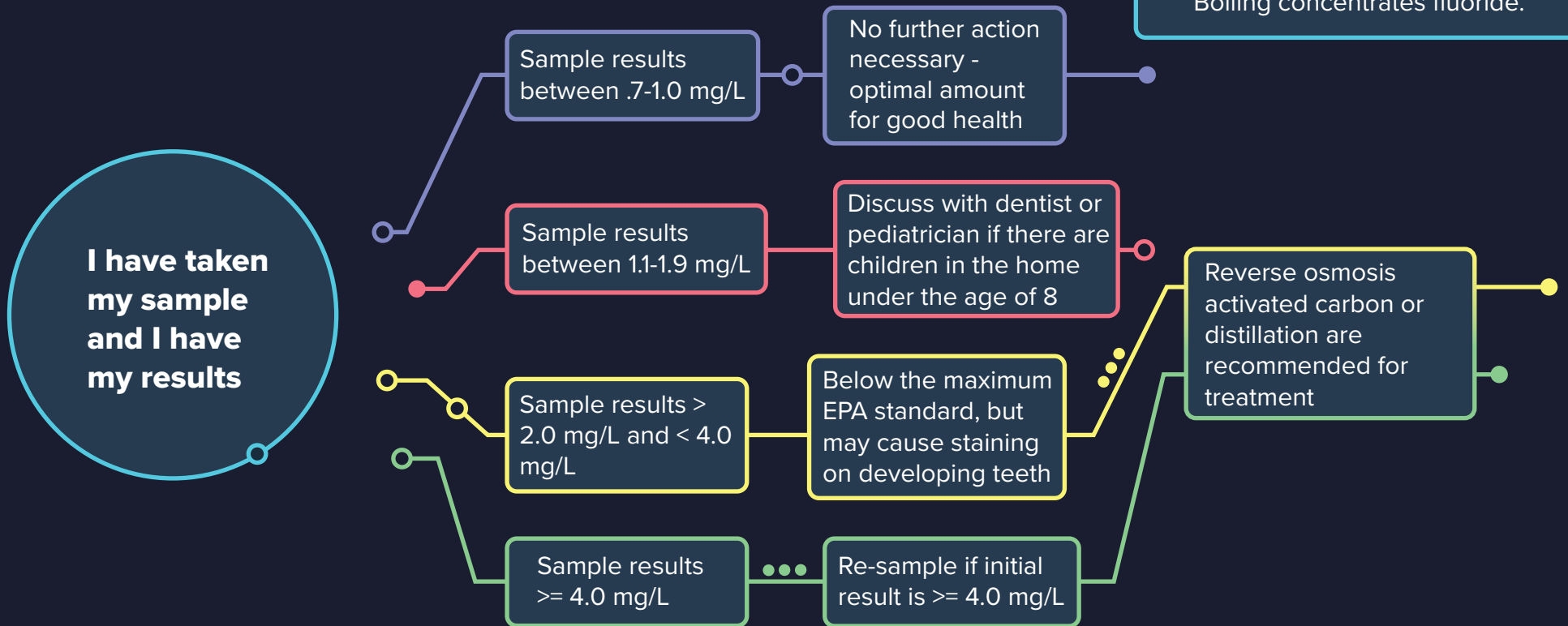
FLUORIDE

A naturally occurring mineral that is released from rocks into the soil, water, and air.

Sample for fluoride: When you move into a home and every 3-5 years.

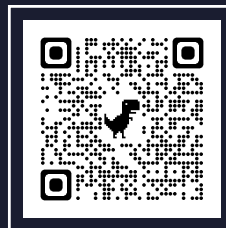
Important Tips:

1. Call a qualified water professional for maintenance and repair.
2. Do not boil water before drinking. Boiling concentrates fluoride.



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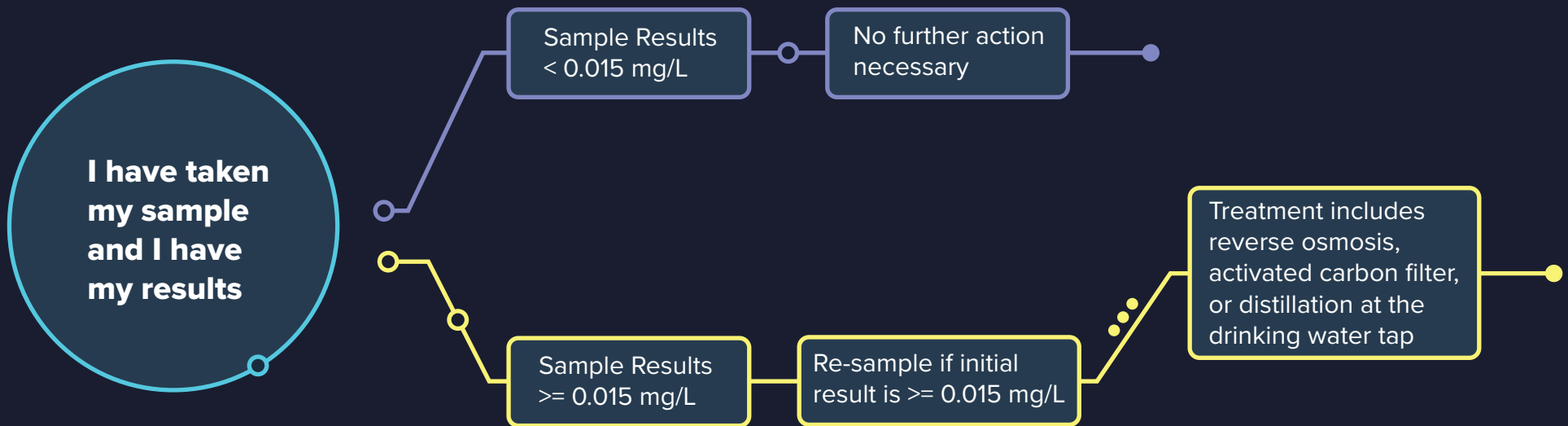
LEAD

Lead can enter drinking water when a chemical reaction occurs in plumbing materials that contain lead. Corrosion is more severe when water has high acidity or low mineral content. Household plumbing fixtures, welding solder, and pipe fittings made prior to 1986 are more likely to contain lead.

Test to determine if household plumbing or service lines contain lead.

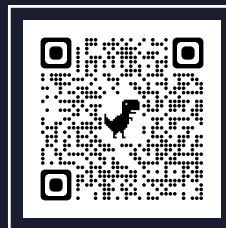
Important Tips:

1. Call a qualified water professional for maintenance and repair.
2. Do not boil water before drinking. Boiling concentrates lead.



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MANGANESE

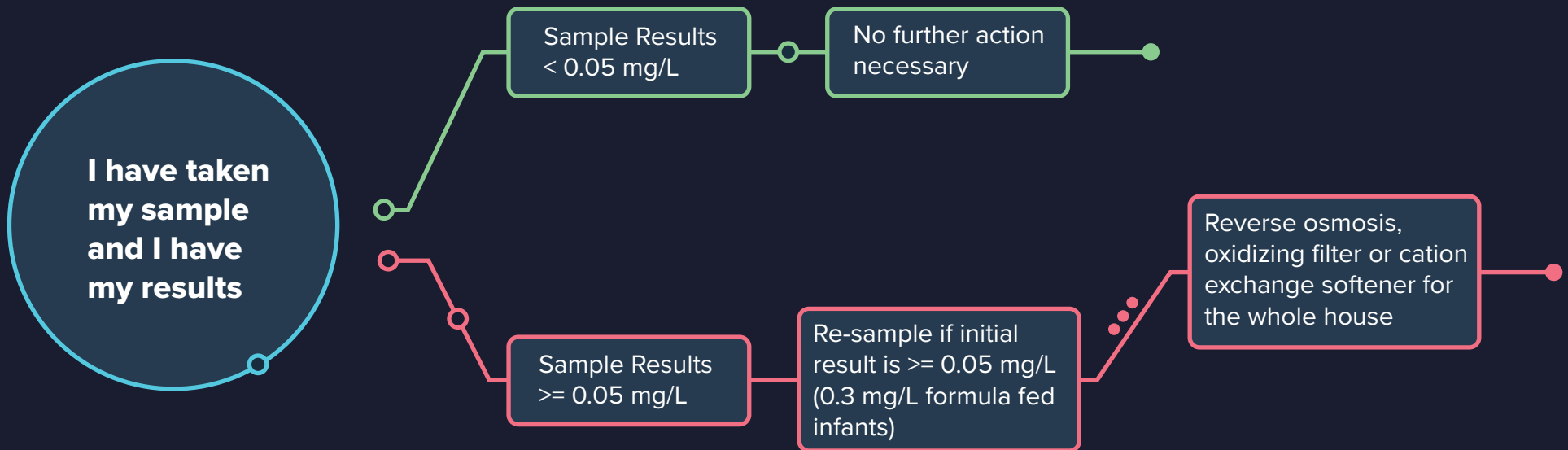
A naturally occurring mineral in rocks and soil in regions of Idaho and can be found in drinking water sources. You might suspect manganese is in your water if it is discolored (brownish red), causes staining of plumbing fixtures or clothing, or has an off-taste or odor.

Sample for Manganese: when you move in and then every 3-5 years and if you have a formula-fed infant under 6 months.

► Consider testing when water softener is needed to treat hard water or there is staining of plumbing fixtures or laundry.

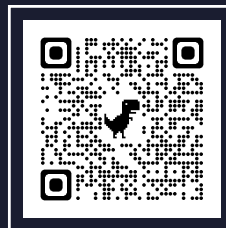
Important Tips:

1. Call a qualified water professional for maintenance and repair.
2. Do not boil water before drinking. Boiling concentrates manganese.



Visit Environmental Health (EH) website:

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NITRATE

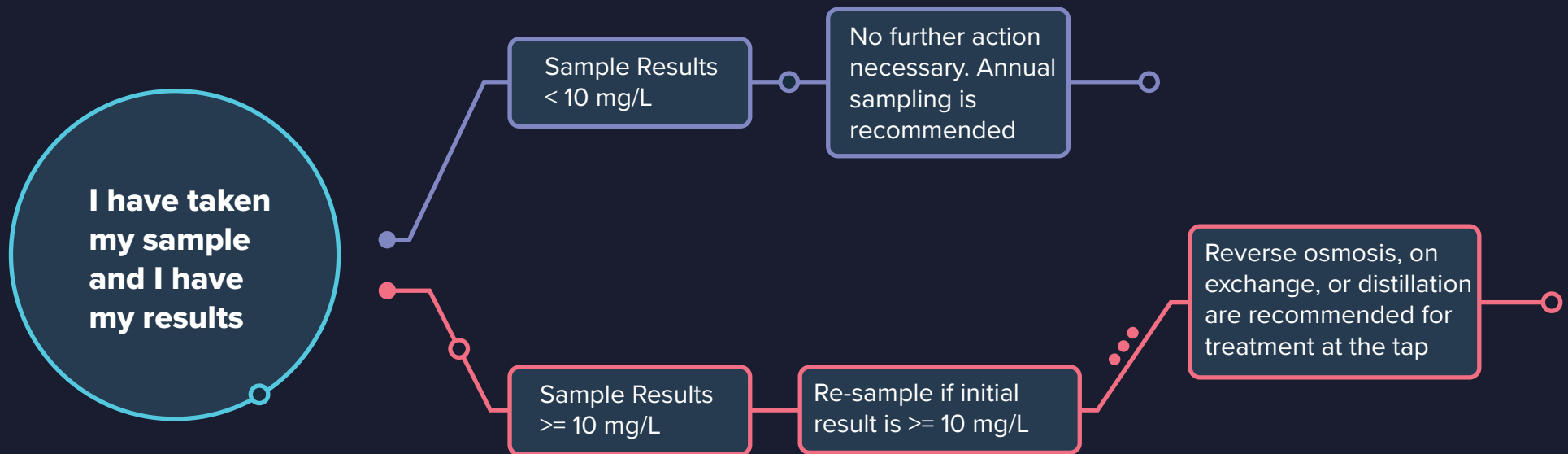
A chemical found in most fertilizers, manure, and liquid waste discharge from septic tanks. Natural bacteria in soil can convert nitrogen into nitrate. Rain or irrigation water can carry nitrate down through the soil into groundwater.

Sample for Nitrate: When you move in and once a year.

► Consider testing if near intensive agriculture.

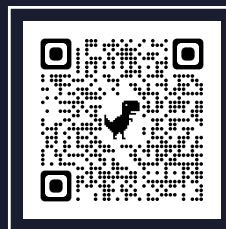
Important Tips:

1. Call a qualified water professional for maintenance and repair.
2. Do not boil water before drinking. Boiling concentrates nitrates.



Visit Environmental Health (EH) website:

<https://healthandwelfare.idaho.gov/health-wellness/environmental-health/drinking-water> for instructional how-to videos and recommendations.



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pH

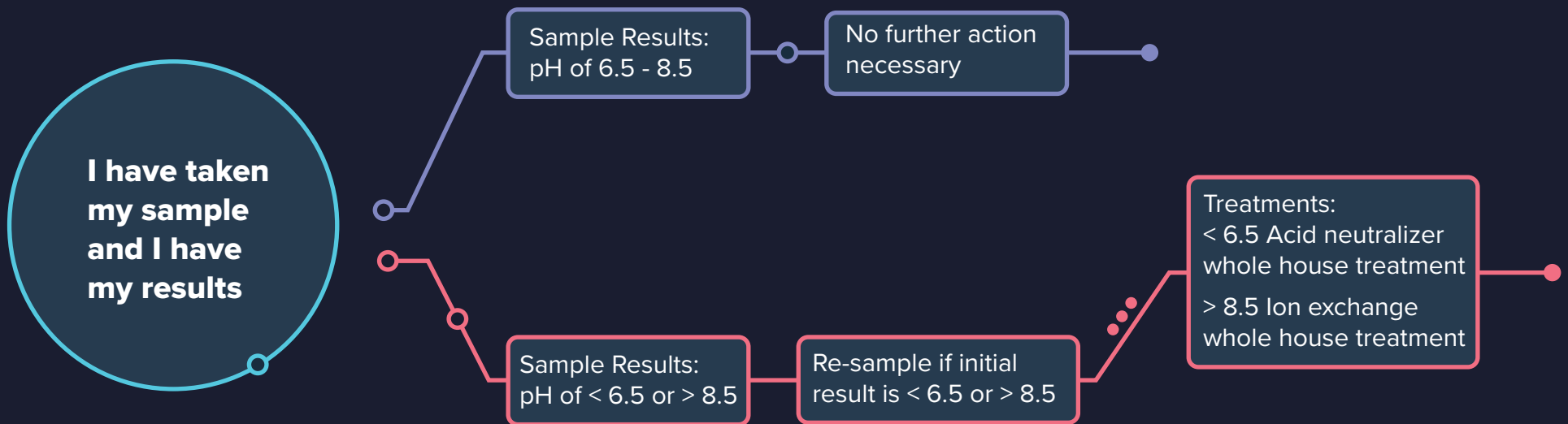
pH is a measurement of how acidic/alkaline water is. In its purest form, water has a pH of 7, which is at the exact center of the pH scale. A change in pH can change the chemical state of contaminants. Most water for use has a pH of between 6.5 and 8.5.

Sample for pH: Periodically or if the water does not taste normal.

▶ Consider testing if there is corrosion of plumbing.

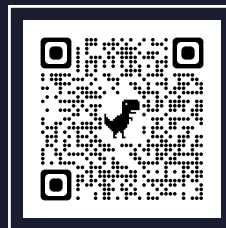
Important Tips:

- Call a qualified water professional for maintenance and repair.



Visit Environmental Health (EH) website:

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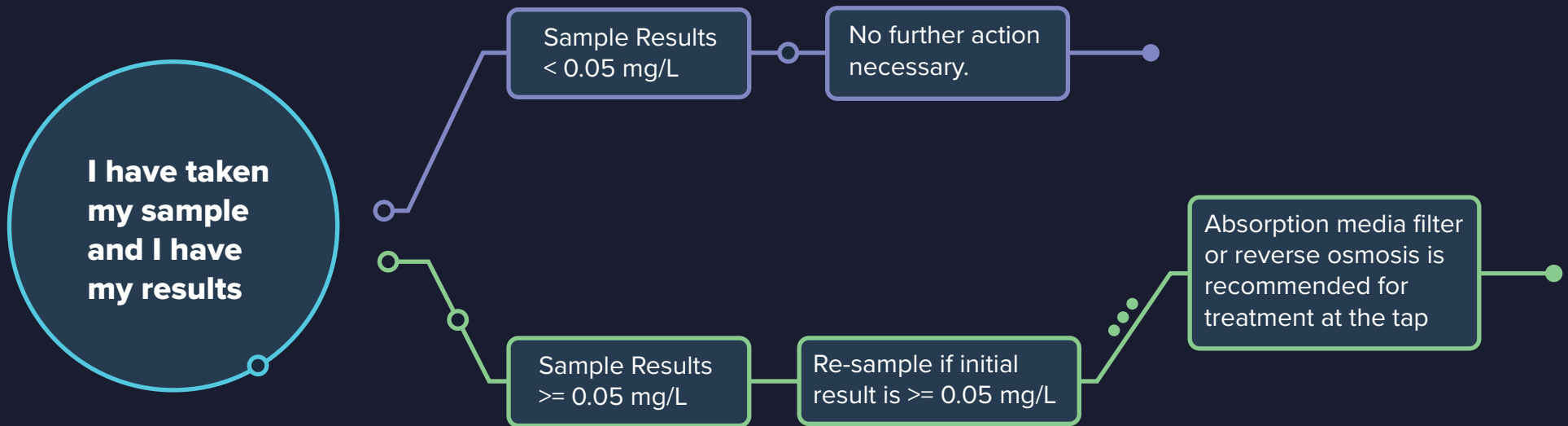
SELENIUM

Selenium is a natural element found in rocks deep underground and soil. In the environment, selenium is found joined to other elements like sulfur, silver, copper, lead, and nickel. Selenium is used in the electronics industry and glass production.

Sample for Selenium: When you move into a home and every 3-5 years.

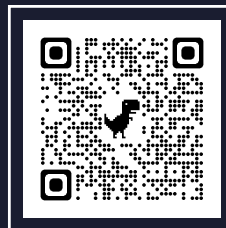
Important Tips:

1. Call a qualified water professional for maintenance and repair.
2. Do not boil water before drinking. Boiling concentrates selenium.



Visit Environmental Health (EH) website:

<https://healthandwelfare.idaho.gov/health-wellness/environmental-health/drinking-water> for instructional how-to videos and recommendations.



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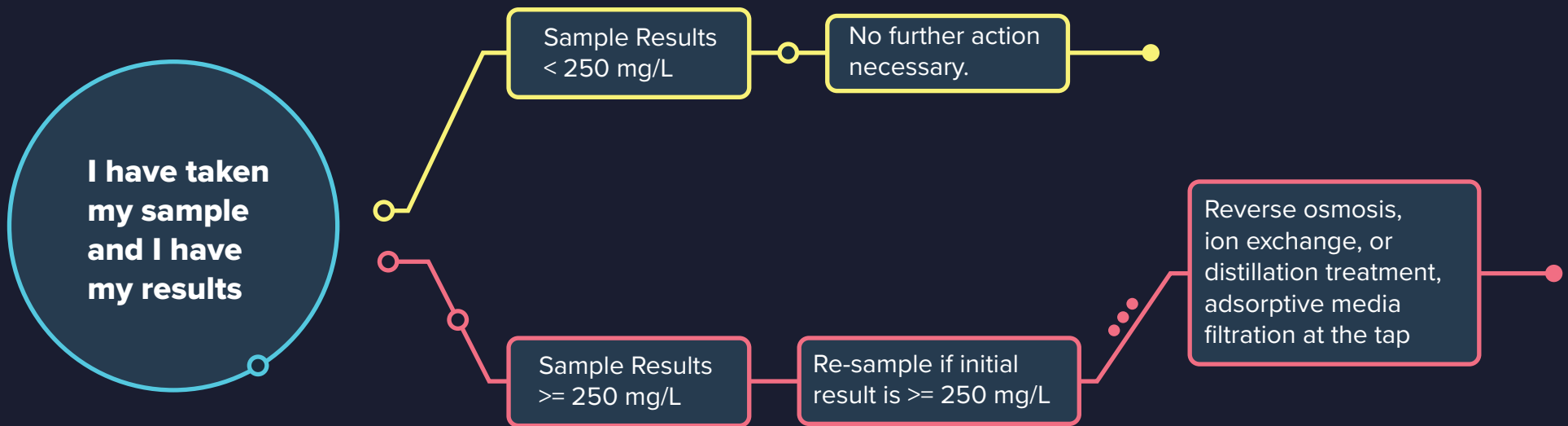
SULFATE

Is a group of mineral salts that are natural or human-made. These salts can be found in soil, air, and water.

Sample for Nitrate: if the water tastes, smells, or looks strange.

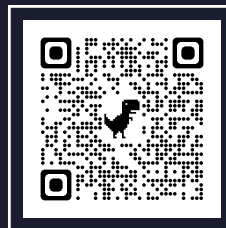
Important Tips:

1. Call a qualified water professional for maintenance and repair.
2. Do not boil water before drinking. Boiling concentrates sulfates.



Visit Environmental Health (EH) website:

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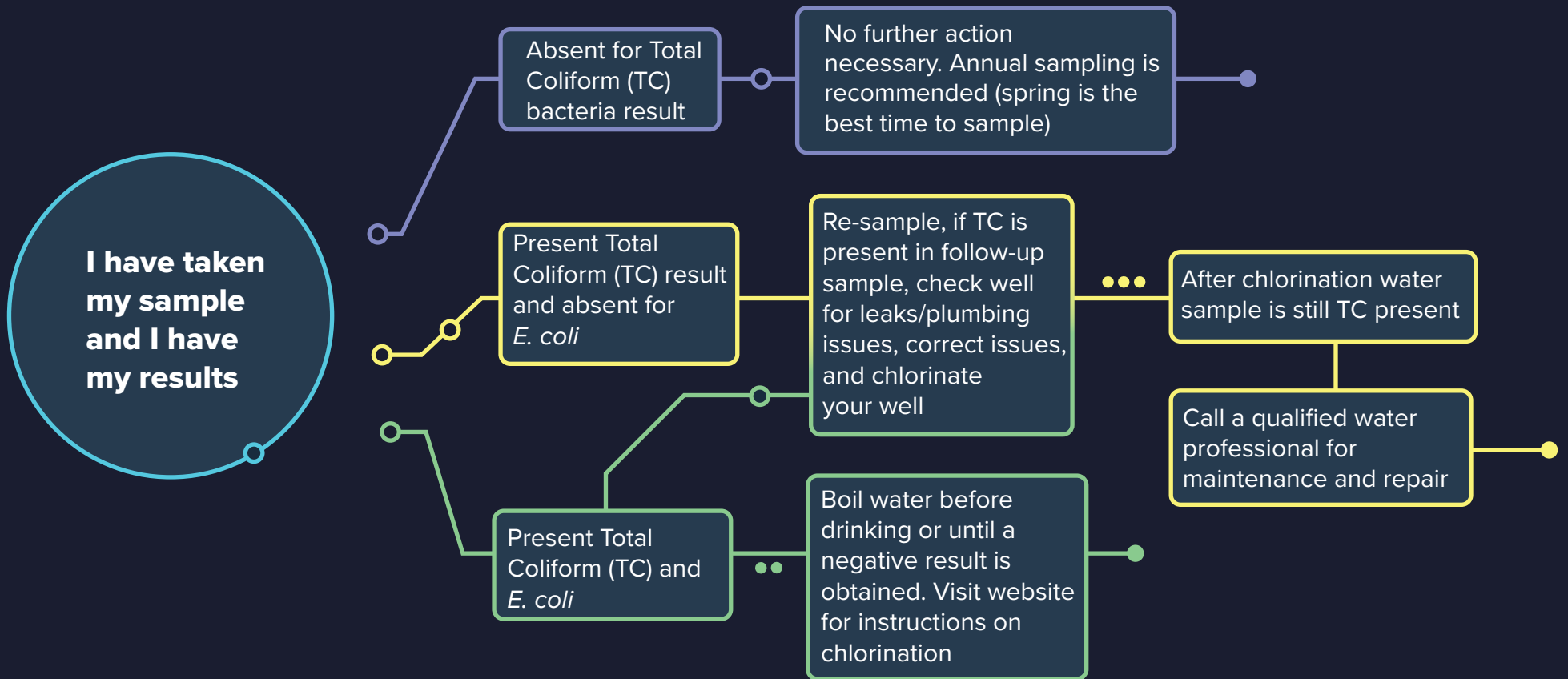
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TOTAL COLIFORM (TC) BACTERIA

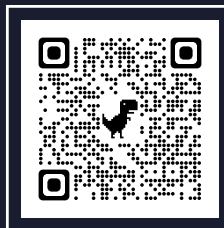
Bacteria are commonly found in soil, surface water, on plants, and in the intestines of humans and warm-blooded animals. TC bacteria are an indicator that contamination has entered the water.

Do you know how to take a water sample? Test yearly or if there is a flooding event, major water leak, problems with a septic tank, or if the well pump has been serviced.



Visit Environmental Health (EH) website:

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URANIUM (GROSS ALPHA & U-228)

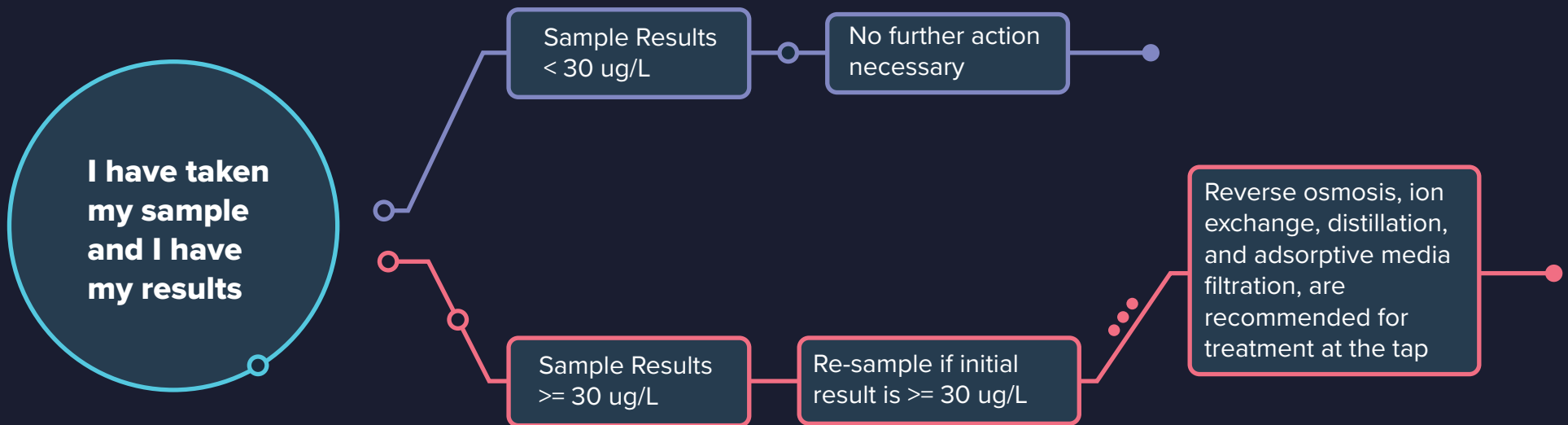
Uranium is a naturally occurring, mildly radioactive compound commonly found in rocks, soil, and water. Uranium in well water is caused by uranium in the rock where the well is drilled.

Sample for Uranium: When you move into a home and every 3-5 years.

▶ Consider testing if mining or refining processing are nearby.

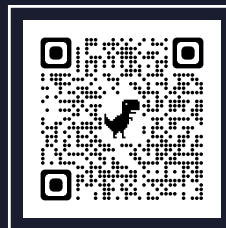
Important Tips:

1. Call a qualified water professional for maintenance and repair.
2. Do not boil water before drinking. Boiling concentrates uranium.



Visit Environmental Health (EH) website:

<https://healthandwelfare.idaho.gov/health-wellness/environmental-health/drinking-water> for instructional how-to videos and recommendations.



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Water Quality Analyte	When to Test	Why to Test	EPA Set Limits	Recommended Treatment
Total Coliform Bacteria and <i>E. coli</i>	Annually (Spring is best) and if there is a flooding event, major water leak, problems with a septic tank, or if the well pump has been serviced	Stomach cramps, pain, diarrhea, vomiting, fever	Zero/Absent	For treatment types, maintenance info, and cost please refer to the Water Treatment Brochure . It is recommended you use an NSF International certified treatment device to treat your water.
Nitrate	Annually (Spring is the best)	Lessens ability of blood to carry oxygen	10 mg/L*	
Lead	Periodically. Test the kitchen tap between June and August. Collect first thing in the morning after water has sat in the pipes overnight. Sample instructions .	Children – physical or mental delays. Adults – kidney problems, high blood pressure	0.015 mg/L*	
Arsenic	When you move in and every 3-5 years	Causes cancer and skin lesions	10 ug/L*	
Fluoride	When you move in and every 3-5 years	Ideal amount for oral health	0.7 mg/L	
		Tooth discoloration, potential bone issues	4.0 mg/L or >	
Manganese	Periodically or as needed and if you have a formula-fed infant under 6 months	Poor taste, color, staining, problems with memory, attention, and motor skills	0.05 mg/L*	
Uranium	When you move in and every between 3-5 years	Kidney damage	30 ug/L*	
Selenium	Periodically or as needed	Hair loss and circulation problems	0.05 mg/L*	
Sulfate	Water tastes, smells, or looks strange	Diarrhea, salty taste	250 mg/L*	
pH	Periodically or as needed	<6.5 Dissolve metal in plumbing and taste metallic	6.5 – 8.5	<6.5 Acid neutralizer whole house treatment
		>8.5 Soda taste and slippery		>8.5 Ion exchange whole house treatment

* Values should be less than this number.

Test After: Natural disasters like floods and earthquakes, well damage, new well construction, addition of water treatment, when buying a home with a well, when children will be living in the home, if the well has never been tested before, when there is a change in water availability, when there is a change in water clarity, or if there is a new smell to the water.

Learn more at: <https://healthandwelfare.idaho.gov/health-wellness/environmental-health/drinking-water>. Certified drinking water laboratories in Idaho: <https://publicdocuments.dhw.idaho.gov/WebLink/Browse.aspx?id=2940&dbid=0&repo=PUBLIC-DOCUMENTS>. To learn how to take your sample properly, please watch our videos: <https://healthandwelfare.idaho.gov/health-wellness/environmental-health/drinking-water>.

Primary

		Water Treatment Options:	Reverse Osmosis	Activated Carbon Filter	Aeration & Filtration	Ion Exchange (Anion & Cation)	Ozone & Filtration	Chlorination	Ultraviolet	Distillation	Adsorptive Media Filtration	Oxidation Filtration System	Water Softening	Cost Range for Treatment
		Primary Use	Reduces the concentration of dissolved and suspended impurities in water.	Removes chlorine and some organics. Addresses general taste, odor issues, and some metals. Contaminant removal also relies on filter's pore size.	Brings oxygen into the water to promote contaminants to clump together for improved filtration.	Reduces water hardness, removing dissolved minerals and prevents scale deposits.	Ozone is generated and injected into the water to kill bacteria and viruses. The ozone changes dissolved contaminants into larger solid particles that can be filtered out.	Owner adds chlorine into water to kill bacteria and viruses. Also helps dissolved and clump contaminants together into solid particles to be filtered.	A UV lamp shines UV rays through the water to kill bacteria, viruses, and other pathogens.	Removes most impurities and disinfects by boiling water, then condensing steam.	A charged media bed that causes ions of the opposite charge (contaminants) to be pulled out of the water and attach to the media*	Contaminants cling to a precipitate and removes impurities by filtration.	Salt removes dissolved minerals by replacing positively charged minerals in the water	
Contaminants	(EPA DW Standard):													
Lead (Source: Plumbing)*	0.015 mg/L		✓	✓						✓				\$800-\$3000
Arsenic	0.010 mg/L		✓	✓	✓ (Partial with high iron)	✓ (Anion)	✓ (Partial with high iron)	✓ (high iron)		✓	✓ (Both)	✓ (high iron)		\$800-\$3000
Uranium (gross alpha & U-228)*	30 ug/L		✓			✓ (Anion)				✓	✓ (alumina)	✓		≥\$800
Fluoride	4.0 mg/L		✓	✓		✓ (Anion)				✓	✓ (alumina)			≥\$800
Nitrate	10 mg/L		✓			✓ (Anion)				✓				≥\$800
Mercury	0.002 mg/L		✓	✓						✓				\$800-\$4000
Selenium	0.05 mg/L		✓			✓ (Anion)				✓	✓ (alumina)			N/A
VOCs	Variable (0.003-10 mg/L)		✓	✓	✓					✓ (Partial)				N/A
Copper (Source: Pipes)	1.3 mg/L		✓	✓						✓			✓	\$800-\$3000
Total Coliforms*	Presence/Absence		✓	✓			✓		✓	✓				≤\$150
Cyanotoxins*	Varies		✓	✓						✓ (Partial)				N/A
PFAS	TBD		✓	✓ (Partial)						✓				N/A
Iron	0.3 mg/L		✓		✓	✓ (Cation)	✓			✓		✓	✓	≤\$3000
Where to get these treatments:			Plumbing & Houseware Stores	Plumbing & Houseware Stores	Plumbing & Houseware Stores	Plumbing & Houseware Stores	Plumbing & Houseware Stores	Plumbing & Houseware Stores	Plumbing & Houseware Stores	Plumbing & Houseware Stores	Plumbing & Houseware Stores	Plumbing & Houseware Stores	Plumbing & Houseware Stores	
(POU) Install Cost:			\$300-\$1500	\$10-\$100	N/A	\$300 (One Tank system) \$1000 (Two-Tank system)	N/A	N/A	\$150-\$300	\$300-\$1200	\$300-\$700	\$1000-\$3000	N/A	
(POU) Maintenance Cost:			\$100-\$200 every 1 or 2 years	\$10-\$100 every few months to replace filter/cartridge	N/A	~\$3.50 for 40 lbs. of IE salt	N/A	N/A	\$50-\$100 per year	Varies by energy cost to boil water	\$300-\$500 every 6 to 12 months	Varies	N/A	
(POE) Install Cost:			\$5,000-\$12,000	\$500-\$3000	\$800-\$4000	Anion: \$1500-\$2500	Contact your local water treatment specialist for a quote	\$500-\$2500	\$250-\$800	N/A	\$2400-\$4500	\$1,500-\$3,000	\$200-\$3,000	
(POE) Maintenance Cost:			\$250-\$500 every 1 to 2 years	Varies by water usage, application of disinfectant, and replacement of filter	Varies based on extra water use and filter media replacement	Anion: \$700-\$900 every 8 to 10 years	Varies based on water usage, cost of ozone disinfectant, energy costs, and filter replacement	Varies by cost of bleach, extra water to backwash, and replacement of filter media	~\$100 per year but varies by cost of electricity	N/A	\$700 to \$900 every year	\$60-\$2300 (Varies by water usage, cost of chemicals, filter media)	\$50-\$300 per year for salt	

Secondary

Water Treatment Options:		Reverse Osmosis	Activated Carbon Filter	Aeration & Filtration	Ion Exchange (Anion & Cation)	Ozone & Filtration	Chlorination	Ultraviolet	Distillation	Adsorptive Media Filtration	Oxidation Filtration System	Water Softening	Cost Range for Treatment
Primary Use		Reduces the concentration of dissolved and suspended impurities in water.	Removes chlorine and some organics. Addresses general taste, odor issues, and some metals. Contaminant removal also relies on filter's pore size.	Brings oxygen into the water to promote contaminants to clump together for improved filtration.	Reduces water hardness, removing dissolved minerals and prevents scale deposits.	Ozone is generated and injected into the water to kill bacteria and viruses. The ozone changes dissolved contaminants into larger solid particles that can be filtered out.	Owner adds chlorine into water to kill bacteria and viruses. Also helps dissolved and clump contaminants together into solid particles to be filtered.	A UV lamp shines UV rays through the water to kill bacteria, viruses, and other pathogens.	Removes most impurities and disinfects by boiling water, then condensing steam.	A charged media bed that causes ions of the opposite charge (contaminants) to be pulled out of the water and attach to the media*	Contaminants cling to a precipitate and removes impurities by filtration.	Salt removes dissolved minerals by replacing positively charged minerals in the water	
Contaminants	(EPA DW Standard):												
Chloride	250 mg/L	✓							✓				N/A
Manganese	0.05 mg/L	✓		✓	✓(Cation)	✓			✓		✓	✓	≤\$3000
Aluminum	0.05-0.2 mg/L	✓							✓				N/A
Fluoride	2.0 mg/L	✓	✓						✓				≥\$800
Silver	0.10 mg/L	✓							✓				N/A
Sulfate	250 mg/L	✓			✓ (Anion)				✓	✓ (alumina)			≤ \$3000
Total Dissolved Solids	500 mg/L	✓							✓				N/A
Hydrogen Sulfide Gas*	No limit		✓	✓	✓	✓					✓		N/A
Zinc	5 mg/L								✓				N/A
Where to get these treatments:		Plumbing & Houseware Stores	Plumbing & Houseware Stores	Plumbing & Houseware Stores	Plumbing & Houseware Stores	Plumbing & Houseware Stores	Plumbing & Houseware Stores	Plumbing & Houseware Stores	Plumbing & Houseware Stores	Plumbing & Houseware Stores	Plumbing & Houseware Stores	Plumbing & Houseware Stores	
(POU) Install Cost:		\$300-\$1500	\$10-\$100	N/A	\$300 (One Tank system) \$1000 (Two-Tank system)	N/A	N/A	\$150-\$300	\$300-\$1200	\$300-\$700	\$1000-\$3000	N/A	
(POU) Maintenance Cost:		\$100-\$200 every 1 or 2 years	\$10-\$100 every few months to replace filter/cartridge	N/A	~\$3.50 for 40 lbs. of IE salt	N/A	N/A	\$50-\$100 per year	Varies by energy cost to boil water	\$300-\$500 every 6 to 12 months	Varies	N/A	
(POE) Install Cost:		\$5,000-\$12,000	\$500-\$3000	\$800-\$4000	Anion: \$1500-\$2500	Contact your local water treatment specialist for a quote	\$500-\$2500	\$250-\$800	N/A	\$2400-\$4500	\$1,500-\$3,000	\$200-\$3,000	
(POE) Maintenance Cost:		\$250-\$500 every 1 to 2 years	Varies by water usage, application of disinfectant, and replacement of filter	Varies based on extra water use and filter media replacement	Anion: \$700-\$900 every 8 to 10 years	Varies based on water usage, cost of ozone disinfectant, energy costs, and filter replacement	Varies by cost of bleach, extra water to backwash, and replacement of filter media	~\$100 per year but varies by cost of electricity	N/A	\$700 to \$900 every year	\$60-\$2300 (Varies by water usage, cost of chemicals, filter media)	\$50-\$300 per year for salt	

Important Information	Conditions or nearby activities:	Test for:
Lead*	Recurring GI illness	Coliform bacteria
Arsenic	Household plumbing or service lines with lead	pH, alkalinity, hardness, lead, copper
Uranium*	Radon in indoor air	Radon
Cyanotoxins*	Corrosion of pipes	Corrosion, pH, alkalinity, lead, copper
Hydrogen Sulfide gas*	Nearby agriculture	Nitrate, pesticides, coliform bacteria
Total Coliform *	Nearby coal or mining operations Nearby gas drilling Buried fuel tanks or gasoline odor	Metals, pH, corrosion Chloride, sodium, barium, strontium Volatile Organic Compounds (VOCs)
Aeration & Filtration	Nearby landfill, factory, gas stations, or dry cleaning	VOCs, pH, sulfate, chloride, metals
Adsorptive media	Scaly residues, soaps don't lather	Hardness
Activated Carbon Filter	Water softener to treat hardness Stained plumbing fixtures, laundry Objectionable taste or smell Cloudy, frothy, or discolored water Rapid wear of water treatment equipment Salty taste, or a heavily salted roadway nearby	Manganese, iron (before purchase) Iron, copper, manganese Hydrogen sulfide, corrosion, pH, alkalinity, hardness, metals Color, detergents pH, corrosion, alkalinity, hardness Chloride, TDS, sodium
Chlorination		
Oxidation & Filtration		
Ozone & Filtration		
Definitions		
Alumina	Aluminum oxide, a white or nearly colourless crystalline substance.	
Anion	Negatively charged ion	
Cation	Positively charged ion	
N/A	Not Available	
POE	Point of Entry: Equipment or water treatment devices installed to treat the water entering a house or building for the purpose of treating water distributed throughout the entire house or building. Point of Use: Water treatment devices which filter water right where you use it. These can be installed on a single faucet, a spigot, or a shower which connect to water lines or even filtration pitchers you fill with tap water.	
POU		
First time testing recommendations		
	Coliform Bacteria	
	Nitrate/Nitrite	
	Chloride	
	pH (acidity)	
	Iron	
	Manganese	
	Sulfate	
	Hardness	
	Alkalinity	
	Total Dissolved Solids	
	Lead	
	Arsenic	
Water Facts: Home Water Treatment Options	https://privatewellassoc.org/Portals/2/Documents/Hosted%20Resources/10_Water%20Facts%20Home%20Treatment%20Options_Arizona%20Cooperative%20Extension.pdf?ver=2018-04-20-173131-913&timestamp=1524264181471	
Well Owner's Handbook	https://privatewellassoc.org/Portals/2/Documents/Hosted%20Resources/10_Well%20Owners%20Handbook_Minnesota%20Department%20of%20Health.pdf?ver=2018-03-20-155704-067	
Arizona Know your Water	https://privatewellassoc.org/Portals/2/Documents/Hosted%20Resources/10_Arizona%20Know%20Your%20Water_Arizona%20Cooperative%20Extension.pdf?ver=2018-04-20-173156-180&timestamp=1524264283891	
EPA National Primary Drinking Water Regulations	https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations	
CDC Drinking Water Treatment Technologies for Household Use	https://www.cdc.gov/healthywater/drinking/home-water-treatment/water-filters.html	
Wellowner.org	https://wellowner.org/	
drinktaps.org	https://drinktaps.org/	
Fresh Water Systems	https://www.freshwatersystems.com/blogs/blog/types-of-drinking-water-contaminants-and-how-to-remove-them	
Wellcare Water Treatment	www.watersystemscouncil.org/download/wellcare_information_sheets/well_water_testing_&_treatment_information_sheets/Water-Treatment.pdf	
Minnesota DPH	https://www.health.state.mn.us/communities/environment/water/docs/factsheet/hometreatment.pdf	
Private Well Class: Water Treatment Solutions	https://privatewellassoc.org/lesson-10	
Goal:		
Develop a list of common contaminants that people can test for and what they need to test their wells		
Resource link:	https://extension.psu.edu/the-water-we-drink	
	https://www.epa.gov/privatewells/protect-your-homes-water#preventwellanchor	
	https://www.epa.gov/privatewells/potential-well-water-contaminants-and-their-impacts	
	https://www.watersystemscouncil.org/download/wellcare_information_sheets/wellcare%20information_brochures/WSC_Homeowners_Revised_Brochure.pdf	