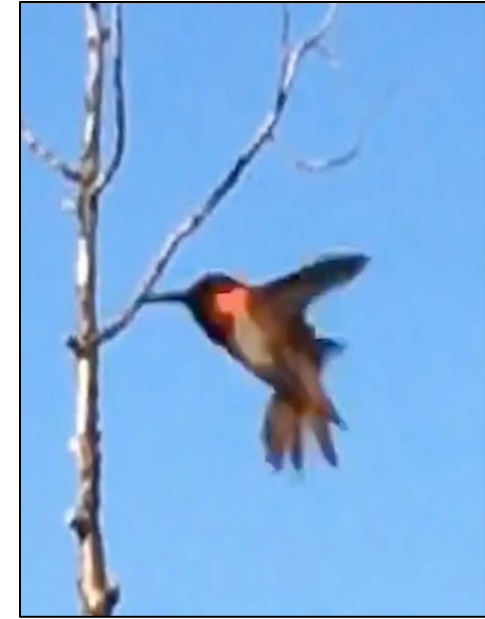




Science Camp #2022.14

Theme: Water



10-12 June 2023 @

Nelson Cabin and Surrounding Area

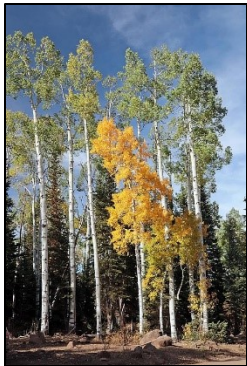
Advisors:

H. Roice Nelson, Jr., Andrea S. Nelson,
Paul & Kate Nelson, Melanie Wright, Sara Ellen & Bobby Beckmann.
Audrey Waldron & J.D. Nielson

Attendees:

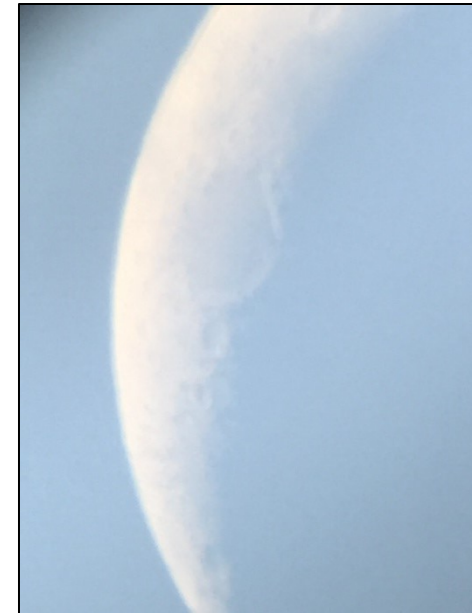
Grant Matthew Nelson, Dallin Spencer Nelson, Avalyn Ashby Wright,
Quinton Miles Nelson, Kendall Joyce Wright, Bobbie Sophia Waldron,
Isabella Malani Waldron, Lauren Rachel Waldron, Chloe Grace Nelson

Guest: Sage Beckmann



Past Science Camp Themes & Sites Visited

1. Nelson Cabin, Fishing, Condensation, Water Coloring, and Music
 1. Nelson Cabin
 2. Panquich Lake
 3. Swimming at Cedar City Aquatics Center
2. Mining Range, Frisco, Silver Reef, Iron Town, Astronomy at Frisco Peak, Archery
 1. Nelson Cabin, Kolob Reservoir, Silver Reef, Snow Canyon, Volcano
 2. Parowan Gap, Rack Range Mines, Frisco, Frisco UU Telescope
 3. Iron Mine, Iron Town
3. Geocaching, Mammoth Cave, Cascade Falls, and Cedar City Cemetery
 1. Nelson Farm, Fiddler's Canyon,
 2. Boys to Mammoth Cave, Cascade Falls and Girls to St. George and Pottery Making
 3. Cedar City Cemetery
4. Volcanoes, Classy Closets, Maps, Surveying, Sand Painting, and Genealogy
 1. Condo, Snow Canyon Volcanoes, Classy Closets, Fiddler's Canyon
 2. Nelson Farm to survey, Nelson Cabin
 3. Cedar City 24th of July Parade
5. Patterns, Horse Riding, Internet, Be-a-man-campout
 1. Dust Devil Ranch, InfoWest, Fiddler's Canyon
 2. Nelson Cabin
 3. Cedar City July 4th Parade
6. Music & Spoken Word, SilencerCo, Indian Tribes & Archaeology, Solar Astronomy
 1. Family Discovery Center, Sophie & Dallin's Baptism, SilencerCo, Music & Spoken Word, UU Science Museum
 2. Fremont Indian Museum, Boulder Anasazi Ruins, Escalante Petrified Forest, Bryce Canyon
 3. Parowan Gap, Solar Astronomy, Nelson Cabin, Uncle Des' & Aunt Sara's, Swimming
7. Rock Cutting, SUU Museum, Computer Hardware and Software, Cabin
 1. 1st Annual Fun Run / Walk, rock collection Bloody Ridge, rock cutting and polishing
 2. HTML at SUU, and Lego Robots at Nelson Cabin
 3. Astronomy at Nelson Cabin, Bottle Rockets, and having a good time
8. 8G: Geography, Genetics, Genealogy, Grandma, Grandpa, Geology, Geophysics, & Guitar
 1. Watered garden, 2nd Annual Fun Run / Walk, Iron Springs, Iron Town, Genetics, Cabin, Guitar
 2. Zion, Angels Landing & Emerald Pools, Geophysical Slides
 3. Bottle Rockets, swimming, and having a good time
9. Garden of the Gods, Drones, Intercontinental Divide, Teepee, Salida Hot Springs, University Mountains
 1. Bow & Arrows, Drone, Intercontinental Divide
 2. Guitar and Buena Vista 4th of July Parade
 3. Mount Antero, Hot Springs at Salida, Teepee
10. Eisenhower Park, Guadalupe River, i-Fly, Cave Without a Name, Alamo, San Antonio
 1. Hike to overlook San Antonio, i-Fly, swimming Guadalupe River State Park
 2. Cave without a Name, Singing, Rob Nelson on Sound and Music
 3. Alamo, Wax Museum, San Antonio Riverwalk
11. Engines, Ghost Towns and Kilns, Nelson Cabin, Al Matheson's Place, Iron Springs Resort
 1. Fisco, Kiln Springs, Nelson Cabin
 2. Teepees at Nelson Cabin, water races, Dutch Oven
 3. Matheson Engines, 4-wheelers, Iron Springs statues, Bottle Rockets, Ride in a Tesla
12. Warner Cabin, Gravity, Zip Lines, & Experiments
 1. Warner Cabin and Panquich Lake
 2. Marysville Zip Line & Lazy River
 3. Bryce Canyon and Gravity Experiments
13. Nelson Cabin, Light, Distance, Physics, Lasers
 1. Green Show & All's Well That Ends Well
 2. James Webb Telescope, Stargazing
 3. Cascade Falls, Water Rockets



14th Annual Nelson Grandkids' Summer Science Camp; Theme: Water

Itinerary

Saturday:

- J.,D. Audrey, Sophie, Izzy, & Lauren arrive Las Vegas, 12:30, and go to St. George and Zion.

Sunday:

- Melanie, Avalyn, & Kendall arrive Provo, 1:22, to Grandpa's & Grandma's.
- Bobby, Sara, Sage, & Rob arrive Las Vegas, 4:00, to Aunt Sara's.
- Paul, Kate, Grant, Dallin, Quinton, & Chloe arrive.
- 7:00 Grandpa's talk on Sons of Utah Pioneers.

Monday:

- 9:00 Breakfast at the Garden.
- 11:00 Science of Water at Iron Springs Adventure Resort.
- 2:00 Lunch at Aunt Sara's.
- 4:00 Pick up Kayaks, Put up Tree Tent, Play at Cabin.
- 6:00 Hot Dogs & watermelons & smores for Dinner.
- 8:00 Christmas in July.

Tuesday:

- 8:00 Pancake breakfast at the Cabin.
- 10:00 Fishing and Swimming at Kolob Reservoir.
- 1:00 Lunch at Kolob Reservoir.
- 3:00 Drive to Virgin – take Kayaks back.
- 7:00 Dinner at Cabin.
- 8:00 Audrey's Finances & Quinton & Chole Science Kit.

Wednesday:

- 8:00 Bagel breakfast and Play at the Cabin.
- 9:00 Water Games and Water Rockets.
- 12:00 Lunch at the Cabin.
- 2:00 Take down tent and Clean Cabin.
- 3:00 Swimming at Natatorium & Lake on the Hill.
- 5:00 Pizza at Grandma and Grandpa's
- 6:00 Green Show and most to Romeo & Juliet.
- 7:00 Melanie & Paul's Families to Provo.

Thursday:

- 8:00 Breakfast at house.
- 10:00 Sara, Bobby, Sage, & Rob to Las Vegas

Good Times!

Photos + slides to be posted at:

http://www.walden3d.com/photos/Grandkids_Science_Camps/220710-12_Science_Camp



Schedule Saturday-Thursday

Saturday, 08 June 2023

- J.D., Audrey, Sophie, Izzy, & Lauren arrive Las Vegas, 12:30, to St. George and Zion.

Sunday, 08 June 2023

- Melanie, Avalyn, & Kendall arrive Provo, 1:22, to Grandma's.
- Bobby, Sara, Sage, & Rob arrive Las Vegas, 4:00, to Aunt Sara's.
- Paul, Kate, Grant, Dallin, Quinton, & Chloe arrive.
- 7:00 Grandpa's talk on Sons of Utah Pioneers at Fiddler's Chapel.

Monday, 09 June 2023

- 9:00 Breakfast at the Garden.
- 11:00 Science of Water at Iron Springs Adventure Resort.
- 2:00 Lunch at Aunt Sara's.
- 4:00 Pick up Kayaks, Put up Tree Tent, Play at Cabin.
- 6:00 Hot Dogs & watermelon & smores for Dinner.
- 8:00 Christmas in July.

Tuesday, 20 June 2023

- 8:00 Pancake breakfast at the Cabin.
- 10:00 Fishing and Swimming at Kolob Reservoir.
- 1:00 Lunch at Kolob Reservoir.
- 3:00 Drive to Virgin – take Kayaks back.
- 7:00 Dinner hamburgers, cobbler, root beer, Dutch Oven at Cabin.
- 8:00 Audrey's Finances & Quinton & Chloe's Science Kits.

Wednesday, 29 June 2022:

- 8:00 Bagel breakfast and Play at the Cabin.
- 9:00 Water Games and Water Rockets.
- 12:00 Left over lunch at the Cabin.
- 2:00 Take down tent and Clean Cabin.
- 3:00 Swimming at Natatorium & Lake on the Hill.
- 6:00 Green Show and most to Romeo & Juliet.
- 7:00 Melanie & Paul's Families to Provo.

Thursday, 30 June 2022:

- 8:00 Breakfast at house.
- 10:00 Sara, Bobby, Sage, & Rob to Las Vegas
- 10:00 Audrey, Sophie, Izzy, & Lauren shopping St. George.

Friday, 01 July 2022:

- 10:00 Audrey, Sophie, Izzy, & Lauren shopping St. George.
- 12:00 Grandpa & Grandma Clean Cabin.

Saturday, 02 July 2022:

- 10:00 Audrey, Sophie, Izzy, & Lauren to Vegas for flight.
- 12:00 Grandpa & Grandma Dutch Oven Dinner for friends at Cabin.

Safety

- **Never go anyplace alone, preferably 3+.**
- Exception is if one of you is hurt, then:
 - One of you stay and help the person hurt.
 - The other one run and get help.
- If you get lost stay put, we will find you.
- If you hear a rattlesnake do not move quickly, just slowly move away from the sound.
- Do not run with a knife open. Use knife safety.
- If you cut yourself, apply pressure to the wound to stop bleeding, and send for help.
- Never point an arrow in a cocked bow or a gun at any person.
- Drink lots and lots and lots of water.
- Do not go swimming unless an adult is with you.
- Do not start branches on fire and swing them around where others can be hurt.
- Have fun, use common sense, and **think before you act.**



Everybody picks up their own dishes!

Everyone cheerfully does what asked to do by Grandpa, Grandma, Uncle Paul, Aunt Kate, Aunt Melanie, Aunt Sara, Aunt Audrey, or other adults.

Job Chart

Monday	Tuesday	Wednesday	Thursday
Breakfast: <ul style="list-style-type: none">- Edwin Gurr- Everyone Help Cleanup	Breakfast: <ul style="list-style-type: none">- Melanie & Audrey- Izzy & Kendall	Breakfast: <ul style="list-style-type: none">- Sara & Bobby- Grant	Breakfast: <ul style="list-style-type: none">- Grandma & Grandpa- Everyone Help Cleanup
Lunch: <ul style="list-style-type: none">- Aunt Sara- Everyone Help Cleanup	Lunch: <ul style="list-style-type: none">- Paul & Kate- Dallin & Chloe	Lunch: <ul style="list-style-type: none">- Rob- Everyone Help Cleanup	
Dinner: <ul style="list-style-type: none">- Grandma- Sophie & Avalyn	Dinner: <ul style="list-style-type: none">- Grandpa- Lauren & Quinton	Dinner: <ul style="list-style-type: none">- Pizza- Everyone Help Cleanup	

May 2023

5/2023

Nelson Farm

Stink Plant

Pond

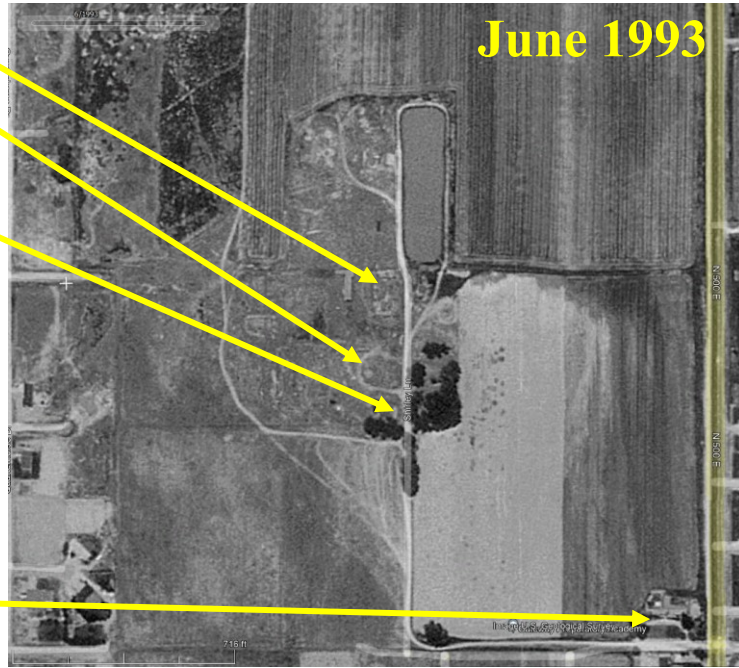
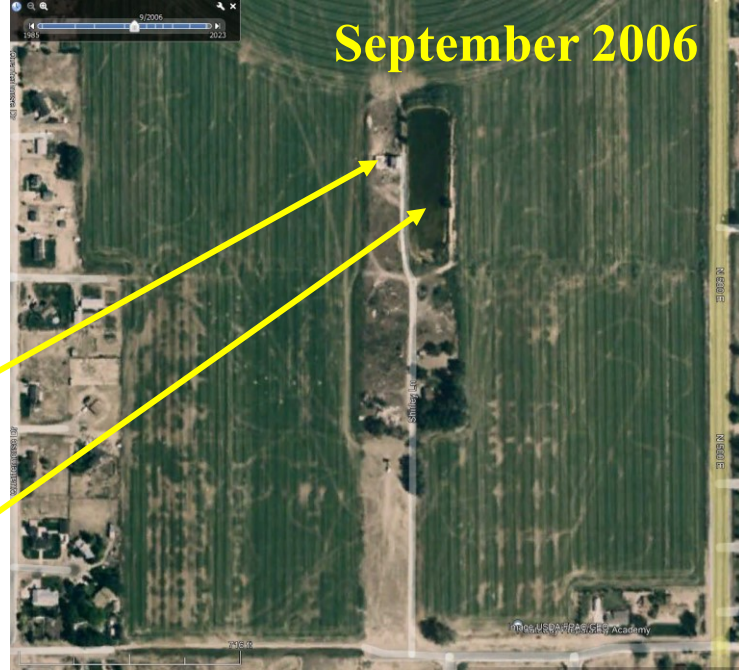
Barn
Corrals

Meat Plant
Grandmas

Gateway

Childhood
Home

September 2006



June 1993

Black creek detailing

Quaternorse Dr

Shirley Ln

1412 ft

Gateway Preparatory Academy

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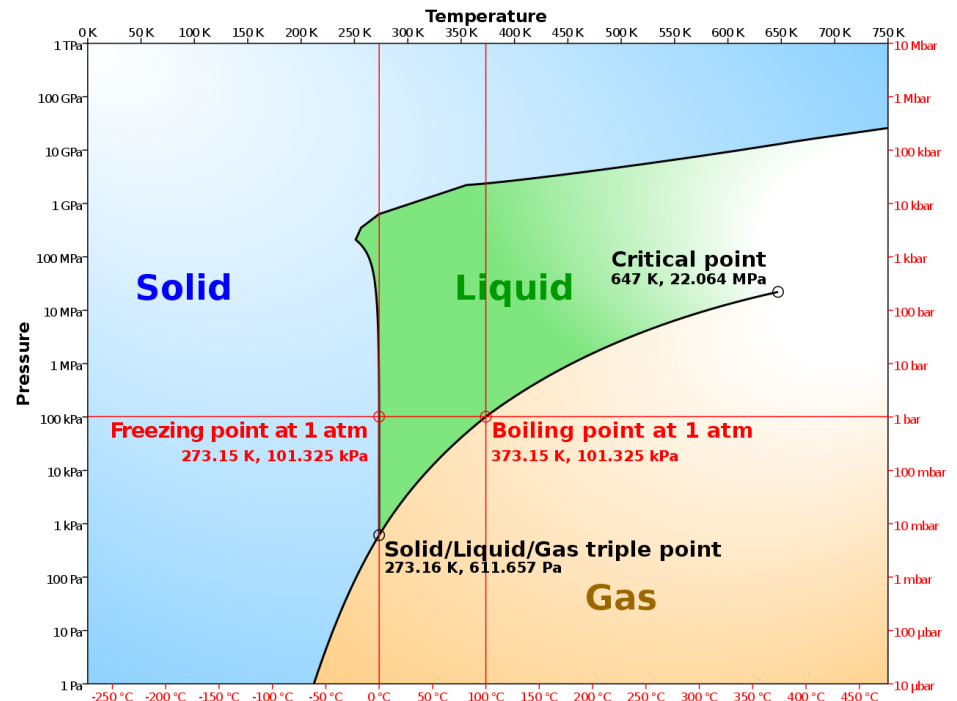
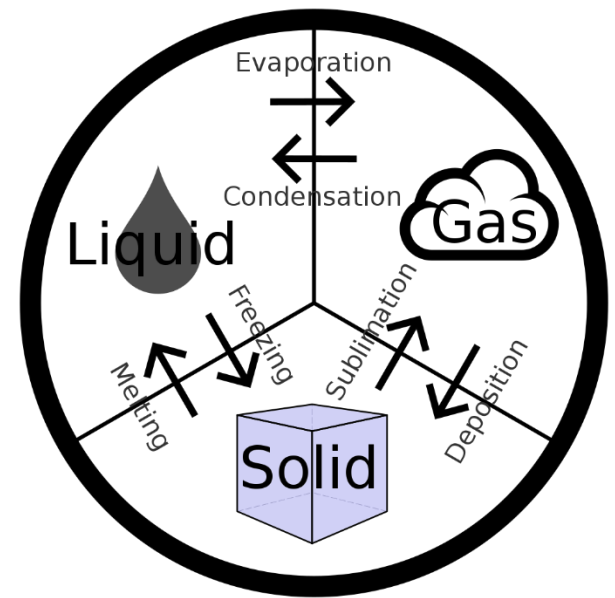
Water Science

Basic Questions:

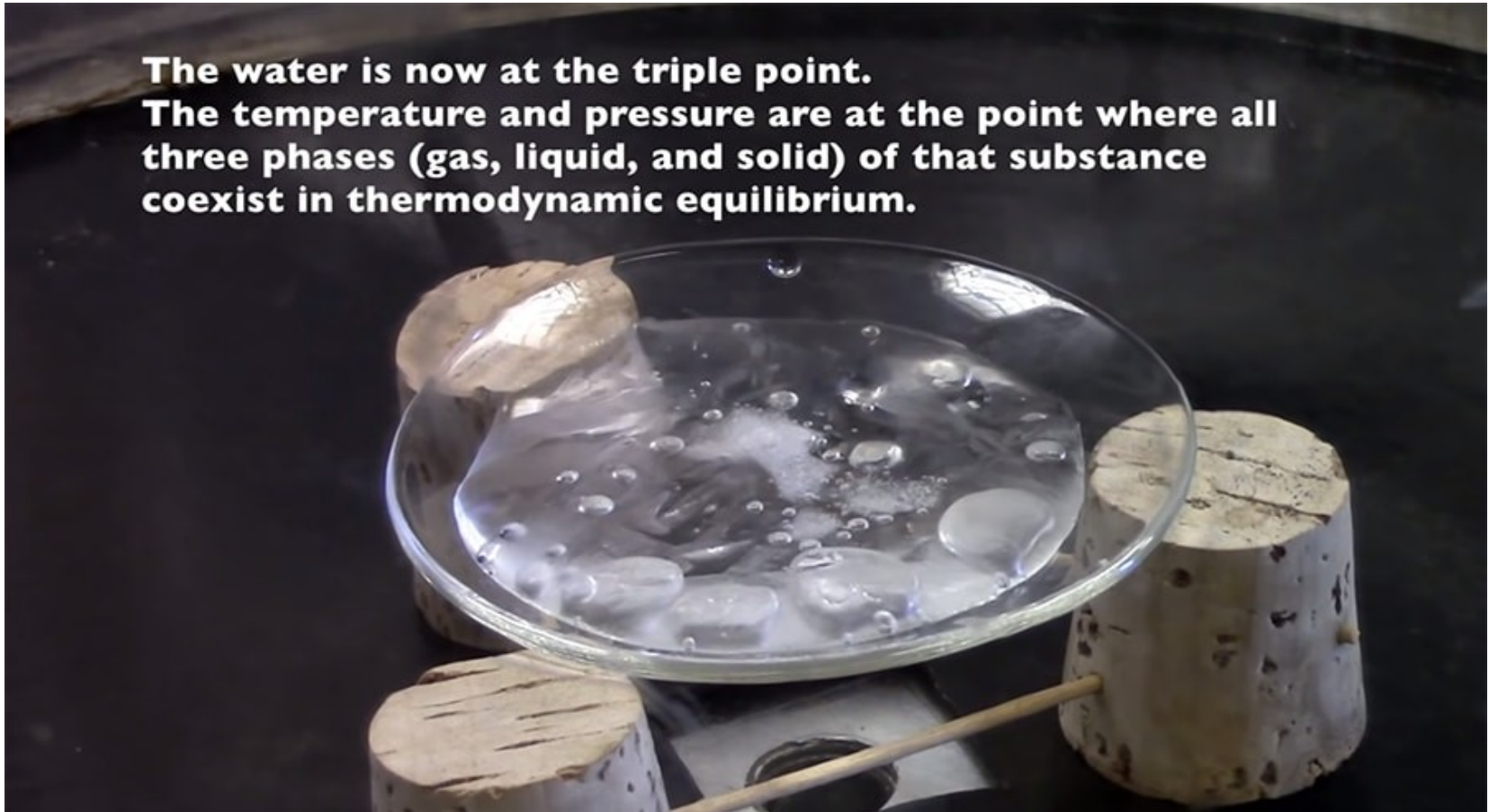
1. Who?
2. What?
3. Why?
4. Where?
5. When?

Four Components of water chemistry affecting water quality:

- Temperature;
- Acidity (pH);
- Dissolved Oxygen; &
- Electrical Conductance (minerals in the water).



Water at the Triple Point

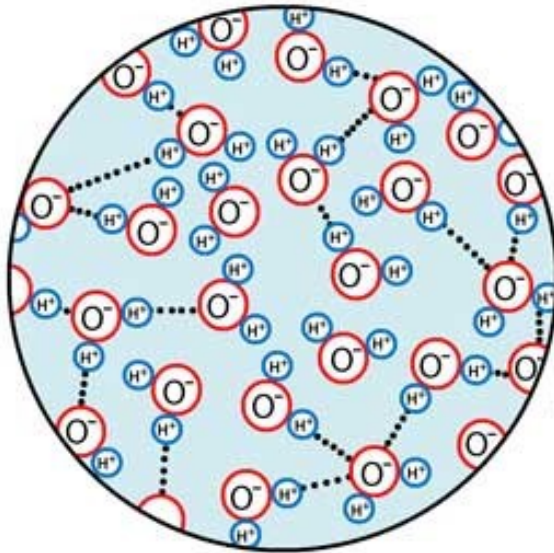


Movie of water at Triple Point in a vacuum, UCSC Physics

https://www.youtube.com/watch?v=Juz9pVVsmQQ&ab_channel=UCSCPhysics

Why Does Water Expand When It Freezes

As water freezes the hydrogen bonds push the H_2O molecules farther apart from each other increasing the intermolecular space resulting in expansion.

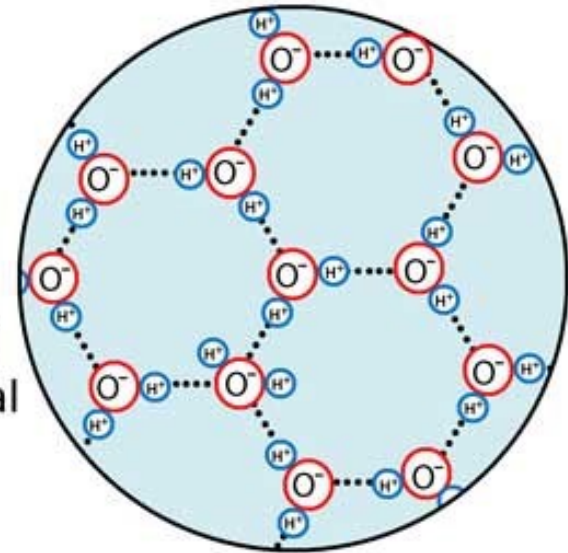


Liquid water
Unstable and irregularly
formed hydrogen bonds

On Freezing



molecules form
stable hexagonal
crystal lattice
structure



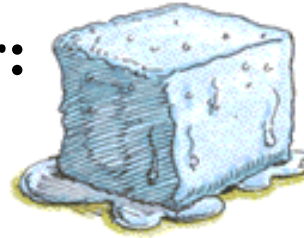
Ice
Stable hydrogen
bonds

© sciencefacts.net

1. Who Uses Water?

Families Use Household Water:

- Drinking
- Cooking
- Washing



SOLID



LIQUID



GAS

Farmers Use Irrigation Water:

- Households
- Livestock
- Agriculture

Cities Use Groundwater:

- Fresh Water
- Saline Water
- Geothermal Water



Governments Use Seawater and Tides:

- An average of 3.5% sodium chloride plus smaller amounts of other substances;
- Tides are cyclic rising and falling of local sea levels caused by lunar and solar gravity;
- Bathymetry is the depth to the bottom of a lake, or to the sea floor.

Water is Life

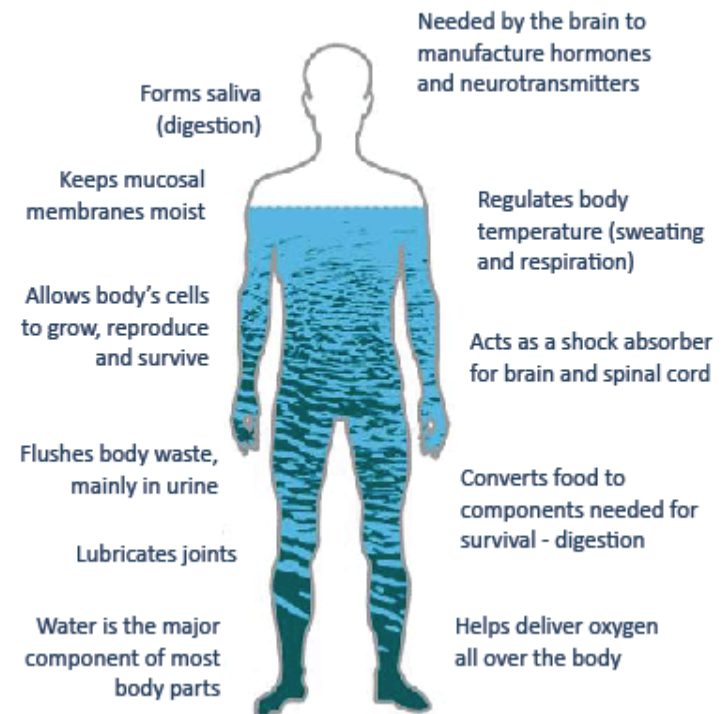
All the biochemical processes which occur in plants and animals, and our surroundings require water to function:

- Up to 60% of the human adult body is water.
- The brain and heart are composed of 73% water.
- The lungs are about 83% water.
- The skin contains 64% water.
- Muscles and kidneys are 79% water.
- Even the bones are watery: 31%.

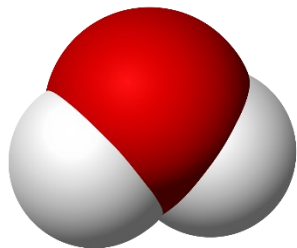
Water serves a number of essential functions to keep us all going:

- A vital nutrient to the life of every cell, acts first as a building material;
- It regulates our internal body temperature by sweating and respiration;
- The carbohydrates and proteins that our bodies use as food are metabolized and transported by water in the bloodstream;
- It assists in flushing waste mainly through urination
- acts as a shock absorber for brain, spinal cord, and fetus;
- forms saliva; and lubricates joints

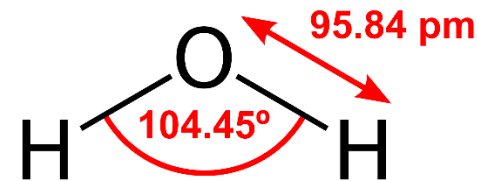
What Does Water do for You?



<https://www.usgs.gov/media/images/water-you-what-water-does-your-body>



2. What Is Water?



Water is:

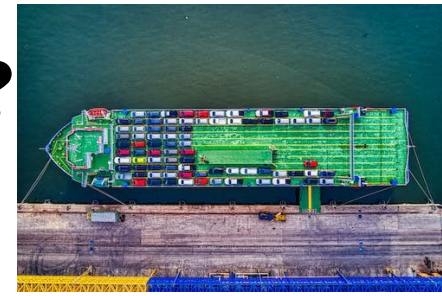
- An inorganic compound with the chemical formula H_2O ;
- Each molecule contains one oxygen and two hydrogen atoms;
- The atoms are connected by covalent bonds (sharing electrons to form electron pairs between atoms);
- A transparent, tasteless, odorless, and nearly colorless substance;
- The main constituent of the Earth's hydrosphere;
- The fluids of all known living organisms;
- A solvent vital for all known forms of life; and
- The liquid state of H_2O at standard temperature and pressure.



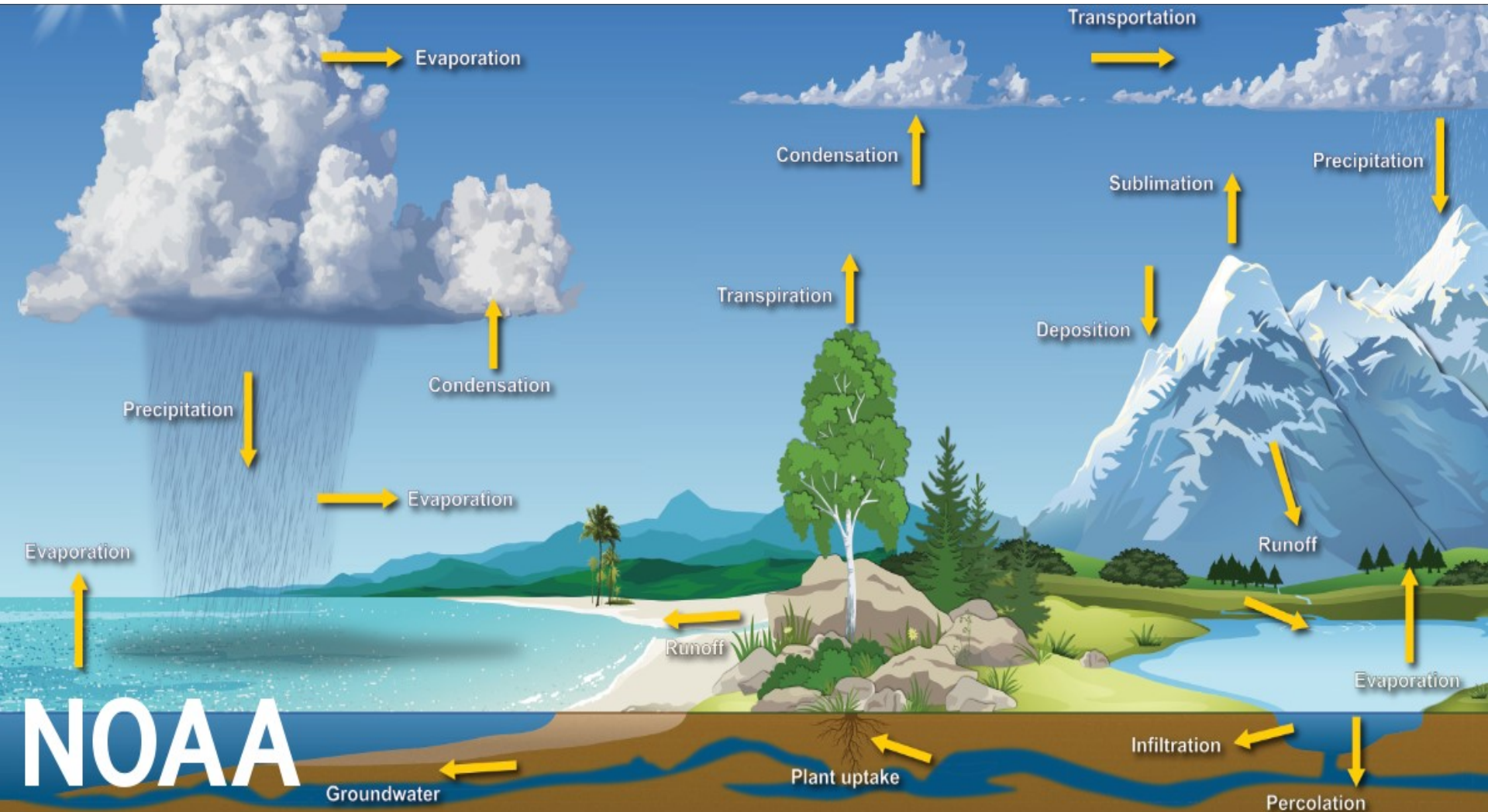
3. Why Is Water Important?

Because Earth's environment is relatively close to water's triple point:

- Water exists on Earth as a solid (ice), a liquid (water), & a gas (water vapor);
- It forms precipitation in the form of rain and aerosols in the form of fog;
- Clouds consist of suspended droplets of water and ice;
- Ice is water's solid state (dry ice is carbon-dioxide (CO₂)'s solid state);
- Crystalline ice may precipitate in the form of snow;
- The gaseous state of water is steam or water vapor;
- Water covers 71% of the Earth's surface (seas and oceans 96.5% of this volume);
- 1.7% of Earth's water is groundwater;
- 1.7% of Earth's water is in glaciers and ice caps of Antarctica & Greenland;
- 0.001% of Earth's water is in the air as vapor, clouds, & precipitation.
- 70% of freshwater used by humans is for agriculture;
- Fishing in salt & fresh water is a major source of food, providing 6.5% of global protein;
- Much of long distant trade is transported by boats through seas, rivers, lakes, & canals;
- Water, ice & steam are used for cooling, heating, solvents, cooking, & washing in industry & homes;
- Basis of swimming, boating, racing, surfing, fishing, diving, ice skating, skiing, & snow boarding.



The Water Cycle



(Image credit: Dennis Cain/NWS) <https://www.noaa.gov/education/resource-collections/freshwater/water-cycle>

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Other Reasons Water is Important:

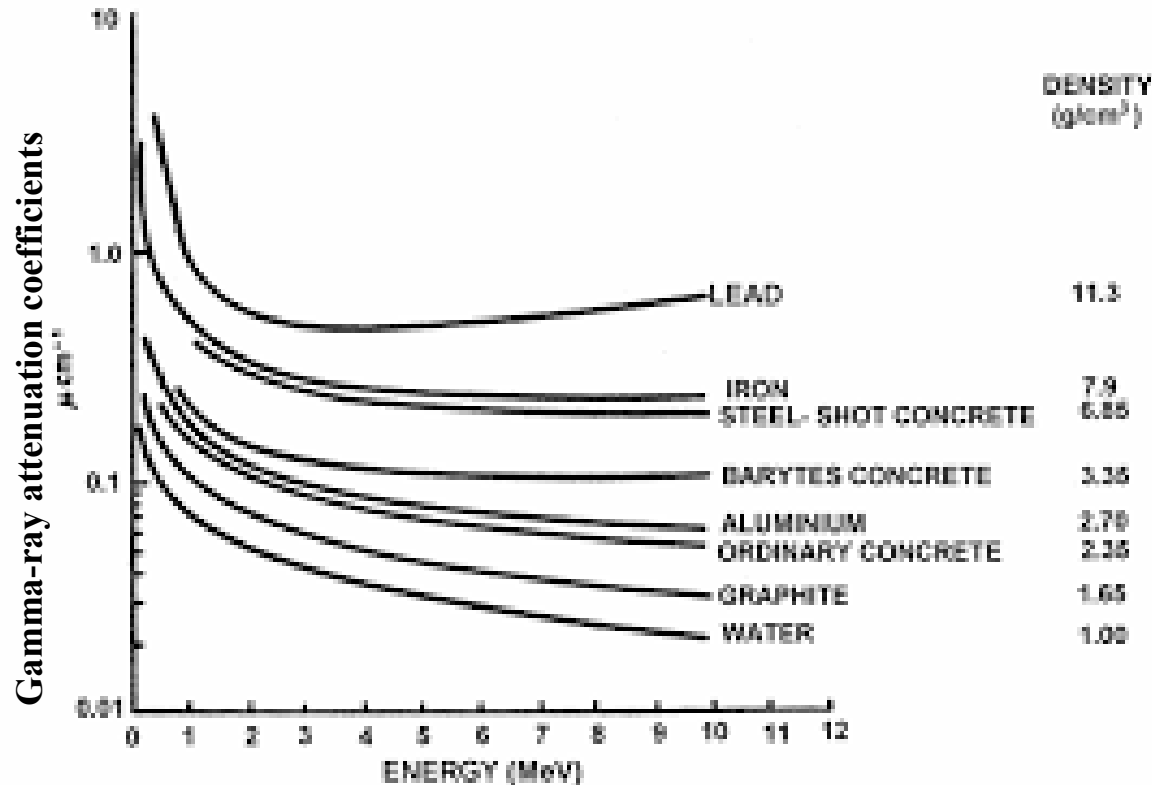
Water covers nearly 3/4 of the Earth's surface or:

- 326,000,000,000,000,000,000 gallons or
- 326 quintillion gallons

About 6,800 gallons of water are required to grow a day's worth of food for a family of four.

Water has the greatest thermal conductivity except for mercury

Water can act as either an acid or a base but is neutral



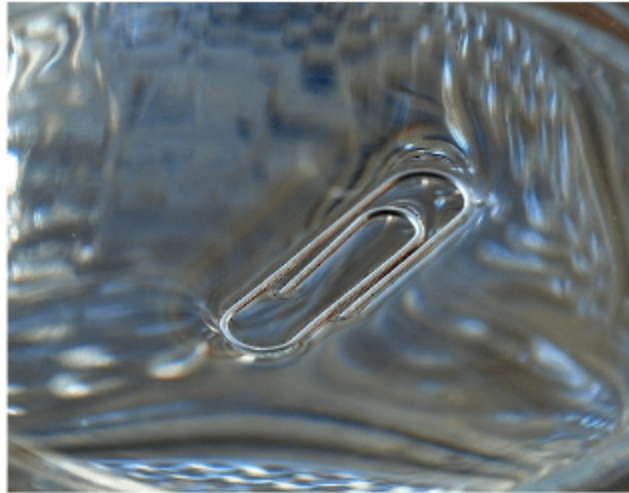
https://inis.iaea.org/collection/NCLCollectionStore/_Public/40/007/40007648.pdf

Water Cohesion

Cohesion: water molecules are attracted to other water molecules



This is what allows water molecules to stick together to form oceans, rivers, and the water in your glass.



Cohesion also creates surface tension—the "skin" on top of water that allows things to float on it.

Water Adhesion

Adhesion: water molecules are attracted to substances other than water



This is what allows water to move upwards through a plant against gravity. Water clings to the sides of the plant's veins. This is called **capillary action.**

Radiation Shielding with Water

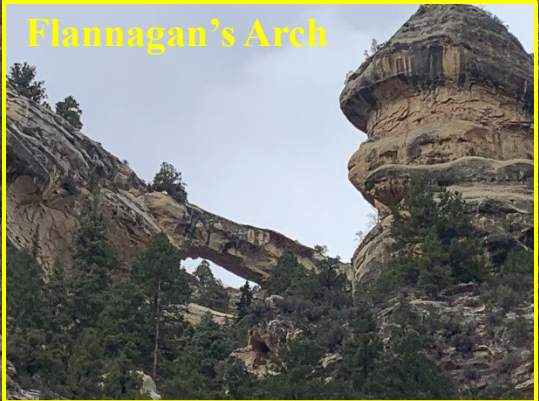
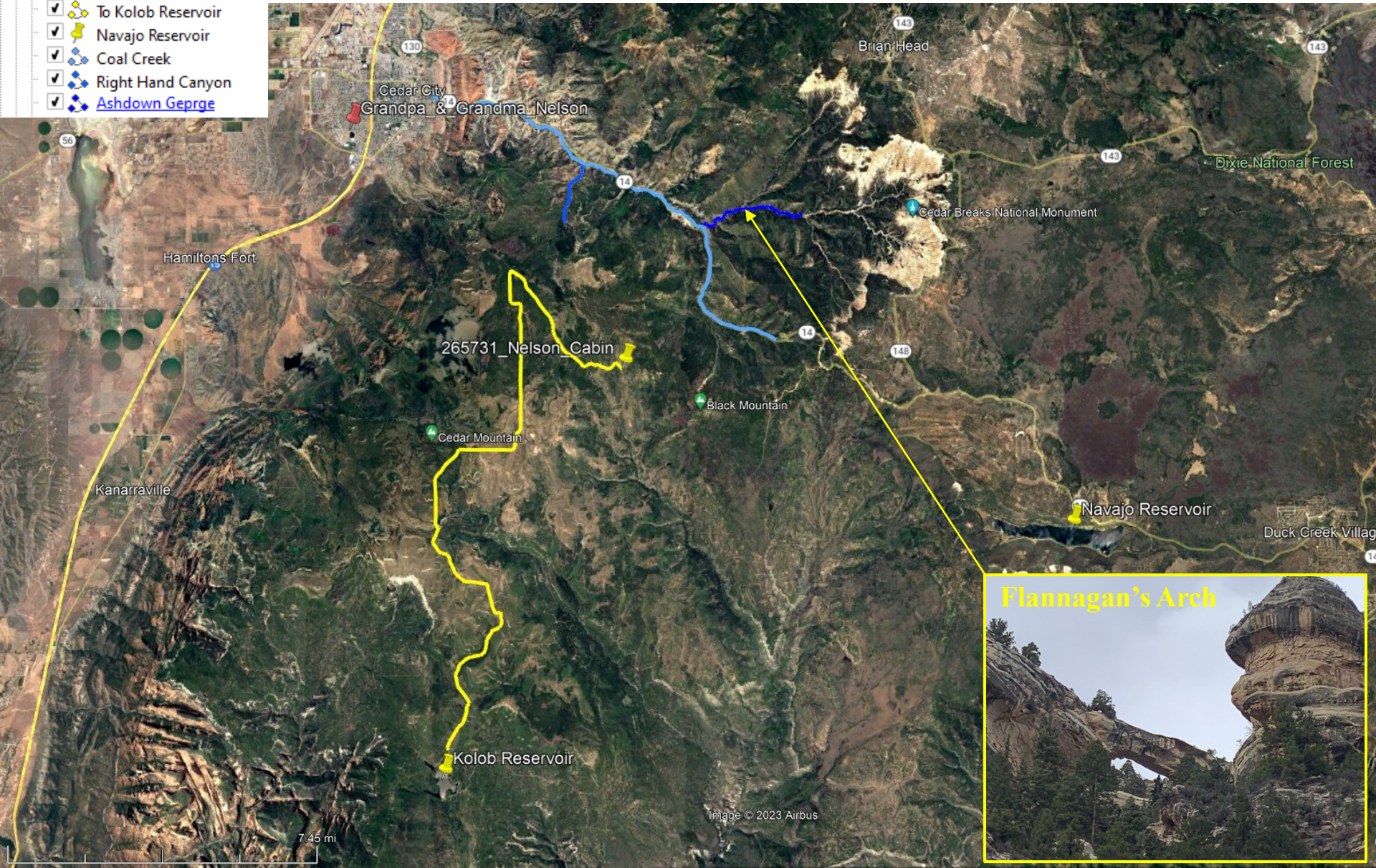
Uncle Paul's Company, Northrop Grumman, is using this principle to line the walls of the HALO (Human Adaptability Logistics Outpost); building with water for astronauts while they orbit the moon:

<https://www.nasa.gov/press-release/nasa-northrop-grumman-finalize-moon-outpost-living-quarters-contract>



4. Where Is Water Found?

- 2155W700S#31
- Grandpa_ & Grand...
- 265731_Nelson_Cabin
- Kolob Reservoir
- To Kolob Reservoir
- Navajo Reservoir
- Coal Creek
- Right Hand Canyon
- Ashdown Geprge

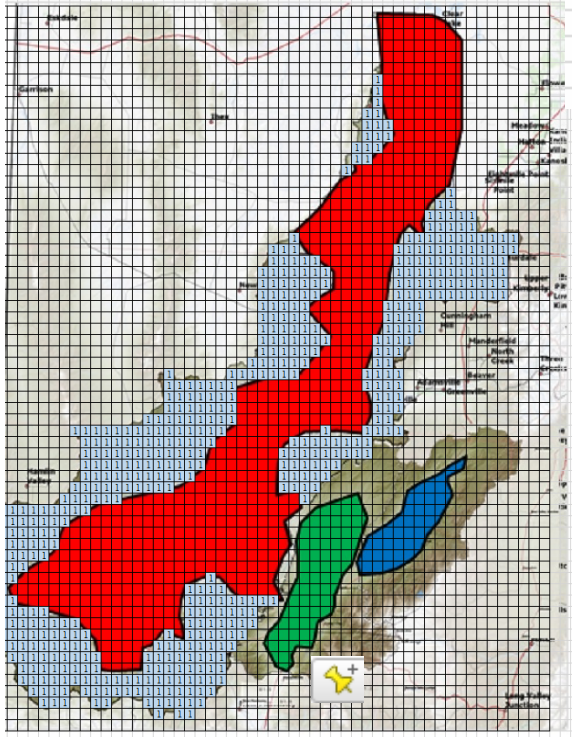


Astronauts' urine and sweat are almost entirely recycled into drinking water with new system

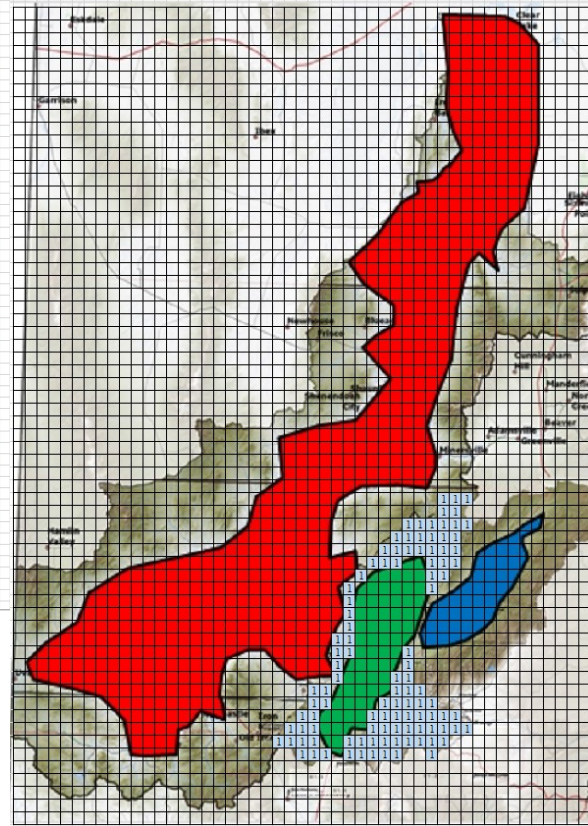
The end result, says NASA, is that the crew is drinking water that is even cleaner than Earth's.



Where Is Water Found in the Utah Deserts?



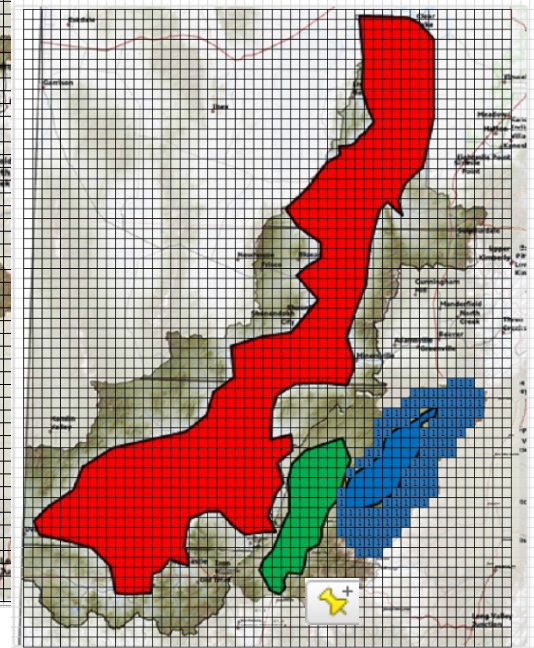
552	47.83%	Escalante Bedrock Aquifers
602	52.17%	Escalante Valley Fill Aquifers
1154		Total Area



104	60.47%	Cedar Bedrock Aquifers
68	39.53%	Cedar Valley Fill Aquifers
172		

DS 172 20.22% Cedar Valley Fill Aquifers

113	74.34%	Parowan Bedrock Aquifers
39	25.66%	Parowan Valley Fill Aquifers
152		



113	74.34%	Parowan Bedrock Aquifers
39	25.66%	Parowan Valley Fill Aquifers
152		

Escalante Valley:

- blue – bedrock aquifers
- red – valley fill aquifer



Cedar Valley:

- blue – bedrock aquifers
- green – valley fill aquifer

Parowan Valley:

- blue – bedrock aquifers
- blue – valley fill aquifer

Cedar Valley Lightning Analysis

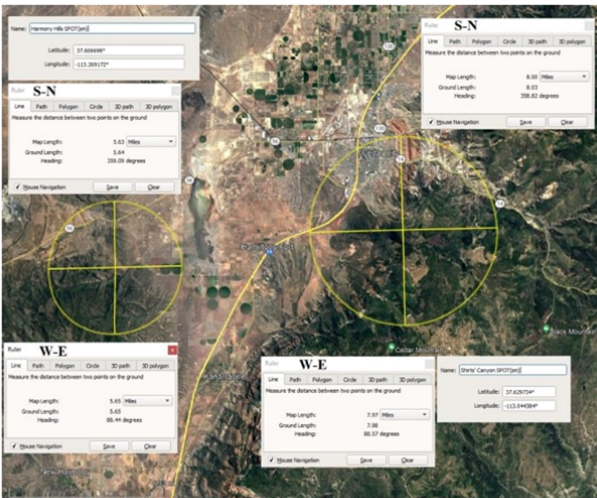
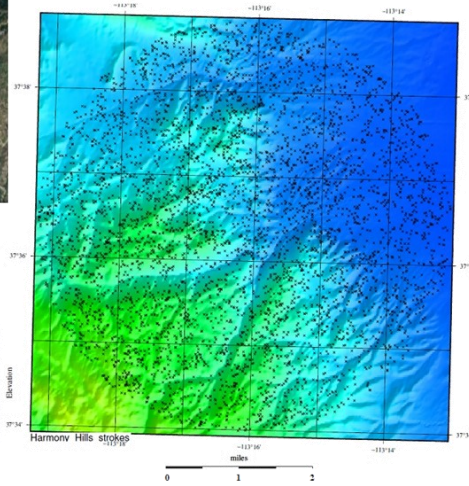
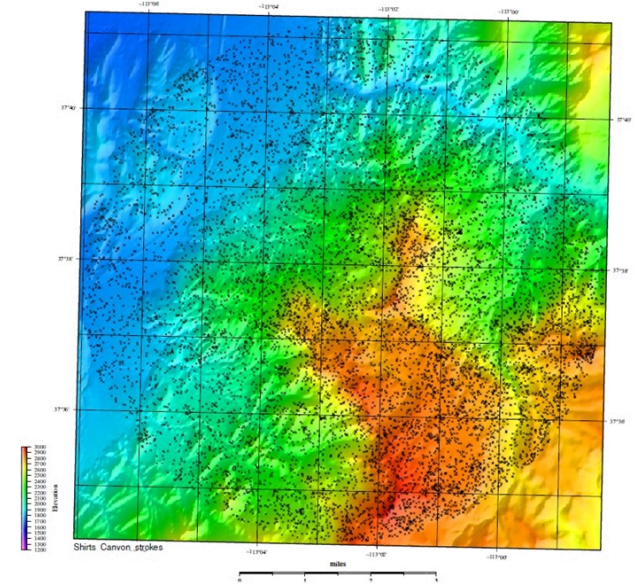


Figure 1. Area of Harmony Hills (west) and Shirts Canyon (east) SPOTsm Analyses, Cedar Valley, Utah.

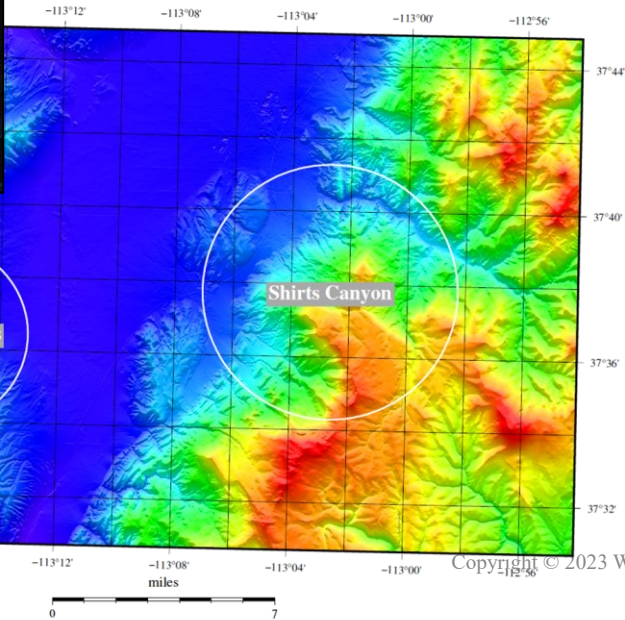
Strikes Harmony Hills



Strikes Shirts Canyon



Vaisala Sensor
Cedar City Airport

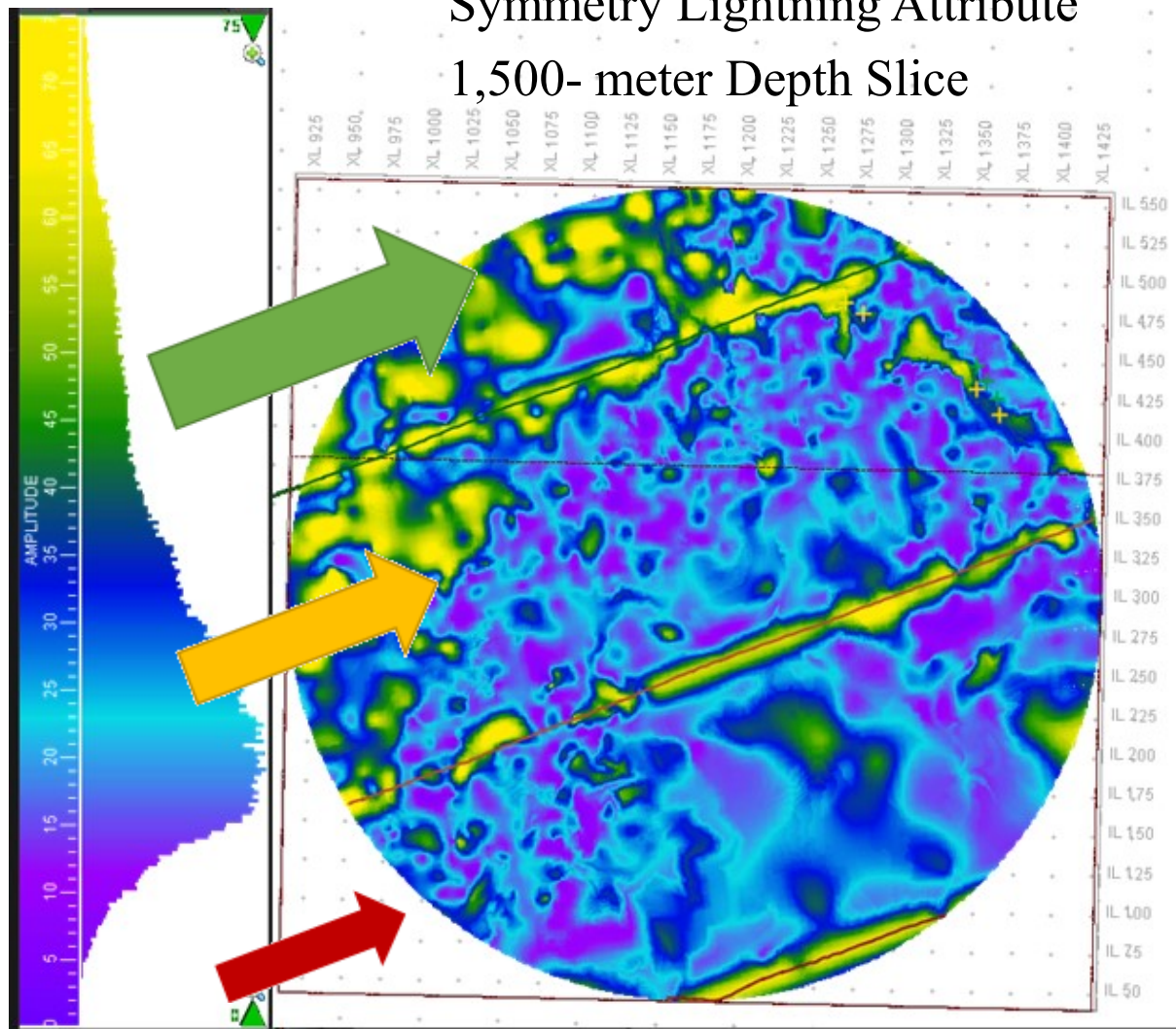
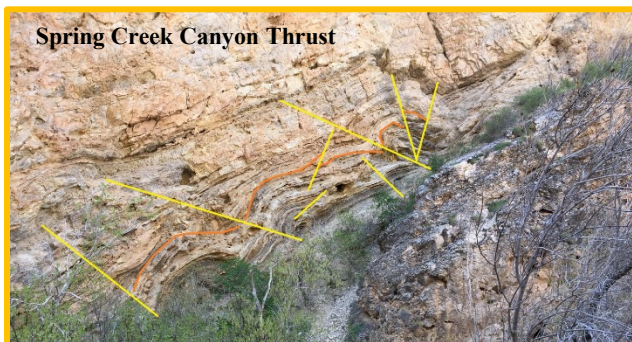
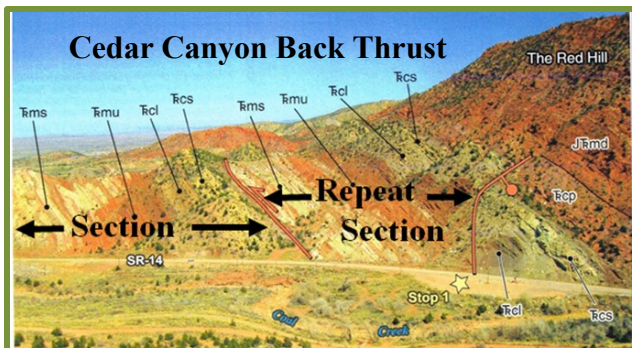


Dynamic Measurement as a subcontractor to Willowstick Technologies:

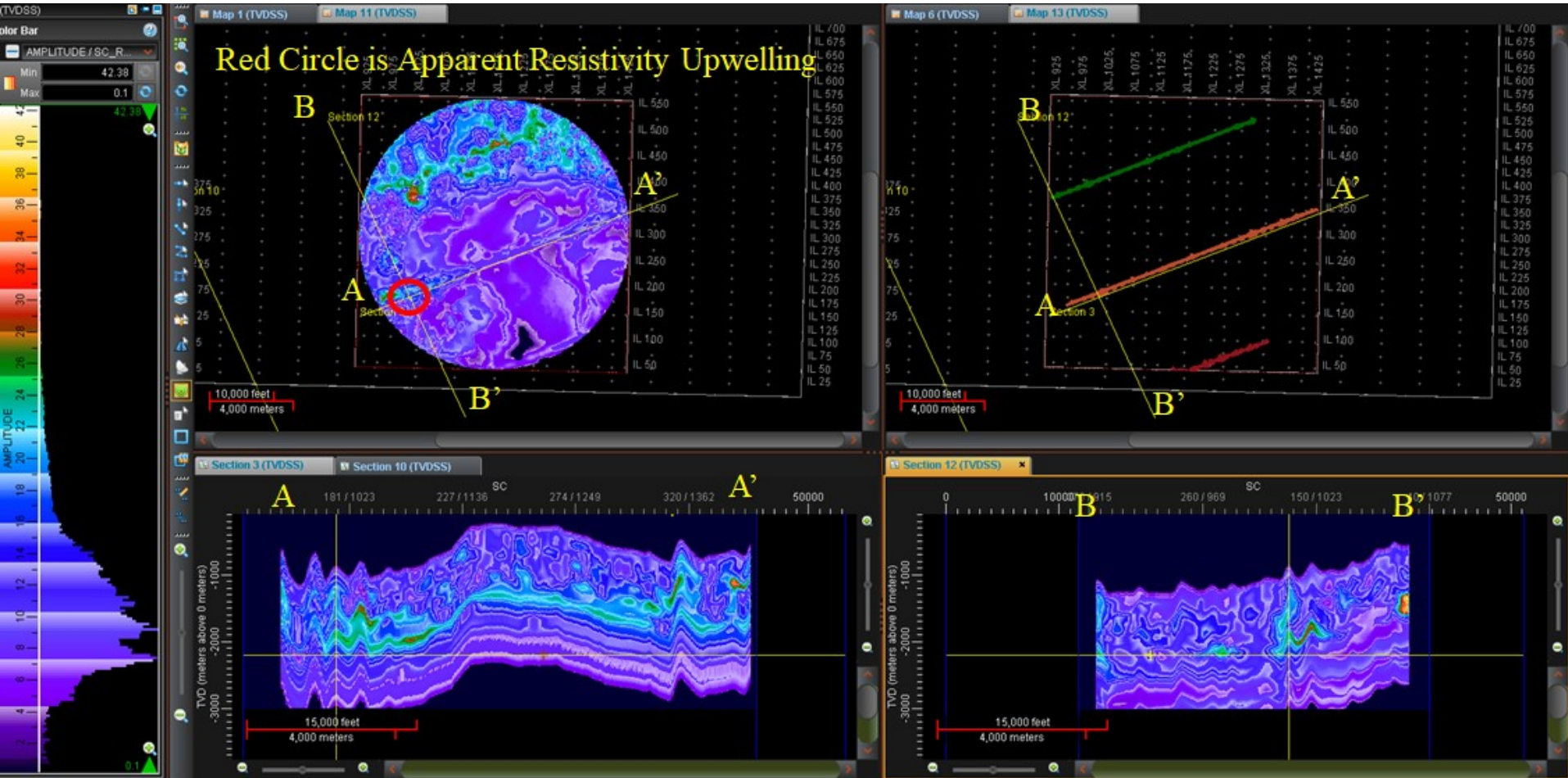
- Did 2 Lightning SPOTsm Analysis in March 2022.
- Unraveling the thrust faulting in Shirts' Canyon.
- Identifying likely bedrock aquifers.
- One well found muddy water where predicted.
- The other well found artesian water and is currently being deepened another 600 feet.
- There are many other potential well locations.

Thrust Faulting Shirt's Canyon

Symmetry Lightning Attribute
1,500- meter Depth Slice

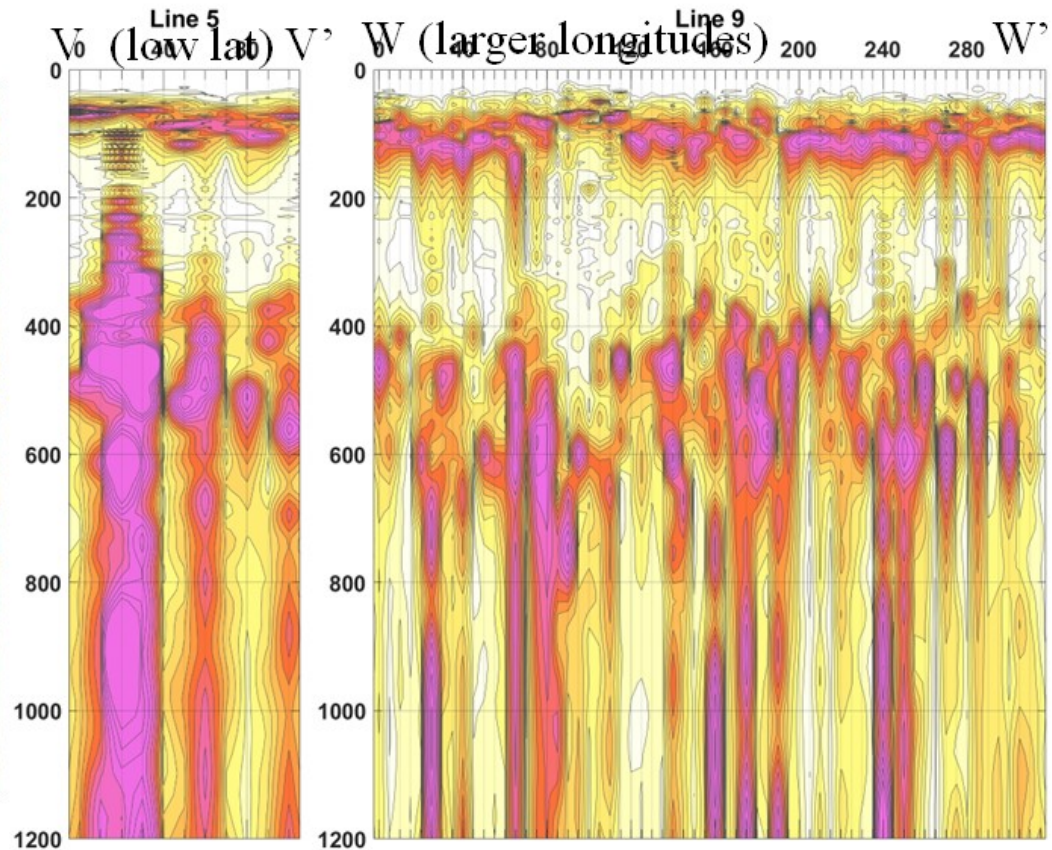
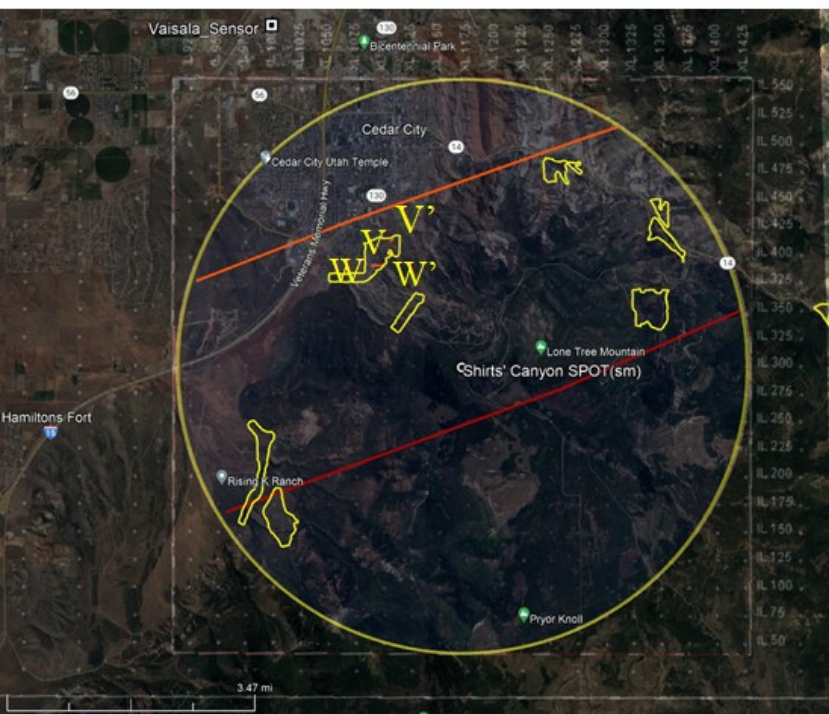


Shirts Canyon Shallow Resistivity L177 T1010

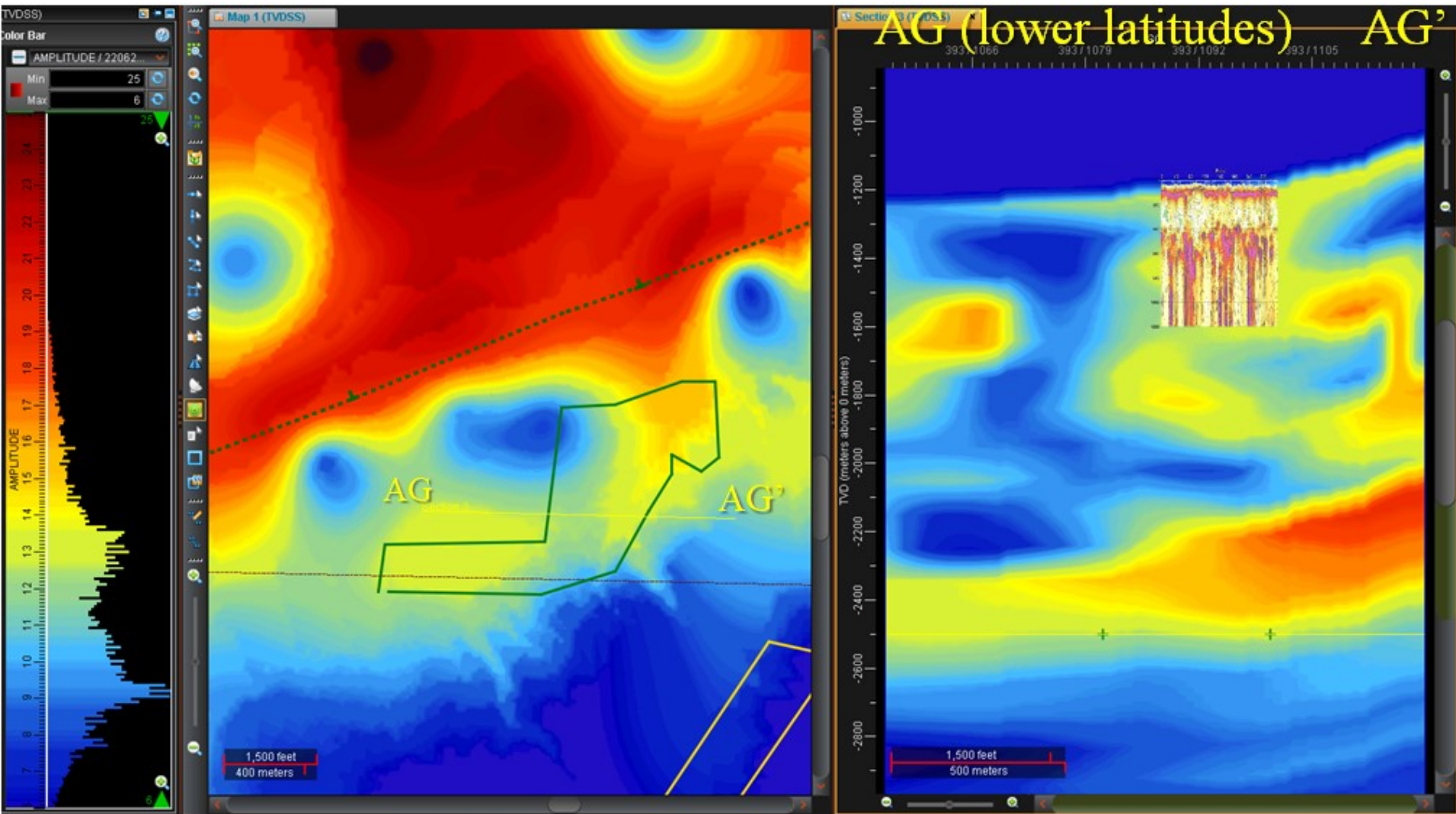


Willowstick Measurements

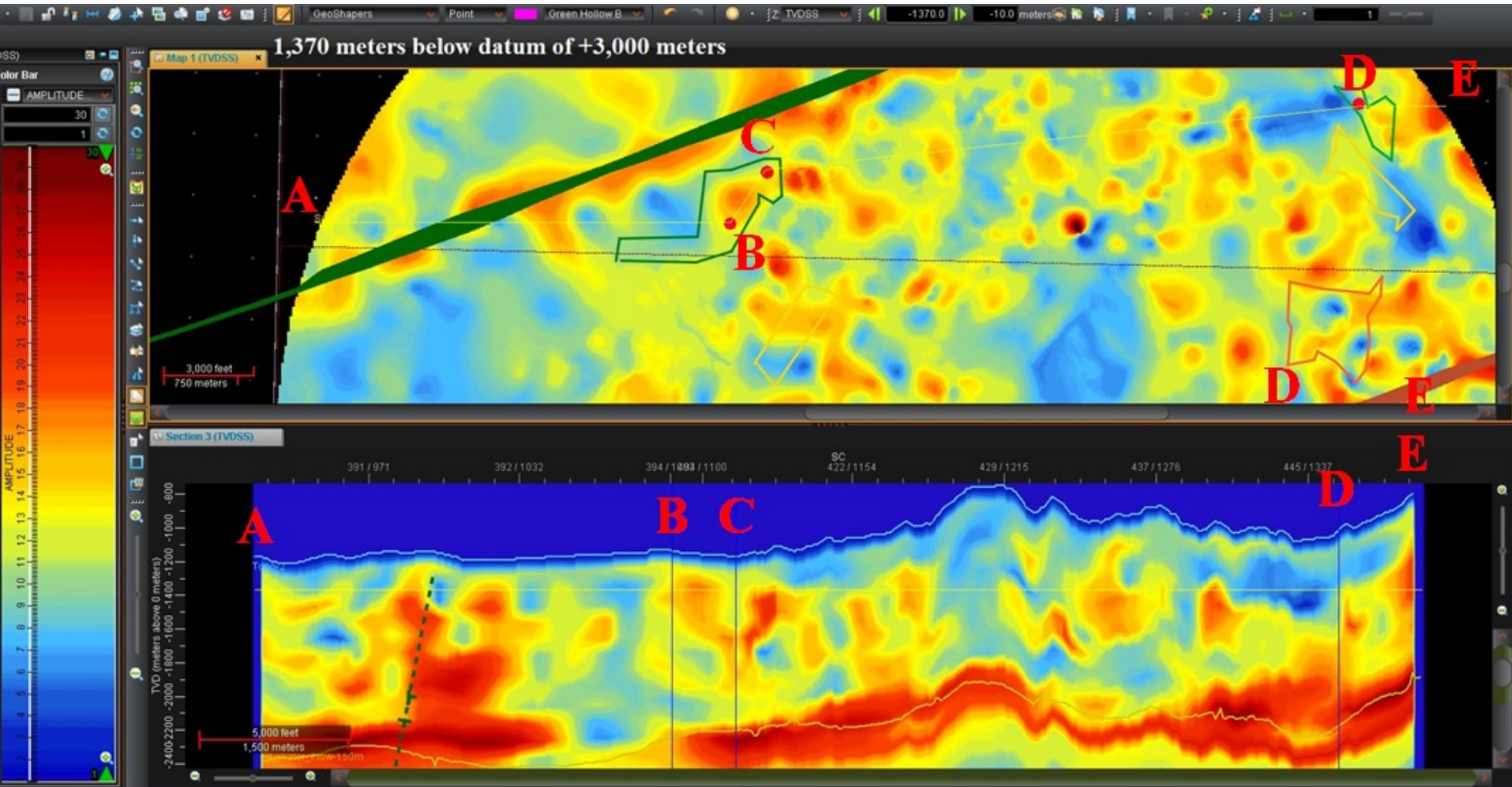
Southview: 5-GH G2 RAP Lines 5 & 9



Southview: 5-GH G2 RAP Lines 5 & 9, Line 9 , ~overlay of W-W' previous slide



Zoom Resistivity Slice -1,370 meters Green Hollow Area



5. When Is Water Important?

- When you are thirsty.
- When you are hot.
- When your eyes, mouth, and nose are dry.
- When you are dehydrated.
- When your joints ache.
- When your spinal cord and back hurt.
- When nutrients need to be moved to cells.
- When there are digestion issues.
- When you need to pass a kidney stone.
- When you need to get rid of wastes to lessen the burden on kidneys by urination, perspiration, and bowel movements.
- When you need it to wash vegetables or dishes.
- When you need to flush a toilet.
- When you need to run an air conditioner.
- Whenever you need water for work or play or life.

Water Science Experiments you can do at Home

Water science experiments you can do at home! Click on the experiment image or the view experiment link below for each experiment on this page to see the materials needed and procedure. Have fun trying these experiments at home or use them for **SCIENCE FAIR PROJECT IDEAS**.



Catch An Ice Cube:

Frozen Water Is A Lot Of Fun



Make A Rainbow:

Refract Water And Make A Mini Rainbow



Which Water Leaks Faster?:

See If Hot Or Cold Water Drips Faster



Make A Water Filter:

Can You Make Clean Water With Sand And Pebbles?



Jumbo Water Bead Balloon:

Make A Strange And Unique Item



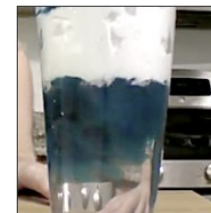
DIY Hydrophobic Sand:

Make Sand That Is Scared Of Water



Fabulous Floating Rocks:

Can Rocks Really Float?



Storm in a Glass:

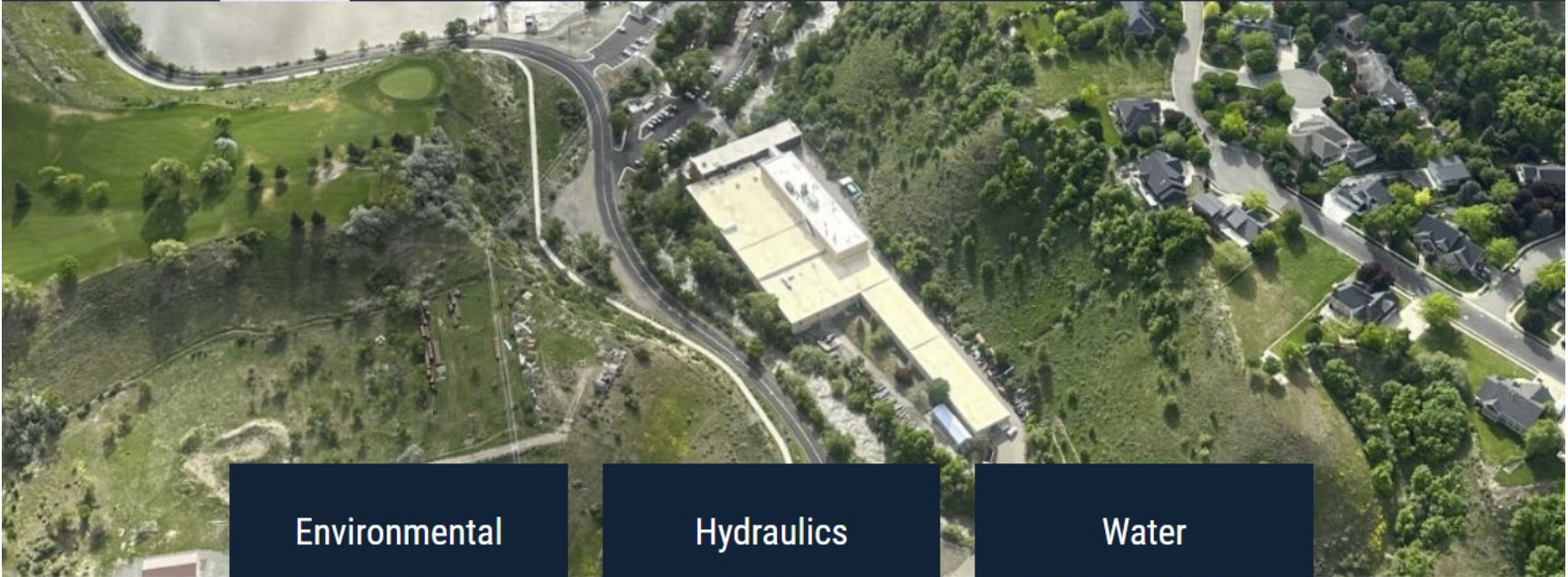
Model of Rainstorm in a Glass

<https://www.sciencefun.org/kidszone/experiments/water-science-experiments/>

Water Research Opportunities

UtahStateUniversity | Utah Water Research Laboratory

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<https://uwrl.usu.edu/>

Great Salt Lake is Drying Up and We will all die!



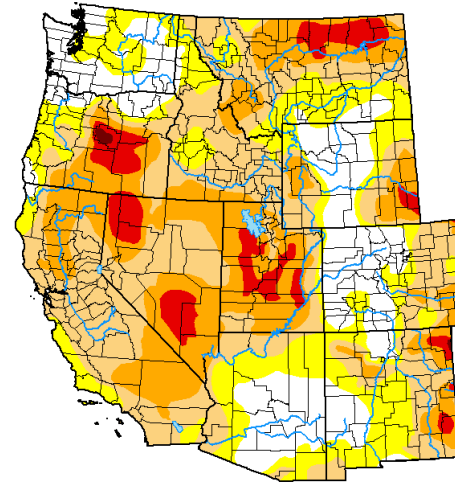
**U.S. Drought Monitor
Western U.S.**

2022 ANNUAL REPORT

Utah Water Research Laboratory
UTAH STATE UNIVERSITY®

**U.S. Drought Monitor
Western U.S.**

January 31, 2023
(Released Thursday, Feb. 2, 2023)
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	18.89	81.11	60.55	28.83	6.38	0.14
Last Week 01-24-2023	18.12	81.88	59.38	28.83	6.42	0.14
3 Months Ago 11-01-2022	4.67	95.33	73.51	47.30	19.34	2.53
Start of Calendar Year 01-01-2023	12.08	87.92	62.42	38.84	12.41	0.27
Start of Water Year 09-27-2022	3.89	96.11	73.90	47.71	19.37	2.63
One Year Ago 02-07-2022	3.94	96.06	87.93	64.09	19.67	3.23

Intensity:
 None (White) D2 Severe Drought (Orange)
 D0 Abnormally Dry (Yellow) D3 Extreme Drought (Red)
 D1 Moderate Drought (Light Orange) D4 Exceptional Drought (Dark Red)

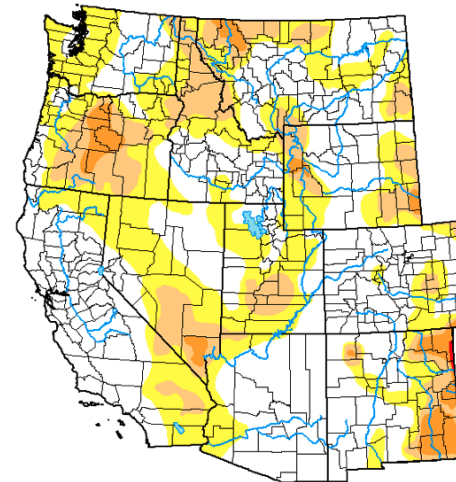
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/about.aspx>

Author:
Rocky Bilotta
NCEI/NOAA



droughtmonitor.unl.edu
May 30, 2023
(Released Thursday, Jun. 1, 2023)
Valid 8 a.m. EDT

**U.S. Drought Monitor
Western U.S.**



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	52.52	47.48	17.01	3.58	0.08	0.00
Last Week 05-29-2023	51.66	48.34	18.35	4.11	0.38	0.01
3 Months Ago 02-28-2023	24.28	75.72	53.55	22.35	3.09	0.15
Start of Calendar Year 01-01-2023	12.08	87.92	62.42	38.84	12.41	0.27
Start of Water Year 09-27-2022	3.89	96.11	73.90	47.71	19.37	2.63
One Year Ago 05-31-2022	6.27	93.73	86.82	68.77	38.00	9.57

Intensity:
 None (White) D2 Severe Drought (Orange)
 D0 Abnormally Dry (Yellow) D3 Extreme Drought (Red)
 D1 Moderate Drought (Light Orange) D4 Exceptional Drought (Dark Red)

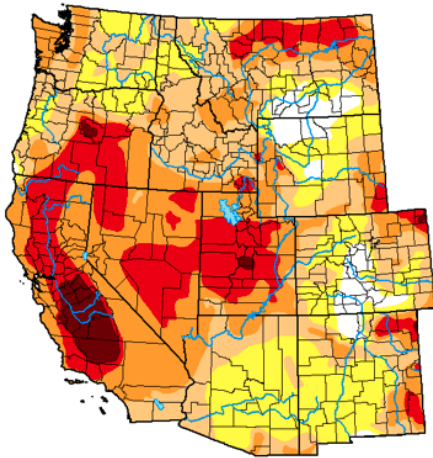
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/about.aspx>

Author:
Richard Heim
NCEI/NOAA



droughtmonitor.unl.edu

October 25, 2022
(Released Thursday, Oct. 27, 2022)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	4.56	95.44	73.49	47.80	19.55	2.53
Last Week 10-19-2022	5.02	94.98	73.03	47.38	19.38	2.62
3 Months Ago 07-26-2022	15.72	83.28	72.69	55.74	29.12	6.51
Start of Calendar Year 01-01-2023	3.68	96.32	89.29	64.90	23.65	3.94
Start of Water Year 09-27-2022	3.89	96.11	73.90	47.71	19.37	2.63
One Year Ago 10-26-2021	2.16	97.84	90.73	74.61	47.11	15.31

Intensity:
 None (White) D2 Severe Drought (Orange)
 D0 Abnormally Dry (Yellow) D3 Extreme Drought (Red)
 D1 Moderate Drought (Light Orange) D4 Exceptional Drought (Dark Red)

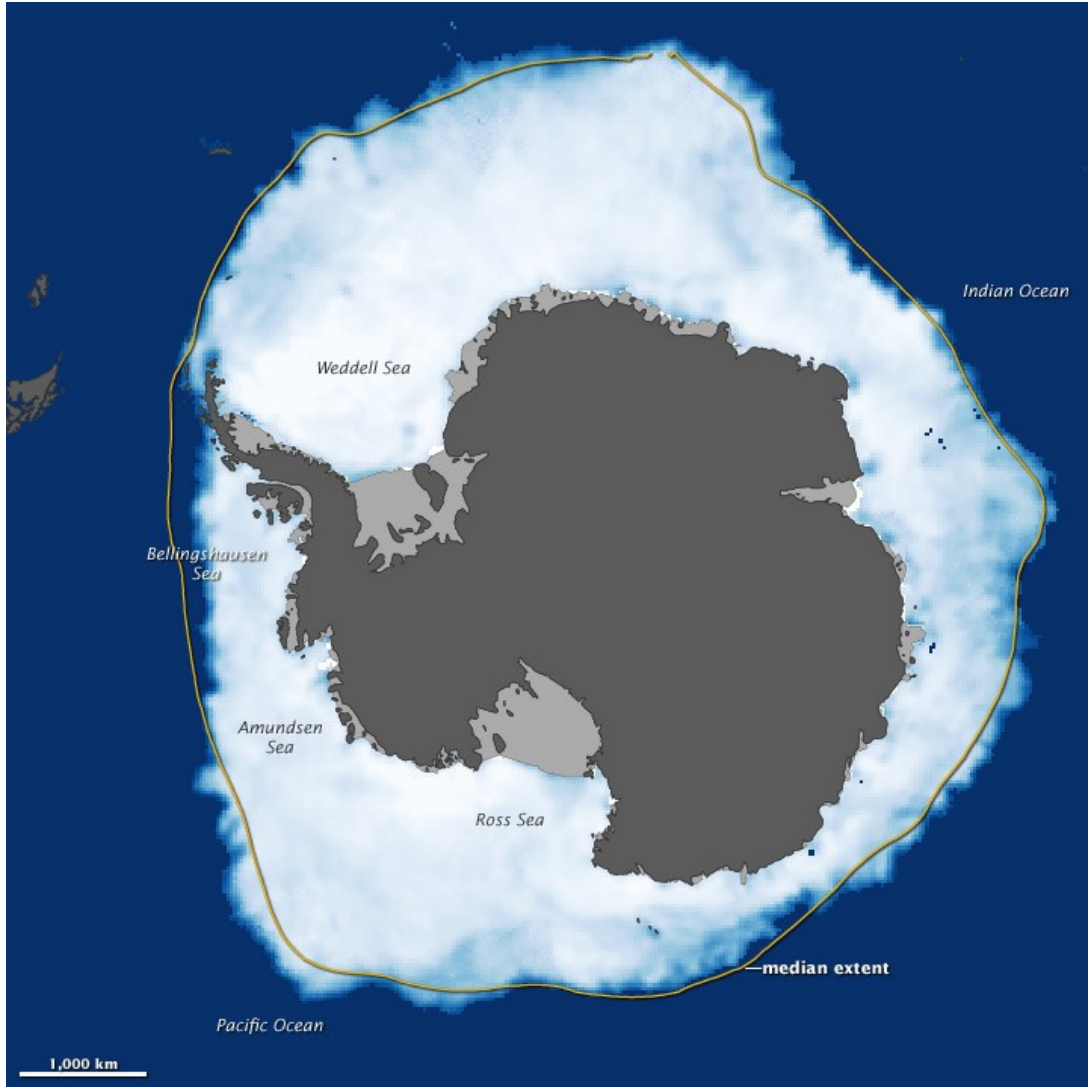
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/about.aspx>

Author:
Adam Hartman
NOAA/NWS/NCEI/PCP

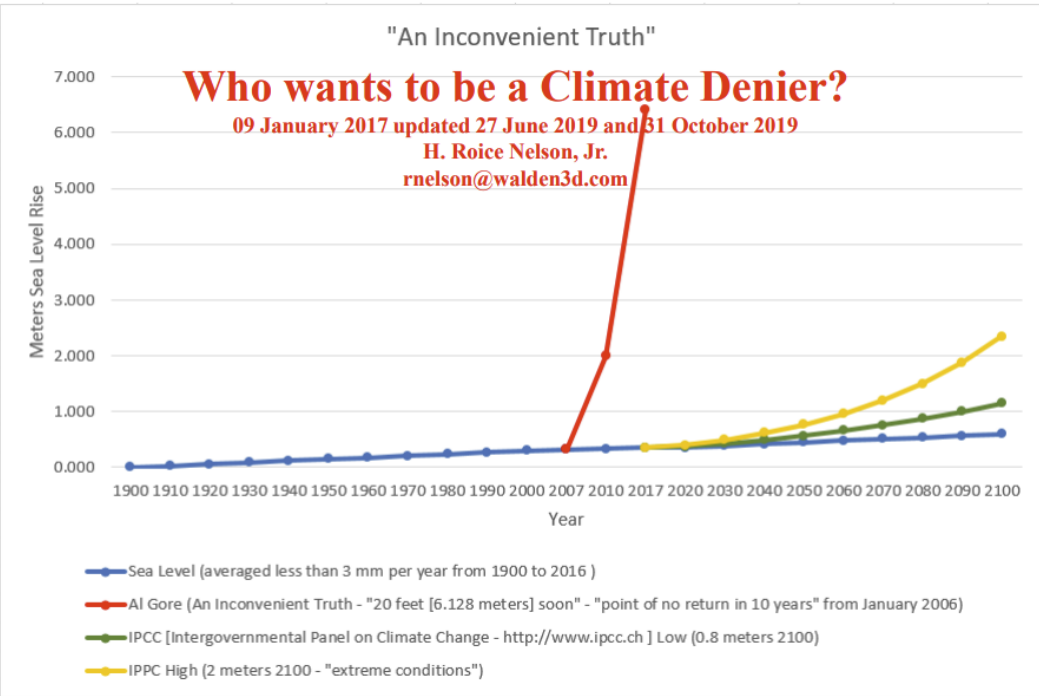
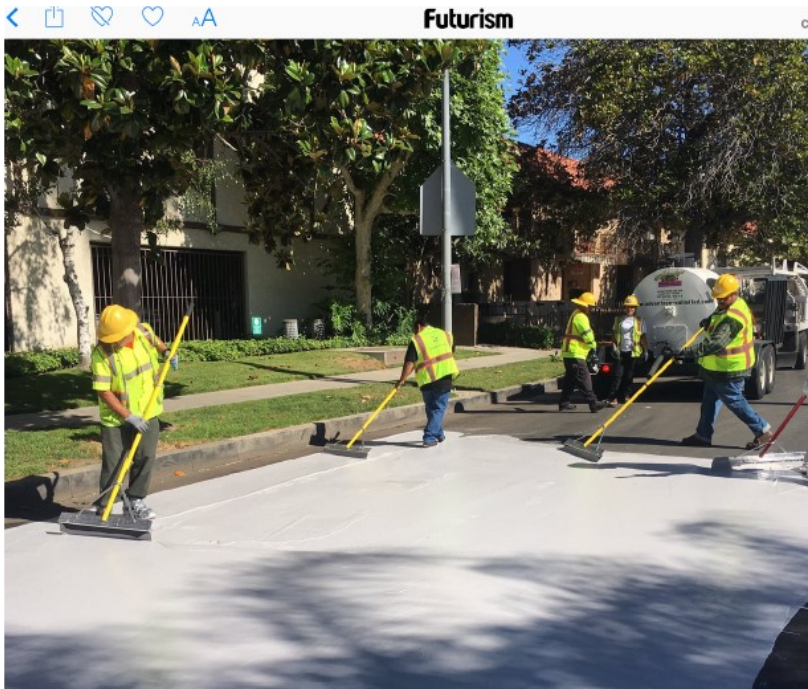


droughtmonitor.unl.edu

Ross Ice Sheet will Melt and Flood Florida!



Climate Change Discussion is Tied to Water



Los Angeles is Painting its Streets to Combat Climate Change

Sep 8, 2017 | 10:17 AM

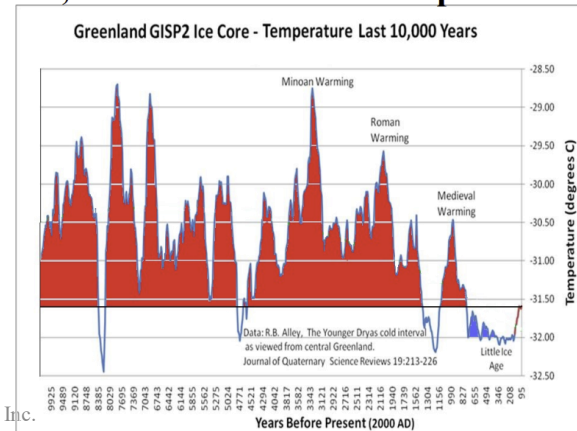
Paint is the Answer

The city of Los Angeles, California is pushing forward to fight against climate change and reduce slowly rising temperatures. This time around, it's painting the streets a different color. Black is a color that's prone to absorbing heat from the sun, so black asphalt that covers a city like L.A. is sure to increase the city's overall temperature, as proven by the record-breaking heat California has had to deal with this early September.

Los Angeles is now coating its streets with a new gray paint called CoolSeal that will, as its name indicates, keep pavements cooler. California-based company GuardTop produces the paint, which the city tested in certain areas back in August, resulting in a 6.6 degrees Celsius (12 degrees Fahrenheit) drop in temperature.

https://www.walden3d.com/Climate_Change/191031_Climate_Deniers.pdf

10,000 Years of Global Temperatures



Water and the Gospel of Jesus Christ

Water as:

A Purifier:

- John to baptize the Messiah with *water*, [1 Ne. 10:9–10](#).
- Moses smote rock and *water* came forth, [1 Ne. 17:29](#) ([2 Ne. 25:20](#)).
- come forth out of *waters* of Judah, or *waters* of baptism, [1 Ne. 20:1](#) ([Isa. 48:1](#)).
- eyes of Nephi¹ *water* his pillow by night because of his people, [2 Ne. 33:3](#).
- Alma¹ and Helam are buried in *water* in baptism, [Mosiah 18:14](#).
- those who believe shall be born of *water* and of the Spirit, [D&C 5:16](#).
- cleanse your feet with pure *water*, [D&C 84:92](#).
- men must be born again of *water* and the Spirit, [Moses 6:59](#).
- by *water* ye keep commandment, [Moses 6:60](#).
- Adam is carried down into *water* by the Spirit, [Moses 6:64](#).

A Deliverer:

- Nephi¹ beholds many *waters* separating his seed from Gentiles, [1 Ne. 13:10, 12–13, 17, 29](#).
- people of Lehi¹ call sea Irreantum, meaning many *waters*, [1 Ne. 17:5](#).
- every one that thirsteth, come to *waters*, [2 Ne. 9:50](#).
- with joy shall ye draw *water* out of wells of salvation, [2 Ne. 22:3](#) ([Isa. 12:3](#)).
- lands of Nephi and Zarahemla nearly surrounded by *water*, [Alma 22:32](#).

A Destroyer:

- by Moses' word, *waters* of Red Sea were divided, [1 Ne. 17:26](#) ([Hel. 8:11](#)).
- slain Lamanites and Amlicites are cast into *waters* of Sidon, [Alma 3:3](#).
- the Lord causes *waters* to come up in places of cities, [3 Ne. 9:7](#).
- bitter fountain cannot bring forth good *water*, nor good fountain bitter *water*, [Moro. 7:11](#).
- many dangers upon *waters*, [D&C 61:4–5](#).
- no flesh to be safe upon *waters*, [D&C 61:15](#).
- destroyer rides upon face of *waters*, [D&C 61:19](#).
- the Lord's presence is as fire that causes *waters* to boil, [D&C 133:41](#).

Living Water:

- with joy shall ye draw *water* out of the wells of salvation, [Isa. 12:3](#) ([2 Ne. 22:3](#)).
- every one that thirsteth, come ye to the *waters*, [Isa. 55:1](#) ([2 Ne. 9:50](#)).
- they have forsaken me the fountain of *living waters*, [Jer. 2:13](#).
- it shall be in that day, that *living waters* shall go out, [Zech. 14:8](#).
- asked of him, and he would have given thee *living water*, [John 4:10](#).
- any man thirst, let him come unto me, and *drink*, [John 7:37](#).
- lead them unto living fountains of *waters*, [Rev. 7:17](#).
- I will give unto him ... of the *water* of life freely, [Rev. 21:6](#).
- fountain of *living waters*, or ... the love of God, [1 Ne. 11:25](#).
- partake of the *waters* of life freely, [D&C 10:66](#).
- same shall be in him a well of *living water*, [D&C 63:23](#).
- shall come forth pools of *living water*, [D&C 133:29](#).
- come unto the Lord and ye shall drink *waters* of life freely, [Alma 5:34](#) ([42:27](#)).
- partake of *waters* of life, [D&C 10:66](#).
- mysteries of kingdom to be well of *living water*, [D&C 63:23](#).
- pools of *living water* in barren deserts, [D&C 133:29](#).

Ezekiel 47

2 Then brought he me out of the way of the gate northward, and led me about the way without unto the utter *gate* by the way that looketh eastward; and, behold, there ran out waters on the right side.

3 And when the man that had the *line* in his hand went forth eastward, he measured a thousand cubits, and he brought me through the waters; the waters *were* to the ankles.

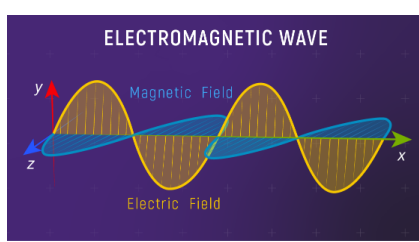
4 Again he measured a thousand, and brought me through the waters; the waters *were* to the knees. Again he measured a thousand, and brought me through; the waters *were* to the loins.

5 Afterward he measured a thousand; *and it was* a river that I could not pass over: for the waters were risen, waters to swim in, a river that could not be passed over.

6 ¶ And he said unto me, Son of man, hast thou seen *this*? Then he brought me, and caused me to return to the brink of the river.

7 Now when I had returned, behold, at the bank of the river *were* very many trees on the one side and on the other.

8 Then said he unto me, These waters issue out toward the east country, and go down into the desert, and go into the *sea*: *which being* brought forth into the sea, the *waters* shall be healed.



Notes



Science Camp Financial Planning

1. Rule of 72:
How many years to 2x your \$.
@8% \$72; $72/8\% = 9$ years to 2x your \$.
2. 10/20 Rule:
 - 10x your monthly income for emergencies.
 - 20x your annual salary to retire.
3. How much 5 do you need to make to beat taxes & inflation? 6.2%.
4. How much of a % does the bank give us: 1%.
5. How much without a financial advisor?
6. What is the compounding %? % on Top of %
7. Tax Bracket

Asset gains or growth fall into three income taxation categories:

Asset:

Puts money in your pocket.

Liability:

Takes money out of your pocket.



If I don't tell you anything more, where do you want most of your money?

¹ Taxable, tax deferred, and tax-free refer to the tax treatment of any gains or growth from these assets. Redistribution of assets may cause tax consequences. Neither New York Life Insurance Company, nor its agents, provides tax, legal, or accounting advice. Please consult your own professionals before making decisions related to your personal circumstances.

Certain interest, although exempt from federal income tax, may still be reportable to the IRS and, in certain circumstances, may be subject to the alternative minimum tax (AMT).

Where are your assets now?



Are you happy with those percentages?

Would you like to discuss how to allocate your assets going forward?²

Ordinary Income		Long-Term Capital Gains		Tax-Free	
Savings & CDs	\$	401(k)	\$	Roth Accounts	\$
Investment Accounts	\$	IRA	\$	529 Plans	\$
Real Estate	\$	Annuity	\$	Municipal Bonds	\$
Business Income	\$	Other deferred compensation plans	\$	Cash Value Life Insurance ²	\$
Other	\$	Other	\$	Other	\$

The primary purpose of cash value life insurance is to provide a death benefit. Cash value life insurance is not a retirement account, unlike a Roth IRA. Cash value life insurance is not an interest-bearing debt obligation, like a muni bond. Cash value life insurance does generally offer tax-free access to the cash value; however, accessing the cash value will reduce the policy's available cash surrender value and life insurance benefit. Also, certain tax advantages are no longer applicable to a life insurance policy if too much money is put into the policy during its first seven years, or during the seven-year period after a "material change" to the policy.

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New York Life Insurance Company

11 Madison Avenue
New York, NY 10010

www.newyorklife.com

AR05050A_052022 SMRU1731987 (Exp.12.01.2023)

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Monthly Retirement Income Worksheet

Input client information into the light blue boxes

A Basic Expenses	
Mortgage or rent payments \$	
Property and other taxes \$	
Utilities \$	
Food \$	
Clothing \$	
Auto loans \$	
Other loans \$	
Credit card payments \$	
Auto maintenance \$	
Home or property maintenance	
Life insurance \$	
Auto insurance	
Homeowners or renters insurance	
Long term care insurance	
Healthcare costs and insurance \$	
Other expenses \$	
A Total Basic Expenses \$	

C Discretionary Expenses	
Travel \$	
Hobbies and recreation \$	
Entertainment \$	
Dining out \$	
Gifts \$	
Charitable contributions \$	
Other expenses \$	
C Total Discretionary Expenses \$	

D Income for Discretionary Expenses	
Guaranteed income not needed for basic expenses \$	
Income from employment \$	
Other income \$	
D Total Income for Discretionary Expenses \$	

B After-Tax Guaranteed Lifetime Income	
Social Security benefits (you) \$	
Social Security benefits (spouse) \$	
Pension (you) \$	
Pension (spouse) \$	
Immediate annuities \$	
B Total Guaranteed Income \$	

Summary of Current Assets

E Investments	Asset	Income [#]
Taxable investment accounts \$		
Employer's retirement plan (401[k], 403[b]) \$		
Individual Retirement Accounts (IRAs) \$		
Deferred annuities \$		
U.S. government bonds \$		
Business interests you could liquidate for income \$		
Real estate or property you could liquidate for income \$		
Other investments		
Cash and Cash Equivalents*		
Checking accounts \$		
Savings accounts \$		
Money market funds \$		
Certificates of deposit \$		
Other cash accounts \$		
E Total Investable Assets \$		

Basic Income Gap:
Total Guaranteed Income - Total Basic Expenses
0



Discretionary Income Gap:
(Total Income for Discretionary Expenses + Investment Income*) - Total Discretionary Expenses
\$ -

Total Income Gap:
\$ -

NEW

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* Do not include any cash that will be used for specific needs or is set aside as short-term emergency funds.

The Cost of Waiting

An early start can be more important than the amount saved.

Saving early can have a significant impact on your future retirement savings. Consider a story of twins, both age 25 today who will each start a savings plan with identical returns. One we call "Early," and the other one "Late."

Early begins saving \$5,500 annually at age 25, but stops his savings plan after just 10 years. **The total contributions are \$55,000.**

Late waits until age 35 to begin saving, but contributes \$5,500 annually 30 years. **The total contributions are \$165,000.**

Because Late contributed \$110,000 more to his plan, you would expect him to accumulate more savings, with the same return — *but that is not the case.*

Actually, **Early ends up with \$208,431 more than Late at age 65**, while contributing \$110,000 less of his income.

Assuming each account grew by 8% every year, at age 65 Early will have \$935,000 and Late will have \$726,000. The 10-year head start makes it impossible for Late to catch up, even with all the additional contributions.

This example demonstrates that *time* is a powerful tool for compounding returns, but the only way to utilize this tool is by taking action without delay.

Saving early allows time for money to grow. Waiting to start funding retirement and other goals can carry a steep price. Remember that time is one of your most precious assets.

Starting today, with even a modest savings amount, will make a big difference to your future accumulations.

Note: These examples are hypothetical and do not represent actual results. Generally, investments fluctuate in value.

Age	Early	Late
25	\$5,500	
26	\$5,500	
27	\$5,500	
28	\$5,500	
29	\$5,500	
30	\$5,500	
31	\$5,500	
32	\$5,500	
33	\$5,500	
34	\$5,500	
35		\$5,500
36		\$5,500
37		\$5,500
38		\$5,500
39		\$5,500
40		\$5,500
41		\$5,500
42		\$5,500
43		\$5,500
44		\$5,500
45		\$5,500
46		\$5,500
47		\$5,500
48		\$5,500
49		\$5,500
50		\$5,500
51		\$5,500
52		\$5,500
53		\$5,500
54		\$5,500
55		\$5,500
56		\$5,500
57		\$5,500
58		\$5,500
59		\$5,500
60		\$5,500
61		\$5,500
62		\$5,500
63		\$5,500
64		\$5,500
65	\$935,165	\$726,734



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51 Madison Avenue

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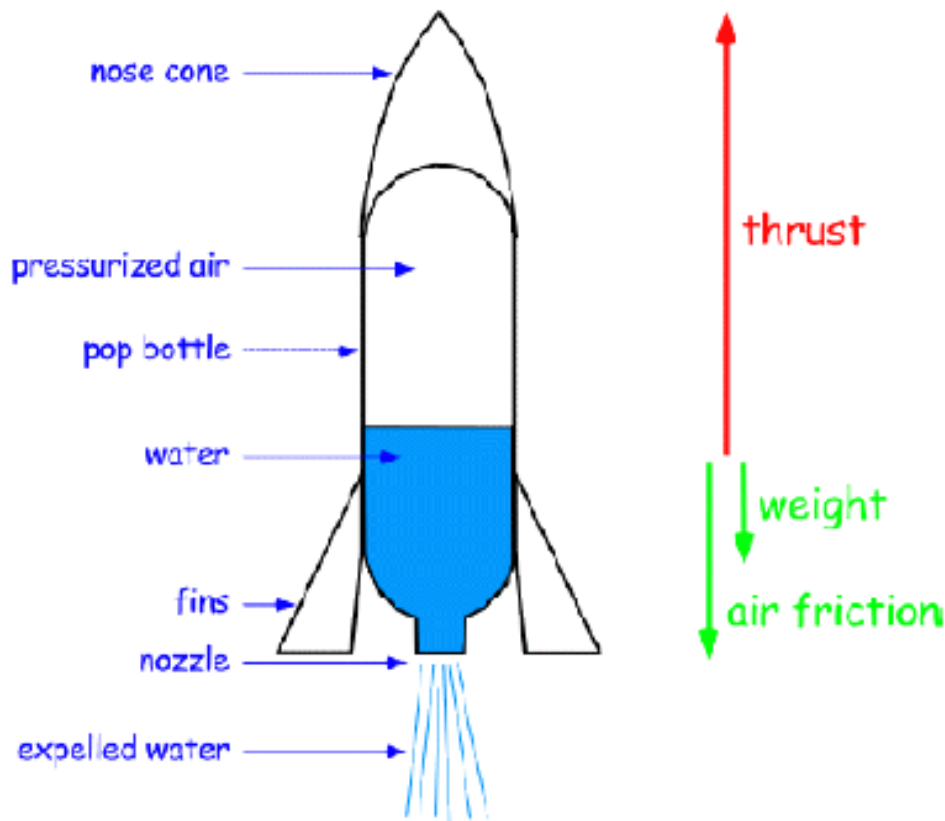
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Water Bottle Rockets

2-Liter Water Bottle Rockets Overview

Great detailed website: <http://www.et.byu.edu/~wheeler/benchtop/flight.php>



The equation for thrust, caused by water exiting the nozzle, is:

$$T = (P_{in} - P_{out}) \cdot A_n$$

where P_{in} - P_{out} is the difference between pressure within the rocket and atmospheric pressure, and A_n is the cross-sectional area of the nozzle opening. Thrust is dependent on pressure, nozzle diameter. The amount of water dictates how long the thrust force will be applied, and therefore contribute to the rocket's total kinetic energy.

Water Bottle Rockets continued

The following values are the optimal values for maximum height at 90 psi:

- Air/Water ratio = 0.5 liters
- Dry Weight = 220 grams
- Stabilizer Length = 3.5 inches
- Maximum Height = 350 ft (impact pressure = 120 mph baseball pitch)

Water Bottles with thicker plastic (cord strength) can be pressurized greater; many European bottles have much stronger cord strengths than U.S. plastic bottles.

The following mathematical expression yields ~apogee height for a given total flight time:

$$h_{ap} = (g/8)(t_{end})^2 - 3.5 \text{ meters}$$

Water rockets, requiring a largish capacity for air and water, are usually large in diameter, this causing a large amount of drag and limiting the height achieved. However, the impulse rating for even a 2 liter water rocket is normally E - four times the impulse of a pyro motor that can be bought over the counter in a high street toy shop.

Motor Impulse Classes	
Impulse /Ns	Class
$I \leq 0.625$	¼A
$0.625 < I \leq 1.25$	½A
$1.25 < I \leq 2.5$	A
$2.5 < I \leq 5$	B
$5 < I \leq 10$	C
$10 < I \leq 20$	D
$20 < I \leq 40$	E
$40 < I \leq 80$	F
$80 < I \leq 160$	G
$160 < I \leq 320$	H
$320 < I \leq 640$	I
$640 < I \leq 1280$	J
$1280 < I \leq 2560$	K
$2560 < I \leq 5120$	L
$5120 < I$	>L

Notes

2023 Science Camp

- **What was best about 2023 Science Camp?**
 - _____
 - _____
 - _____
 - _____
- **What would be your ideal 2024 Science Camp Theme?**
 - _____
 - _____
 - _____
 - _____
- **Remember, Grandpa & Grandma will hopefully be serving a mission for The Church of Jesus Christ of Latter-Day Saints in 2024.**