

Swim spa to the rescue

BY ALISON OSINSKI

Q My backyard is too small for a full-size swimming pool, but I really enjoy water walking and lap swimming. Is there anything I can install that would fit in the yard and still allow me to get a good water workout?

A You might want to consider installing a swim spa. Swim spas are elongated spas that have an additional recirculating pump, intake and powerful jet installed in one wall. The jet creates a current against which bathers can swim or run.

Like a treadmill, the swim jet allows the bather to swim or run in place, rather than travel up and down the pool. The current can be turned on and off, and adjusted to the swimming or running strength of the user. Unlike tethers or other restraining equipment designed to allow swimmers to work out in place, swim jets do not impede strokes. Development of smooth front, back and side strokes is possible, but swimming against a current does take some practice.

Swim spas can be purchased as prefabricated, self-contained units, or a swim jet can be added to a traditional swimming pool either during its construction or as an aftermarket item installed over the deck edge.

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Q Our county just passed a new pool and spa barrier regulation that requires homeowners to install multiple layers of protection, including fences, alarms and pool safety covers or other protective devices. It also requires that gates in pool fences be inspected. Can you tell us how to tell if a gate is installed and operating properly?

A Regular inspection of pool barriers and proper preventive maintenance are essential to effectively deterring access by unattended children or trespassers.

Any barrier system can be rendered useless if you prop a gate open, fail to maintain closures and latch mechanisms, ignore or disable alarms or forget to lock the gate.

Access gates in the pool-barrier fence should open outward from the pool, and should be at least as tall as the mandatory height of the fence.

The closer mechanism should be inspected monthly and adjusted to allow the gate to self-close and positively self-latch from any open position.

The latching mechanism should be mounted on the inside of the gate, located at least 4 feet off the ground and at least 6 inches below the top of the gate. Gates should be equipped with locking devices and should remain locked when the pool is not in use or supervised.

To prevent anyone without a key from getting in by accessing the latch from the exterior of the gate, a rigid webbing, shield or plate should be installed extending to either side of the latch and from below the latch to the top of the gate. The shield should not have openings greater than 1/4 inch in diameter.

Remember that multiple layers of protection are designed only to delay access to a pool during lapses in supervision. Barriers should never be thought of as a substitute for active supervision by a responsible adult. ■

Dr. Alison Osinski owns Aquatic Consulting Services in San Diego. For more information, call her at the Swimming Pool Hot Line, (900) 446-6075 ext. 820, between 8 a.m. and 6 p.m. Pacific time. (Callers are billed \$2.95 per minute. You must be 18 or older to call.)

ACROSS THE NATION

Continued from page 24

Gender-based participation was tracked in 56 sports for the survey — and women dominated in a dozen, especially those characterized as “fitness activities,” such as step aerobics, aerobic exercising, exercise walking and calisthenics. For the study, a swimmer was defined as someone who takes to the water six or more times annually. Results were based on a survey of 35,000 U.S. households.

► **Who's Who in Aquatics available:**

The U.S. Water Fitness Association of Boynton Beach, Fla., has released its 1997 *Who's Who in Aquatics*. The book names 100 individuals who have distinguished

themselves in “overall aquatics,” which includes instruction, recreation, competition, water fitness, service and leadership development. The honoree list includes Roger Galvin, NSPI CEO; Bill Kent, 1996 NSPI president and owner of Horner Equipment; Les Kowalsky, National Swimming Pool Foundation board chairman; Alison Osinski, owner of Aquatic Consulting Services; and Jules Field, *P/SN* publisher. For more information, call USWFA at (561) 732-9908.

► **A pool trend?** Under the headline “Aging pools becoming ponds,” an Associated Press article in the *Marin*

Independent Journal of Marin County, Calif., June 29 detailed how two Northern California women turned their family pools into backyard ponds. One spent \$10,000 to create a koi pond with rock coping, a natural-looking waterfall and nighttime lighting; the other brought in seven truckloads of gravel to make the pool 3 feet deep, then added floating flowers and a rock waterfall at a cost of nearly \$1,000. ■

Across the Nation is compiled by Linda G. Green, with the assistance of Rebecca Robledo, Anne Baye Ericksen, Kyle Wadsworth, Margi Frank, Diane Winocur and *P/SN* correspondents.

LETTERS TO THE EDITOR

Continued from page 20

Recirculating an idea

To my knowledge, there is one preventive measure regarding the hazards of limb entrapment, body entrapment, evisceration and hair entanglement in wading pools that has not been addressed in print, and that is the matter of correct wading pool recirculation system operation by those charged with this responsibility.

Due to the inherent characteristics of a typical wading pool (high pool perimeter and water surface area versus low water capacity), the available recirculation flow rate resulting from a two-hour or less turnover time is sufficient only to provide adequate flow rates for good surface skimmer(s) performance. So, to draw any flow from the drain(s) is inappropriate and would only reduce the surface cleaning efficiency of the skimmer(s).

Therefore, it is the responsibility of the wading pool operator to recognize when 100-percent skimmer suction and zero-percent drain suction is called for, thereby requiring the drain suction valve to be closed during normal wading pool operations.

Main drain suction would be appro-

priate when it is desired to sweep dirt and debris from the wading pool floor down to the drain(s) for withdrawal from the pool. But this operation would only be performed when the wading pool is closed to bather use and under the direct and uninterrupted supervision of responsible personnel.

Conclusion: When no wading pool main drain(s) suction is required for proper system operation and the suction is turned off, no risks are involved.

Let's include this along with the wading pool design remedies currently being considered to make wading pools safer.

R.D. McCoy
Swimming Pool Design Service
Alexandria, Va.

Editor's Note: Some state health codes require a pool's water to be pulled into the circulation system by both the skimmer and the main drain. You must first check your local health codes to see what is required in your area.

Shocking news

Editor's Note: Accompanying the following letter was an article head-

lined “Child exposed to strong dose of chlorine in critical condition,” which ran in the *San Antonio Express-News* May 27, 1997.

According to the article, a maintenance worker at a San Antonio hotel poured a “shock treatment” of 3 gallons of chlorine into the pool's skimmer while 75 children swam nearby.

Fifteen of them were taken to local hospitals complaining of coughing, burning eyes and vomiting; all but one were discharged soon after. The 11-year-old boy mentioned in the headline remained in critical condition with unspecified injuries two days later.

The attached article speaks for itself. How many times have I added a gallon or two of chlorine just before a swim party?

Perhaps we need to adopt a “One Hour Rule” for adding chemicals prior to pool usage.

Something to think about.

Leif Zars
Owner
Gary Pools Inc.
San Antonio

Send The Back Page contributions to P/SPN, Attn: The Back Page, 3923 W. 6th St., Ste. 407, Los Angeles, CA 90020 or e-mail your story ideas to psn@poolspanews.com.



As a member of a competitive swim team, my daughter spends several hours a day in the water, both in our home pool and in the community pool. Her bathing suits need to be replaced every few weeks, and at close to \$50 per suit, we're going to go broke. Can anything be done to extend the life of a bathing suit?

After each swimming session, your daughter should wash her suit in a cleaner made specifically for swimsuits. (Try "Aqua Mate" by Peli-Guard or "Swimwear Cleaner" by Everything But Water.) Then spin the suit dry in an extractor or suit dryer. If neither is available at the pool, don't put the wet suit in a plastic bag or roll it up in a towel. Rather, hang the suit up and let it air dry to prevent mildew.

Another key influence on the life expectancy of a suit is the suit itself. The weight and quality of threads, elastics and fabrics all have a direct impact on how well a suit will hold up to repeated use and exposure to water, chemicals and sunlight.

To help prevent rapid suit disintegration, people who spend a lot of time in treated pool water should purchase swimsuits made of Lycra 128, rather than recreational swimsuits made with Lycra 146.

Lycra 128 has long, strong, flexible fiber strands that resist breaking when exposed to chlorine. The material is also resistant to body oils that break fibers. (Lycra is DuPont's trademark for its Spandex fiber, a polyester-based elastomer that is blended with other fibers to allow the bathing suit material to stretch.)

Another good choice is a suit made of a nylon fiber called Antron. Such suits are shiny, durable, resist fading from repeated washings and exposure to sunlight — and they dry quickly.

Dr. Allison Osinski
owns Aquatic Services in San Diego
information, call
Swimming Pool
a.m. and 6 p.m.
446-6075, ext.
billed \$2.95 per minute
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Battling buildup — despite the drought

Q: We haven't been able to drain and refill our pool as often as we'd like because of drought restrictions. Is there any way to lower TDS levels or reduce the buildup of cyanuric acid in the water without emptying the pool?

A: You might want to ask your pool service technician about renting a portable nanofiltration system.

Nanofiltration can be used to lower total dissolved solids (TDS) and cyanuric-acid levels so that a decrease in oxidation reduction potential and loss of sanitizer effectiveness does not occur.

It is possible to reduce unacceptably high levels of TDS and cyanuric acid — as well as sodium, chlorides, calcium, magnesium, copper, iron, lead and other heavy metals, nitrates, sulfates, phosphates, algae spores and some viruses, fungi and parasites — all without emptying a pool and disposing of heated, chemically treated water. Dissolved organics also can be eliminated, thereby preventing trihalomethane formation.

Nanofiltration is a secondary filtration process used in conjunction with your regular sand, diatomaceous-earth or cartridge pool filters. Nanofiltration technology has been around awhile, but only recently has it been applied to treating pool water.

Nanofilters operate at higher pressure than ultrafine and microfiltration systems and can remove smaller particles

from the water. Indeed, nanofilters can remove particles down to 0.001 microns in size or any impurities with molecular weights over 200.

Both portable and fixed, permanently installed nanofiltration systems are available. The systems consist of pumps, prefilters, membrane filters, hoses, electrical cords, flow meters, flow-adjustment and check valves, and pressure sensors and gauges.

Pool water is forced under pressure through semipermeable cellulose acetate membranes. Impurities are concentrated into 10 percent of the water, which is sent to waste. The remaining 90 percent of the water is returned to the pool.

The membranes are reusable and, after filtering approximately 300,000 gallons of pool water, can be washed with a solution of water and detergent or water and muriatic acid. The nanofilter membranes have a life expectancy of about four to six years.



Illustration by Rick Leckly

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Here's something fun to do while you wait for your latest water-test results: a word-search game full of terms from the world of sanitation and oxidation. Words can be found in almost every direction — but always in a straight line!

D

Swimming Pool Word Search

Sanitation & Oxidation

C	B	A	B	R	O	M	A	M	I	N	E	H	E	O
M	C	C	R	K	L	X	H	I	J	G	O	Y	F	D
N	D	Y	E	I	O	D	I	N	E	C	R	P	O	Q
E	M	F	A	C	X	V	O	D	L	U	G	O	R	P
N	H	D	K	N	S	W	N	C	A	T	A	C	S	N
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O Our county just passed a new pool-barrier regulation that requires homeowners to install multiple layers of protection around swimming pools and spas. It also requires that gates in pool fences be inspected to make sure they are effective and operate properly. Can you provide a checklist to help us determine if our gate is installed and operating properly?

A Regular inspection of your pool barriers and proper preventive maintenance is essential to ensuring an effective deterrent to pool or spa access by unattended children or trespassers.

Remember, any barrier system can be rendered useless if you prop open a gate, fail to maintain closures and latch mechanisms, ignore or disable alarms — or just forget to lock the gate.

The following list will give you some idea of what to watch for when setting up and maintaining a gated fence around your pool:

- Access gates in the pool-barrier fence should open away from the pool.

- Access gates should be at least as high as the required height of the fence.

- There should be no openings in the gate wider than 4 inches in diameter. If the gate is chain link, the holes should be no greater than 1-3/4 inches in diameter. The bottom of the gate should also be within 2 inches of the ground. (These standards are designed to keep small children from easily slipping under the gate or squeezing through any opening in the gate or fence.)

- The gate's latching and closing mechanisms should be inspected monthly and adjusted to allow the gate to self-close and positively self-latch from any open position. Gates should never be propped open or otherwise disabled to prevent their closing and latching.

- Gates should be equipped with locking devices and should remain locked when the pool is not in use or supervised.

- The gate's latching mechanism should be mounted on the inside of the gate, located at least 4 feet off the ground and at least 6 inches below the top of the gate. To prevent access to the latch from the exterior of the gate, the latch should also be protected by a rigid webbing, shield or plate on both sides, below and above the latch. This shield should not have openings greater than 1/4-inch in diameter.

One final note: Remember that multiple layers of protection are designed only to *delay* access to a pool during lapses in supervision. Barriers should *never* be thought of as substitutes for active supervision by a responsible adult.

O We frequently entertain friends and relatives around our backyard pool. Is there anything we can do to lessen the likelihood that one of our guests might be injured during one of our parties?

A There are a number of measures you can take to help ensure your guests' safety.

- Let everyone know that you have — and will enforce — certain pool-safety rules. For instance, do not permit running around the pool deck, swimming alone or diving into shallow water.

- Make sure the water depth, pool

contours and edges of steps, ramps or tiers that protrude into the pool are all properly marked.

- Install handrails and make sure the deck and all shallow pool surfaces are covered with slip-resistant materials. Slip-and-fall incidents are the most frequent sources of claims against pool owners.

- Designate a specific person to supervise pool use. If you're planning a large party, you might also consider hiring lifeguards for the night.

- Do not serve alcoholic beverages around the pool. Pool accident and injury rates can be curtailed significantly by prohibiting intoxicated guests from using the pool. Alcohol plays a significant role in drownings, spinal injuries and other catastrophic aquatic accidents. Indeed, studies have shown that more than 50 percent of adult victims of water accidents were drinking prior to the incident.

When alcohol is absorbed into the bloodstream, it acts as a depressant to the central nervous system, slowing breathing and swallowing reflexes. Less oxygen is also delivered to the brain and muscles.

In other words, alcohol consumption leads to increased risk-taking and faulty judgment, poor coordination and balance, a decreased ability to process information and slowed reaction time — all of which can be life-threatening around the water, especially if an intoxicated guest tries to perform a highly skilled physical movement like diving into a pool.

Dr. Alison Osinski is the owner of Aquatic Consulting Services in San Diego. For more information, call her at the Swimming Pool Hotline between 8 a.m. and 6 p.m. Pacific time at (900) 446-6075, ext. 820. (Callers will be billed \$2.95 per minute. You must be 18 years of age to call.)

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Q Why can't I seem to control the pH level in my pool? Every time I test the pH, I have to add chemicals to move it back into the desired range.

A Your pH level is not static — and never will be because of the many things that are added to the water, such as chlorine, other chemicals, organic compounds from bathers, air pollution, rain, source water and even the pool's plaster.

Your pool's pH level is also interrelated with four other key components of water balance that themselves constantly change: total alkalinity, calcium hardness, water temperature and total dissolved solids.

But don't get discouraged! Keeping pool water within the recommended pH range is a critical task. Not only does it increase bather comfort, but it also helps to maximize the effectiveness of chlorine and to prevent damage to pool surfaces, plumbing and equipment.

So what exactly is pH? To chemists, pH is the concentration of hydrogen ions in the water. More specifically, it is the negative, base-10 logarithm of the hydrogen-ion concentration in the water. For example, a pH of 7.0 is 1.0×10^{-7} or 0.0000001.

But for practical purposes, you can think of pH as a measurement that indicates how acidic or basic the water is. Measured on a scale from 0 to 14, a pH of 7.0 is neutral. When pH dips below 7, the water is said to be *acidic*. When it's above 7, the water is considered *basic*.

Generally speaking, the recommended pH range for pools is 7.2 to 7.8. (The ideal range for each particular pool depends on the other four factors of water balance noted above.)

There are plenty of very good reasons to maintain your pH within the proper range: Low pH levels (acidic water) can cause chlorine to dissipate rapidly, equipment to corrode, and pool-surface materials to etch, pit or crack.

At high pH levels when the water is basic, chlorine becomes less effective because less hypochlorous acid is formed. (This can be seen in a drop in ORP.) What's more, algae may grow, the water could become cloudy, calcium

scale might begin to form on the pool's interior surface and in the plumbing, and the filter runs (the time you can go between backwashings) might shorten.

As noted above, pH levels change constantly, and this fluctuation is often aggravated by low levels of total alkalinity. When kept between 80 to 120 parts per million, however, total alkalinity will act as a pH *buffer*.

Maintaining the proper amount of total alkalinity can help you keep pH levels stable — despite the wide variety of factors that can cause it to fluctuate.

Among pool chemicals you may be adding to the pool, for example, muriatic acid, cyanuric acid, sodium bisulfate and trichlor tablets all cause pH to drop. Dichlor and carbon dioxide, for their part, cause little change. Other chemicals like sodium hypochlorite or sodium carbonate cause the pH to rise.

In other words, keep testing and adjusting that pH!

Q My neighbor uses a floating chemical dispenser to add chlorine to his pool. How does it work? Can it save me money or time spent messing with chemicals?

A Whether you save time or money by using a floater depends on what is in the floater.

In many cases, chemical dispensers or floaters are used in outdoor residential pools to slowly erode a form of chlorine known as *trichloro-s-triazinetriene*, more commonly known as *trichlor*.

Trichlor is a white substance that is produced as a solid tablet or stick and is manufactured by drying *cyanuric acid* in the presence of gas chlorine. The resulting product is 85- to 90-percent available chlorine by weight and has an extremely acidic pH of 2.9.

Among trichlor's advantages: It is easy to store and use, has a long shelf life and can be purchased in quantity if adequate, safe storage space is available.

Another advantage of the product is that it is an *isocyanurate* or *stabilized* chlorine product. What this means is that when you use trichlor, cyanuric acid is simultaneously added to the water along with the chlorine. Cyanuric acid, also known as *conditioner* or *stabilizer*, helps protect chlorine from dissipating when exposed to the sun's ultraviolet light.

In this way, moderate levels of cyanuric acid introduced with trichlor — 20 to 30 parts per million, say — can help lower chlorine costs. Any concentration of cyanuric acid in the water, however, will reduce chlorine's effectiveness.

So if you use trichlor, thereby increasing the pool's cyanuric acid level, you will need to maintain a higher level of chlorine to achieve the same level of sanitization and oxidation that you would get in an unstabilized pool. To offset this effect, you may need to dilute or drain and refill your pool on a more frequent basis than would be required if you used unstabilized forms of chlorine.

Because it is a very acidic product, trichlor can also damage metal pool components, pipes, pump impellers, filters and heaters if the water balance is not adjusted to correct for the downward pH trend it causes.

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Q When purchasing a solar heating system for my swimming pool, should I get glazed or unglazed solar collector panels? What are the advantages and disadvantages of the two types of systems?

A Your choice should depend on the geographic location of your pool and on whether or not you're planning to operate the pool and the solar heating system throughout the year.

Glazed panels use black, chrome-plated copper plates with a low-iron, tempered-glass covering. Systems using this type of panel are much more expensive than those with unglazed panels because they require the use of a booster pump as well as a transfer fluid and heat exchanger to transfer the heat from the sun to the pool water. Their advantage? They can operate in harsh climates all year long without any danger of freeze damage.

Unglazed panels utilize black thermoplastic rubber or polypropylene absorber plates and are inexpensive when compared to glazed panels. Systems with unglazed panels are recommended for warm or mild climates and for outdoor seasonal pools that are only operated during the summer months. These systems use the pool's circulation pump to move pool water directly through the collector panels and so do not require transfer fluid.

Both systems use two heat sensors connected to a solar controller: One sensor measures pool water temperature, while the other measures the temperature at the surface of the controller. If the temperature differential is beyond a set point, the controller sends a signal to a motorized valve that closes and sends pool water through the solar collectors to be heated.

A Whether your solar heating system is the sole means of heating your pool water or is used as an aid in reducing the cost of operating traditional fossil-fuel heaters, it can work well with the panels mounted on the roof of your house, garage or adjacent structure; on a deck rack; or even on the ground.

Panels should not be placed where nearby trees or buildings will create shadows and therefore shade the panels for part of the day.

Ideally, panels should be installed so that they face due south, however there is some flexibility here: If the panels are oriented within 15 degrees east or west of due south, the loss of performance will be insignificant.

For year-round operations, angle the panels toward latitude. In Southern California, for instance, panels should be set at an angle of 32 to 34 degrees north latitude. And depending on where you are in New England, you should set the solar panels to between 41 and 47 degrees north.

To take advantage of seasonal variations, pools operated only during the summer months should angle panels at latitude minus 10 to 15 degrees. For winter heating, place panels on a latitude plus 10 to 15 degree angle.

If you take care to find the proper placement and angle, you can greatly increase the efficiencies that come with the use of a solar heating system.

Q We're looking for any energy efficient, environmentally friendly way to heat our pool. We're not interested in cogeneration or solar systems and unfortunately geothermal heat is not an option, so we're considering heat pumps instead. How do they work?

A Heat pumps generate heat by taking energy from the surrounding air and using it to transfer heat to the pool water. They're really more similar to air conditioners than traditional fossil-fuel pool heaters.

Here, in brief, is how they work: A fan assembly draws ambient air through an evaporator, where it warms the refrigerant gas. (The refrigerant is usually Freon, a nonchlorine fluorocarbon or non-CFC). A device known as a compressor compresses and pressurizes the warmed Freon gas, causing its temperature to rise. The heat exchanger then transfers the heat to the pool water as it is circulated past the tubing that contains the heated gas.

As a result of this heat exchange with the cooler pool water, the Freon cools down. It is then recompressed and reheated, and the cycle repeats itself over and over.

A hint: When selecting a heat pump, remember that they are rated in tons like air conditioners. One ton equals approximately 15,000 Btus, or the amount of energy needed to keep 1 ton of ice frozen at 32 degrees Fahrenheit for 24 hours.

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Q Where should solar panels be located to obtain the best results?



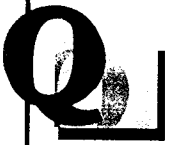
Why does my skin wrinkle after being in the pool for a long time?



Skin cells absorb pool water due to osmotic pressure and the lack of enough protective keratin.

Keratin, a protein manufactured in the epidermis (the outermost layer of your skin) normally blocks your skin from absorbing moisture, dirt and bacteria. It cannot, however, protect your skin from protracted exposure to water.

As your skin cells absorb water, they swell, enlarge and wrinkle. But not to worry: As the water evaporates when you leave the pool and dry off, your epidermal cells will unpudder and return to their normal size within a few minutes.



Why do some pool swimmers develop rashes, itchininess or other skin problems?



Skin problems that can come with swimming in pools are usually caused by moisture loss, halogen sensitivities, bacterial infections or harmful marine life.

• Swimmers with a moisture loss in their skin frequently complain of dry, red, itchy, chapped and blistered skin; in some cases, swimmers can even get eczema. Not surprisingly, dry skin seems to be a bigger problem for swimmers who spend extended amounts of time in the water on a daily or very regular basis. It also usually gets worse during the winter months.

In addition to limiting the amount of time you spend in the water, you can treat these problems by applying Dermasil, Curel or some other over-the-counter cream that replaces lipids; Bag Balm, Udder Cream or another lanolin-based veterinary antiseptic; or, finally, a cream that contains the drug doxepins.

• As for halogen sensitivities, bathers who develop a particular chemical sensi-

tivity should obviously avoid swimming in pools treated with that particular halogen.

According to the Centers for Disease Control & Prevention, and a study conducted by dermatologists in New York City, between 5 and 17 percent of people who swim frequently in pools treated with chlorine, bromine or potassium iodide halogen compounds develop contact dermatitis and halogen hypersensitivities, such as erythemic multiforme.

• Bacterial infections, such as those caused by the bacterium *Pseudomonas aeruginosa*, often cause red, bumpy, itchy rashes that resemble poison ivy or a case of the measles.

Treatment here includes staying out of the contaminated water, instituting immediate procedures to rid the pool of the bacteria and implementing a better sanitization/oxidation program for the pool water, and a better maintenance regime for the equipment and deck area. (Note: If you suspect you have a *Pseudomonas* problem, it may be time to call your local pool professional for a little advice and assistance.)

• You aren't likely to encounter marine life in your swimming pool, but marine-life larvae, often from jellyfish, can become trapped in your swimsuit fabric when you swim in the ocean. Showering while wearing your suit or immediately getting into a freshwater swimming pool may then provoke the larvae into discharging a venom that can cause a painful red itch, hives or blisters. Jellyfish venom can even cause your lymph glands to swell.

If you are stung by a jellyfish's nematocysts (or stinging cells), whatever you

do, *don't* rub your skin. You will only spread the nematocysts and increase the affected area.

Rather, apply antihistamines or corticosteroid creams to relieve what can be very painful symptoms. Applying papaya extract or papain — one of the main ingredients found in meat tenderizers — will also dilute and break down the high protein acid in the stinging cells, thereby reducing the amount of poisonous venom released.

To prevent all of this pain and trouble, simply remove and wash your swimsuit *after* leaving the ocean and *before* getting into a swimming pool.



What causes some swimmers to suddenly lose tooth enamel?



Swimming in extremely acidic pool water will cause erosion of dental enamel, especially in young children. Symptoms include pain when chewing or teeth that look gritty, rough, yellow or transparent.

Acidic source water, acid rain, bather wastes, acidic pool chemicals and hydrochloric acid formed in the chlorination process must all be neutralized with water-maintenance routines. It's important for your dental health that you balance your pool water, keeping it slightly alkaline with pH in the range of 7.2 - 7.8.

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Q Why do my eyes sometimes burn after being in a pool?

A Eye irritation is a major cause of bather discomfort — and a source of complaints about pools

which are often incorrectly attributed to there being too much chlorine in the water.

But chlorine is not the culprit. Rather, the most likely causes of eye irritation are high chloramine levels (above 0.2 parts per million), unbalanced water (a Langelier Saturation Index reading outside the +/- 0.3 range), excessive debris or turbid water that comes into contact with a swimmer's cornea, water friction against the cornea that causes a disruption of the eye's tear film, or pollution such as windblown debris, smog or pollen.

Yet another frequently overlooked source of eye irritation is the sun. Swimmers often get eye burn from sunlight reflecting off the water's surface. This problem can be exacerbated by swimming laps for long periods of time in lanes that run directly east and west. And prolonged ultraviolet light exposure can eventually cause inflammation of the cornea and possibly lead to development of cataracts.

To prevent eye irritation, make sure you only swim in properly maintained, sanitized, and balanced pools. You should also consider wearing polarized goggles to filter out destructive rays of the sun while swimming outdoors. Apply eye drops that contain antihistamines after leaving the pool, and if you plan on participating in other activities around the pool for any period of time, wear sunglasses and a hat.

Q Why do I see halos around lights after swimming?

A Worry not: More than 60 percent of swimmers typically see rainbows or halos

around lights within 15 minutes of entering a pool.

Because pool water is less salty than tears, osmotic pressure forces pool water into the eye. This causes the clear part of the front of the eye to swell with water. (Such an accumulation of fluids is called corneal edema.)

When this occurs, some cells are also lost off the surface of the cornea, which, in turn, causes blurred vision and photophobia. However, this light sensitivity usually disappears within 30 minutes of leaving the pool water.

To lessen the effects of corneal edema, simply wear goggles whenever you swim in pools or freshwater lakes.

Q Is it safe to wear contact lenses while in the pool?

A The answer to this question depends on what you mean by the word "safe."

Will you lose your lenses? The loss of soft lenses is fairly common in salt water, uncommon in chlorinated fresh water, and *extremely* unlikely in pools if you take the precaution of splashing water into your eyes before getting in the water.

Why? Because the osmotic pressure of the pool water forces the saltier water out of soft (or disposable) contact lenses, the lenses then tend to shrink and will fit the cornea more tightly. Indeed, the longer the lenses are exposed to chlori-

nated water, the stronger the adherence will become. In other words, your lenses are less likely to pop out the longer you stay in the pool.

Wearing hard contact lenses while swimming, however, is not recommended: The loss of hard lenses is common in both chlorinated and salt water.

Will you damage your lenses? Studies have consistently shown that pool water causes no damage to contact lenses.

Will your vision be affected? Generally speaking, you should not experience any change in vision from wearing contacts in a pool.

Some irritation associated with eye dryness may occur because people tend to blink their eyes less frequently while swimming. However, the problem is short-lived: Normal blinking patterns usually return within half an hour of leaving the pool.

Will you get an eye infection or injury? Contracting an eye infection is possible if your contact lenses absorb contaminated water. Corneal abrasions may also result from rubbing irritated eyes when debris is lodged under the lenses.

One final caution: corneal damage may occur if you try to remove your lenses too soon after leaving the pool. Because hypotonicity (the lower osmotic pressure described above) makes lenses adhere more firmly to the cornea, you should wait at least 30 minutes after leaving the pool to remove your contacts. Using saline-solution eye drops or artificial tears will also help you remove your lenses safely and easily.

Dr. Alison Osinski is the owner of Aquatic Consulting Services in San Diego. For more information, call her at the Swimming Pool Hotline between 8 a.m. and 6 p.m. Pacific time at (900) 446-6075, ext. 820. (Callers will be billed \$2.95 per minute. You must be 18 years of age to call.)

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Q I really hate scrubbing off the "bathtub ring" that forms on the tile line in my pool. Is there any way to prevent this scum line from forming?

A You may not be able to prevent those unsightly bathtub rings entirely, but you can do something to reduce their formation — not to mention the time and effort needed to remove them.

Scum rings form as organic debris, detergents, oils and bather's waste products collect on the water surface and come in contact with the pool walls. In addition to making the pool look unclean, these oily products reduce sanitizer and filter effectiveness, promote bacterial growth and cloud the water.

How can you prevent all these undesirable problems? Try regular use of enzymes or absorbent foam products.

Whether natural or synthetic, enzymes are protein-like substances that act as catalysts to start or speed up chemical reactions. In a pool, they will slowly digest and destroy oils in the water by converting them to carbon dioxide and water. The process is not unlike that used to clean up oil spills in the ocean.

Manufacturers recommend an initial dose of one to two ounces of enzyme per 1,000 gallons of pool water, followed up every week with a maintenance dose of about half that amount.

Your other preventive option is to use absorbent foam products that will physically remove oils from the water and thus prevent scum lines from forming.

Manufacturers of the products say the patented molecular structure and cell design of their foam products, which look a bit like sponges, allow them to absorb many times their own weight in oil. Once the product is saturated with oil, it turns a dark color and sinks to the bottom of the pool skimmer, hair and lint strainer or filter tank.

The product can be replaced or — for a period of time — cleaned and reused by removing and squeezing out the oils.

Q We seem to have an uncontrollable algae problem in our pool. It doesn't look good, but is algae really harmful to the pool or swimmers?

A Algae is a waterborne plant introduced into pools by swimmers, source water, rain, wind and windborne debris. Although it is not harmful to swimmers in and of itself, algae will cause problems in your pool when allowed to grow unchecked.

In order to manufacture food, algae gradually removes carbon dioxide from the water — which may cause a dramatic rise in pH. It may also cause an unusually high chlorine demand as the sanitizer is used up trying to kill or control algae growth.

Algae growth may also make the pool surfaces slippery and the pool water turbid, cloudy and discolored. In addition to any unpleasant odors it may cause, algae also can harbor pathogens or disease-causing bacteria.

For all these reasons, you should control algae growth.

How? What you need to do is maintain adequate chlorine and ORP (oxidation reduction potential) levels, superchlorinate regularly and scrub or brush pool walls to prevent algae from adhering. You must also keep the water circulating continuously, making sure there is a uniform circulation pattern with no

"dead spots" in the pool.

If water is not continuously circulated, sanitized and oxidized, you may need to use commercially prepared algaecides or algaestats to get the pool's algae growth under control. (Note: Some algaecides are more effective against particular types of algae, while others are designed especially for use in pools and not spas — or visa versa. For advice on selecting the appropriate algaecide for your pool, ask your local pool professional.)

If you continue to have serious algae problems despite all the above-mentioned efforts, you may want to monitor your pool's nitrate levels more closely. Nitrates stimulate plant growth and if your pool has nitrate levels above 25 parts per million, uncontrolled algae growth will often occur — even though the water is using up large amounts of chlorine.

Generally speaking, screened pools, pools located in agricultural areas and pools that border large bodies of water are most susceptible to nitrate problems.

If nitrates do appear to be a problem in your pool, you should try to determine the source of contamination. Nitrates are introduced into pools from fill water in areas where fertilizer has worked its way down into the ground water and contaminated reservoirs or wells; where fertilizers or grass blow into the pool from the adjoining landscaping; and by human or animal urine or fecal matter, rain and bird droppings.

To lower nitrate levels in your pool, try shocking the water with chlorine to a level over 30 ppm — or partially drain and refill the pool with water that is not contaminated with nitrates.

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INFORM

please...

BY DR. ALISON OSINSKI

Q

How can you tell if a pool has a leak and is losing water?

A

Pools lose water constantly — and it's usually *not* because they're leaking.

Evaporation, splash-out and maintenance procedures such as vacuuming and filter backwashing all contribute to water loss.

In fact, water loss from evaporation *alone* can account for between 4 and 12 feet of water loss per year — or up to 1/3 of an inch of water *per day*. It all depends on the general climate of the geographic region in which your pool is located, the relative humidity, wind velocity, the pool-water temperature in relation to the air temperature and whether or not your pool is aerated or covered.

As for splash-off, the water loss depends on the activities taking place in the pool and the design of the gutters and skimmers.

What's more, swimmers also "drag off" anywhere from 1/2 to 2 gallons of water with them when they leave the pool, depending on their size, amount of hair and type of bathing suit.

All this aside, some pools *do* develop leaks in their shells, pipes, or equipment — a problem you may suspect if your pool loses more water than can be explained by the above factors.

How will you know? There are clues you can watch for: Take note, for example, if you seem to be adding more water than normal, if your automatic fill device seems to be running constantly or if your water utility bill is unexpectedly high.

Algae growth, discolored water, an inability to maintain proper chemical levels or air bubbles in the pool may also betray a leaky pool.

You should be suspicious as well if your pool starts to settle, the tiles start popping off the pool walls, the pool equipment cracks or the deck raises above or settles

below the level of the pool.

Outside the vessel itself, other warning signals of a leak include grass that grows unevenly, wet spots that never seem to dry out in areas adjacent to the pool or voids and sink holes below the pool, deck or adjacent dwellings. (Remember, any leaking water would flow downhill from your pool and saturate the soil there.)

Whatever your tip-off, the simplest way to determine if your pool is leaking water is to perform a "bucket test."

First, fill a plastic bucket with pool water, carefully marking the water level in the bucket with masking tape. Next, mark the water level in the pool with another piece of tape and then place the bucket on a step or seating tier in the pool so the water in the bucket remains at the same temperature as the pool water.

Next, turn off any automatic water-fill devices and do not cover the pool with solar or insulating pool blankets. In addition, you should not perform any maintenance procedures on the pool that use water. Finally, do not allow anyone to get in or out of the pool.

Wait 24 hours, then carefully measure the difference in water loss from the bucket and from the pool. Because the only water loss noted should be due to evaporation, both the bucket and pool should have lost exactly the same amount of water, say 1/4 of

an inch or so.

If water loss from the pool is greater than the water loss from the bucket, your pool probably has a leak.

Having determined that the pool's actually losing water, it's time to call a professional to come out and look your pool over. The technician will be able to perform dye tests to locate suction leaks in the pool shell and a pressure test to assess the condition of your recirculation lines. He or she may also employ special leak-detecting equipment that uses sound to find leaks in the system.

Such tests are well worth the money: Leaks in a pool may not *seem* like a serious problem — until you realize how much damage losing 1 inch of water per day for a month can cause, let alone how much it can add to your water bill.

If a 20-by-40-foot pool loses 1 inch of water per day, for example, that means almost 15,000 gallons of water must be replaced per month to make up for this loss.

That's a *lot* of water.

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Q We have a problem with metal stains on the surface of our plaster pool. How do these metals get into the water in the first place? How can we prevent serious staining problems?

A Metals that cause pool stains, leave deposits on pool surfaces or result in water discoloration are often introduced as a component of the source water used to fill a pool. Indeed, depending upon where you live, dissolved mineral concentrations in your source water may be very high.

Beyond that, metals can be added to pools by ionizers or metal-based algicides and sanitizers; by aggressive water chemistry that eats away at metal pool components such as light rings and ladders; by adding too much acid to the water or by adding it improperly; or by running water through the plumbing at too high a velocity, thereby stripping metals away from pipes.

Correcting design errors and rigorous following chemical maintenance procedures will clearly be useful in preventing stains. But the most straightforward preventive approach involves the use of sequestering and chelating agents.

Sequestering agents keep metals from falling out of solution (or *precipitating*, to use the technical term). They also keep metals from discoloring or clouding the water, oxidizing and staining, attaching to and discoloring swimmers' hair, and from depositing and building up on pool surfaces.

Chelating agents bond and react with metal ions, thus keeping them from combining with other substances and precipitating. They also prevent crystal formation and may even aid in removing metals from the water.

Once metals have stained or built up on a pool's surfaces, it may be necessary to grind away the blemishes with a pumice stone or sandpaper. If the stains are more serious, it may be necessary to acid wash or, in some cases, resurface the pool.

Q We're building a new pool and have to decide what type of filter we want to

have installed. What's the best type of pool filter?

A This is a difficult question to answer because there isn't one filter that's always best in every situation and for every type of pool. What's more, there are a variety of filters that are used on both residential and commercial pools with great success.

In brief, they are: *cartridge filters*, *sand filters* (which can be rapid, high-rate or vacuum) and *diatomaceous earth filters* (which can be vacuum, pressure or regenerative). No matter the specific type or model, all filters are designed to do one thing: mechanically remove insoluble solid matter from the pool's water.

Each of these systems, however, does have its own advantages and disadvantages, so you may find the following questions helpful to consider:

□ Performance issues: What is the filtering capability of the various types of filter media? That is, what size particle is the filter able to remove from the water, and what degree of clarity is it possible to achieve?

□ Application issues: How much water will your pool hold, and what will its desired flow and turnover rates be? What are the filter's plumbing and hydraulic requirements? What is the filter surface area, and how much space will it require for installation?

□ Use issues: How much and what type of bather load is expected in the new pool? How much plant material or other debris will likely find its way into the pool? How easy is the filter to maintain?

□ Budget issues: What is the cost to purchase the filter in question? How about the cost of operation and media or component replacement?

□ Legal issues: Are there any water or filter-media disposal restrictions on the books locally?

By weighing all of these issues together, you and your builder will be able to choose the filter that will meet your needs — and those of your new pool.

Q I always end up swallowing water when I go swimming in my pool. Is it safe? Can I get sick from the water?

A Interestingly, the quality of water in many pools is actually *better* than that of public water supplies or bottled drinking waters — but that's not always the case.

The potability of your pool water depends on its bacteriological quality. And unfortunately, you can't tell if pool water is safe just by looking at it: Only by testing for the presence of disease-causing (or *pathogenic*) organisms can you determine for sure whether or not the water is safe to drink in any quantity.

Even without such testing, however, you can rest assured: If you're swimming in a properly designed, maintained and sanitized pool, the water should be safe to drink. In California, as a matter of fact, pools are officially designated for emergency use as reservoirs after earthquakes, wildfires or other natural disasters.

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Q When we drain our spa, will it hurt the plants to pour the water in our backyard? Or should we dump the water down the sewer in front of our house?

A Water drained from a spa is safe to use for watering lawns or plants — or, for that matter, any purpose appropriate to “gray water.” Recycling water in these ways is also environmentally sound — and may even be a necessity in areas where drought restrictions are in effect.

There are, however, some precautions you must take before dumping your spa: If the water has a high chlorine content, uncover the spa and allow the chlorine to dissipate naturally before using the water on your yard and landscaping. (If time is an issue, you can chemically remove the chlorine by adding sodium thiosulfate or sodium sulfite to the water.)

If you're thinking of draining your used spa water into the gutter out front, think twice: Draining spa (or pool) water down a storm sewer without a permit may be a violation of the federal Clean Water Act, the Water Quality Act of 1987 or local municipal regulations.

What's more, in some areas you can be fined for contributing to the pollution of natural waters or for illicitly discharging chlorinated or highly acidic water into a municipal storm sewer system.

Your best bet? Check local regulations with your city's sewer or pollution-control department *before* disposing of any water down the sewer.

Q Our 4-year-old son is afraid of the skimmers in our backyard pool. I don't want to scare him unnecessarily, but should I tell him to stay away from them?

A You should not allow your son to play with the pool's skimmers: They are not

toys, and he should have a healthy respect for them.

But you also need not worry unnecessarily about his getting too close to them: Modern pool skimmers must meet NSF Standard No. 50, which specifies several required safety features.

As for the fear, you can do a lot to help your son by taking the time to show him how skimmers work. Here is a little background information:

Skimmers are outlets that allow 50 percent or more of the water to leave the pool during any given turnover period and travel through the circulation system to be filtered, heated and chemically treated.

Skimmers also help keep the pool clean by trapping debris floating at or near the surface of the water: If you look at the skimmer from inside the pool, you'll notice a plastic weir that moves up and down in the skimmer throat as it is hit by the pool water. The weir is designed to act as a one-way valve to prevent debris caught in the skimmer from floating back into the pool.

Looking down into the skimmer through the deck cover or hatch, you'll find the skimmer basket, which is designed to trap and collect floating debris, rubbish, band-aids, hair, bugs, leaves and the like.

If you remove the skimmer basket, you'll likely see a float valve or “turtle.” This anti-vortex control plate creates a safety bypass and prevents air lock by diverting water flow through the main drain when the water level in your pool drops.

If you don't see a float valve, your pool should be equipped with flow-adjustment plates that cover the skimmer suction lines and allow water flow to be equalized between all the skimmers on the pool.

Without this device, suction would be greatest in skimmers nearest the recirculation pump and inadequate in skimmers at any distance from the pump.

In addition, approximately 12 to 18 inches below the skimmer on the wall of the pool you should see an opening that leads to an equalizer line.

An equalizer line keeps air from being sucked into the system and thereby causing the circulation pump to lose its prime. If the water level drops two or more inches below the weir, the water going into the skimmer line is diverted automatically from the weir to an equalizer-line outlet.

When this happens, the equalizer lines will operate with an extremely strong suction. This can present a possible danger: Equalizer lines are accessible from within the pool to curious children (and adults), and suction-entrapment accidents have been known to occur.

For this reason, equalizer lines should *always* be covered with secured grates.

To prepare for the unlikely event that a suction-entrapment accident involving the skimmer ever does occur, you should teach all of your family members how to immediately turn off the pool circulation pump to free the person who has become entrapped.

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We like to start swimming as soon as we can each spring. Is it ever too early to open our pool?

Will the kids get sick swimming in colder weather?



It's never too early or too late in the year to go swimming. Many pools in resort areas operate during all seasons of the year with no detrimental effect to the health of swimmers.

As a matter of fact, there's no real reason to winterize your pool at all if you plan to swim regularly throughout the winter season: You can continue to operate your pool on a year-round basis with only a few modifications to your pool and its equipment.

- First and foremost, to keep a pool open in cold weather, you must keep the water heated and circulating continuously — 24 hours per day.

- Your pool's chemical-treatment, circulation and filtration equipment should be installed in a sheltered, heated and well-ventilated room.

- The pool heater should be properly sized for *temperature maintenance* rather than intermittent heating, and should be installed as close to the pool as possible. (Note: When a pool is first being installed, the shell and circulation pipes can be insulated to reduce heat loss.)

When not in use, it is essential that the pool be covered immediately with a thick, thermal pool blanket to prevent unnecessary heat loss. A strong safety caution: Do not allow anyone to swim in the pool without first removing the insulating blankets.

Your house, fences, windscreens, trees and other landscaping materials can all be of help here: If situated just so, they can serve as windbreaks to help prevent loss of heat through convection to moving air.

Shortly before swimming, uncover the pool and let the steam layer rise over the pool and deck. In relation to the temperature of the ambient air, the steam layer and warm pool water will

keep swimmers remarkably comfortable in all but the most severe weather conditions.

The trick to cold-weather swimming, of course, is getting *out* of the pool and back *into* the house. So have some warm towels or blankets available to wrap up in and keep you cozy on your walk back to the house.

Once you try cold-weather swimming, you'll understand its attractions. As anyone who has ever swum laps in a mountainside pool in Lake Tahoe or soaked in a spa at a Colorado ski resort in January will tell you, nothing can beat the healthful, stress-relieving benefits of outdoor swimming and water exercise during the winter.



My husband and I have a running argument about whether the water in our spa is too slimy feeling: He says I put too much conditioner in it; I think there's something wrong with the water. Could it be both?



A slimy feeling in your spa water can be caused by a number of things, including some spa chemicals, algae, biofilm growth, molds, oils, body fats and the build-up of other organic waste products.

Although it is unlikely that the addi-

tion of conditioner (cyanuric acid) is itself the cause of the slimy feeling, levels of cyanuric acid higher than 20-30 parts per million can adversely interfere with the chlorine's ability to remove undesirable organic contaminants from the water.

(Note: It is recommended that you maintain a certain level of cyanuric acid in outdoor pools and spas to prevent chlorine from dissipating when exposed to ultraviolet light.)

There are a number of steps you can take to prevent slimy-feeling water:

- Carefully monitor the levels of all chemical products added to the spa.

- Superchlorinate on a weekly basis — or more often if *combined* chlorine levels exceed 0.2 ppm.

- Monitor (or have a service technician monitor) the oxidation reduction potential (ORP). The appropriate levels will vary depending on the size of your spa. (Note: ORP levels should exceed 650 millivolts in most residential pools and 750 millivolts in commercial pools and spas.)

- Consider using an enzyme product if you believe oils and body fats are causing the problem. Enzymes are catalysts that convert oils found in water into carbon dioxide and water.

- Keep close track on the total dissolved solid (TDS) levels, diluting the water regularly to control any buildup that might interfere with the chlorine's ability to sanitize and oxidize.

- Finally, drain and refill your spa whenever total dissolved solids exceed 1,500 ppm.

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Q I've heard a lot about how fun "inner-tube water polo" is. How do you play?

A This version of polo is indeed enjoying a growing popularity — and is easy to play with people of mixed swimming ability and athletic skill. To start a game in your own pool, you'll need the following:

- **Water polo balls:** You should buy at least six balls so that everyone can warm up and you don't spend too much time chasing after lost balls.

- **Standard automobile-size inner tubes:** In addition to the tubes, you'll need an air compressor or bicycle pump to keep the tubes properly inflated.

- **Orange safety cones:** You need enough cones to divide your pool by 2-meter, 4-meter and mid-pool lines, plus a goal-keeper area.

- **Numbered water-polo caps with ear protectors:** To save money, you can use bathing caps instead — colored differently for each team.

- **A two-flag referee stick:** This device can either be purchased or made by simply attaching one blue and one white flag to each end of a 3-foot section of a broom handle.

Before you get started, there are several safety rules to consider. First, jewelry, goggles or other sharp objects that might cause injury must be removed. Second, because this game involves close contact, long fingernails should be trimmed.

Participants also should be aware that they might suddenly be submerged if they tip out of their inner tubes. To accommodate less experienced swimmers, the game can be played in shallow water; nonswimmers can also be required to wear personal flotation devices.

Now, to the game: Each team has seven players, divided into right, center and left forwards; right, center and left backs; and a goal keeper.

Play is divided into two 12-minute halves, with a 3-minute half time. If necessary, the game can also include one 3-minute overtime period, but if the score is still tied at the end of that period, the game goes into sudden death to

determine the winning team.

Players must sit with both legs hanging over the edge of the tube. At the beginning of the game, the players line up at opposite ends of the pool facing the wall, with both hands on the wall. To start play, the referee drops the ball at the mid-pool line and players begin their mad rush.

The purpose of the game is to advance the ball down the pool toward the goal, all the while propelling yourself and your inner tube forward with your arms and legs. To keep things lively, the ball must be passed every 5 seconds and players can tackle the ball — *not* a player — in order to steal possession.

As players tire, they can substitute out at the 2-meter line by tagging a new player as they leave the pool.

In general, if the ball goes out of bounds, a member from the opposing team throws it back into play from the same point at which it left the pool. If a defensive player throws or tips the ball out of bounds over the goal line, however, a corner throw is awarded at the 2-meter line. And if the ball is thrown out of bounds over the goal line by an offensive player, the goalie gets to throw the ball back into play.

A goal is scored when the ball is thrown or pushed across the goal line between the goal posts. Note: Players are *not* permitted to shoot at the goal from inside the 2-meter line.

After a goal is scored, the goalie puts the ball back into play by passing the ball to a teammate. A restriction: The goalie cannot swim out of the goal-keeper area with the ball nor pass the ball beyond the mid-pool line.

And now for the big no-no's, which fall into three basic categories:

- An *infraction* is when a player holds the ball underwater, moves inside the goal-keeper area, touches the ball when out of his or her tube, stalls by holding the ball for more than 5 seconds, does not place both hands on the wall at the start of a period, or substitutes illegally. It is also an infraction if the goalie leaves the goal area with the ball.

- If a player commits an infraction, the opposing team is awarded an indirect free throw from a point nearest to where the infraction occurred.

- Referees call a *personal foul* when a player pushes, tackles, hits, holds, or otherwise impedes the movement of an opponent or his or her tube; dumps an opponent out of his or her tube; kicks the ball; strikes the ball with a closed fist; deliberately splashes water in the face of an opponent or blocks an opponent's vision.

If such a foul occurs outside the penalty area — the 4-meter line — an indirect free throw is awarded. If the foul occurs inside the penalty area, the opposing player is awarded a penalty throw directly at the goal from the 4-meter line with only the goalie defending the goal.

- Any one of these actions is a *major foul*: hitting, kicking, striking or seriously endangering another player; and unsportsmanlike conduct.

If a player commits a major foul, he or she is ejected from the remainder of the game and a penalty throw is awarded the opposing player. To keep the game going, a substitute may take the disqualified player's place.

All that said, go at it and have some fun!

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INFORMATION please...

BY DR. ALISON OSINSKI

Q Should DPD or OTO reagents be used to measure sanitizer residuals in pool water? Is one reagent really better than the other?

A When using color comparator test kits, DPD (diethyl-p-phenylenediamine) is recommended over OTO (orthotolidine) as an indicator reagent for determining the parts per million of chlorine or bromine in pool water.

OTO testing was dropped from the 19th edition of *Standard Methods for the Examination of Water and Wastewater*, a comprehensive, 1,500-page book published since 1905 by a joint committee of the American Public Health Association, American Water Works Association, and Water Pollution Control Federation and widely considered the bible on water testing. What's more, OTO's use in testing commercial pool waters is now prohibited by code in many states.

Why the move away from OTO? According to *Standard Methods*, it is no longer an approved testing method because of "poor accuracy, imprecision, high error, and toxicity resulting from OTO exposure through absorption, inhalation and ingestion."

More specifically, OTO cannot accurately distinguish between free and combined chlorine levels. Only total available chlorine results can be obtained unless the water sample is first cooled to 34 degrees Fahrenheit — an unlikely scenario around most swimming pools.

OTO results are also not reliable after a few seconds because their color intensity continues to change rather than stabilize, making accurate comparison to color charts difficult. Adding to OTO-test unreliability is the fact that dissolved metals — especially high levels of iron and manganese — interfere with the reagent and may cause false results.

Finally, OTO is a known carcinogen that can cause urinary tract tumors and should not be handled without taking appropriate precautions.

Q I went to a holiday party at the home of an acquaintance where a buffet dinner was served on the patio adjacent to their backyard pool. I couldn't believe my eyes, but they had decorated and lit a Christmas tree in the deep end of their swimming pool. How did they do that?

A Believe it or not, this festive practice is common in many warm areas of the country.

To decorate your pool with an underwater Christmas tree, you need an artificial tree with a plastic stand, chemically activated lightsticks, unbreakable waterproof ornaments and clothespins with spring closures.

To start, assemble the artificial tree on the pool deck, making sure the branches are firmly secured to the tree trunk. Then carefully lower the tree to the deep end of the pool, making sure it does not cover the main drains. To secure the tree, place weights on the base.

Next, attach several inches of monofilament line and a clothespin to each ornament and lightstick. Activate the lightsticks and then dive down to the tree and attach the lightsticks and ornaments to the branches.

The result: a beautiful, if unusual, holiday display.

Q Is it possible to turn my swimming pool into an ice rink during the winter? Will it

hurt the pool to let the water freeze?

A Allowing the water in a pool to freeze will not damage your pool — and can actually help protect the pool surface. What's more, if you have at least two months of the year where daily temperatures average below 32 degrees Fahrenheit, you can even convert your outdoor swimming pool into a private ice-skating rink.

A frozen backyard swimming pool is a convenient, safe, supervised location for recreational skating, hockey drills — or even racing remote-control toy cars.

To prepare the pool, first winterize the pipes and equipment as you normally would at the end of the season. Next, drop the water level 18 to 20 inches below the coping and install a vinyl pool blanket or liner over the pool so it floats on the water surface and lays up over the sides of the pool onto the deck.

Note: It is critical that the blanket remain in contact with the water and that it be sized to overlap the pool by 2-1/2 feet so that it can be properly anchored!

Once the blanket is in place, install weighted water bags, sand bags or specially designed panels (such as "Link-a-Rink" panels) around the pool to hold the blanket in place and protect the tile and coping.

After the blanket has been installed and secured, add 4 inches of water to the pool on top of the blanket and then let the water freeze. That done, be sure to check the ice daily to make sure it is a minimum of 4 inches deep before permitting any skating. Enjoy!

Dr. Alison Osinski is the owner of Aquatic Consulting Services in San Diego. For more information, call her at the Swimming Pool Hotline between 8 a.m. and 6 p.m. Pacific time at (900) 446-6075, ext. 820. (Callers will be billed \$2.95 per minute. You must be 18 years of age to call.)

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Q While vacationing at a resort hotel in Las Vegas recently, we noticed posted signs prohibiting the use of spas by children. When we asked the lifeguard why our children couldn't use the spa, she said it was potentially dangerous for young children to soak in warm-water spas and that the state health and safety code prohibited the practice. Is it really dangerous for children to use spas?

A There are many psychological, physiological and therapeutic benefits associated with soaking in warm-water spas. Some individuals, however, should be discouraged from using spa facilities.

Small children, for example, should use spas only for a limited time and only with the consent of their medical doctor. Unsupervised small children should *never* be permitted to use a spa.

Why the caution? Because children, who have a relatively small size compared to their skin surface area, may overheat very rapidly and suffer damaging effects from hyperthermia.

Enthusiastic, curious and normally active children are also more at risk of being injured while in a spa than are members of the more sedentary general adult population: In their playful enthusiasm, many children have been injured from falls, from pulling heavy objects or electrical appliances into the water and from suction-entrapment accidents while in spas.

Health codes in some states, including Nevada, prohibit young children from using public spas at any time. Other states, like California, restrict spa usage to children over 14 years of age — unless the young ones are accompanied by a responsible parent.

Certain adults must also take special care in a hot-water environment: Extreme drowsiness, elevated blood pressure, dehydration, hyperthermia, fetal brain damage, slips and falls, suction entrapment and drowning can all result from a failure to heed spa-use warnings and take the appropriate precautionary measures.

Q Can swimming in chlorinated pools damage or bleach my hair?

A Swimming in chlorinated pools can indeed damage hair — and that damage is cumulative. In other words, the longer or more frequently you swim, the more damage is done.

Chlorine is, in fact, a bleach and it will cause hair pigment to lighten. Color-treated hair may fade and darker hair may become less shiny. Permed hair, which is already porous and protein-damaged as a result of chemical treatment, will tend to absorb even more chlorine, becoming further damaged and overprocessed.

What's happening here is that chlorine is bonding with hair protein and eating away at its cuticle — the protective, scaly, outer protein layer that covers the inner cortex and central medulla of each visible hair shaft. The result: dry, brittle, straw-like hair.

Chlorine will also make the hair shaft weak, so that it is more easily damaged by brushing or combing. Split ends may result, and some long distance and competitive swimmers have even reported losing hair in patches.

Your best bet, if you are worried about your hair, is to coat it with a cream rinse and put on a rubber swimming cap before you get into the pool. Not only will this prevent your hair from absorbing chlorine but, as you exercise and your body temperature rises, it will also serve, in effect, as a hot-oil treatment.

Q Can chlorine in pool water cause my hair to turn green?

A Too much chlorine does *not* cause blond, gray or white hair to turn green. To blame, rather, is exposure to hard metals dissolved in the pool water — particularly copper, iron and manganese.

When absorbed by the hair shaft and oxidized by chlorine, metals commonly found in pools tend to leave behind a greenish residue on hair.

Metals are introduced into pool water through the source water used to fill the pool, as algaecides or sanitizers, from ionizers, as a result of electrolysis from water moving through recirculation pipes at excessive velocities, and from aggressive (acidic) water conditions.

You can help reduce the build-up of metals and remove some oxidized metals from your hair by using shampoos that are specially formulated for swimmers or that contain the chelating agent EDTA (ethylenediamine tetracetic acid).

Washing your hair in warm water containing dissolved aspirin will also do much the same for your hair.

As a preventative measure, you should also monitor the amount of dissolved metals in the water and add sequestering or chelating agents to the pool to neutralize or remove metals from the water *before* they have a chance to be absorbed by your hair.

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INFORM

please...

BY DR. ALISON OSINSKI

Q Is it safe to talk on the phone or watch TV while sitting in a spa?

A The danger of electrocution is *always* present in a spa, pool or any other wet environment, and it is *not* safe to use a regular telephone or place electrically powered appliances such as radios, CD players or televisions where they may accidentally fall or be pulled into the water.

According to U.S. Consumer Product Safety Commission statistics for 1992, for example, 34 people — all between the ages of 15 and 24 — were electrocuted in pools, while another 20 people died from electrical accidents while soaking in bathtubs.

In more than half of the fatal accidents where the victim was submersed in water, the source of the electrical current involved either light fixtures that were incorrectly installed or hair dryers, lamps, TVs, radios or fans that fell into the water.

A current passing through the body may burn tissue and disrupt electrical heart signals, causing ventricular fibrillation. Even just 5 milliamps of stray current with no resistance can produce a jolt that can knock a person down or cause a pacemaker to malfunction. And just 1/3 of an ampere can kill.

In other words, you should use *extreme* caution when using electrical appliances, equipment or tools in the vicinity of a swimming pool or spa.

Unless the equipment is approved for poolside use, in fact, you should keep all electrical devices away from the area. Approved equipment will have a third-party certification sticker (such as one from the Underwriters Laboratories) and will be double insulated or designed with other precautionary protective devices to prevent electrical shock.

To reduce the risk of electrocution, all electrical receptacles should be 10 or more feet from the pool and should be protected by ground fault circuit interrupters (GFCIs) that will interrupt the flow of electricity if the cord is acciden-

tally cut or frayed.

These precautions taken, there are a number of other “don’ts” you should heed when it comes to water safety:

- Don’t use the telephone while soaking in the pool or spa.

- Don’t use *indoor* electrical appliances *outdoors*.

- Don’t use regular household un-insulated extension cords on a pool deck. For safety’s sake, it’s best to use only battery-powered devices near a pool or spa.

- Don’t place an appliance or piece of electrical equipment where it could fall or be pulled into the water. If any electrical equipment does fall into a body of water, do *not* reach for it without first unplugging it from the power source.

- When you are wet, don’t touch an appliance with one hand while touching something metal (like a pool ladder) with the other hand. Always remember to dry off before touching any electrical equipment or appliances in the pool area.

- Survey the pool/spa area and take care that you don’t allow extension poles used for rescue or maintenance purposes to come in contact with overhead power lines or any electrical equipment in the vicinity.

- Don’t attempt to make electrical repairs on pool or spa equipment yourself — and don’t allow an unqualified service technician or friend to do any electrical work on your pool or spa. Call a qualified and *licensed* electrician to perform any such electrical repairs.

Bottom line: *Don’t* take chances with electricity and water.

Q Do “high” levels of chlorine in a pool cause swimsuits to fade or disintegrate?

A To be sure, chlorine *is* a bleach, and materials exposed to any amount of bleach will eventually fade. But levels of chlorine at even slightly higher-than-normal levels in a pool will *not* cause bathing suits to fade or disintegrate — not immediately, anyway.

Good-quality swimsuits — as compared to “lay around on the beach and get a tan” suits — are now made from chlorine-resistant materials that hold up better in chemically treated pools. No matter the material, however, rinsing a suit in fresh water and a swimsuit cleanser will help extend its life.

Interestingly, clothes are exposed to much higher levels of chlorine in washing machines than are suits worn in pools: Most pools maintain free chlorine levels between 1 and 10 parts per million (ppm), while the 10 gallons of water in a washing machine typically include 1/4 cup (2 ounces) of 5-percent chlorine bleach. This is the same as adding 1 ounce of 10-percent sodium hypochlorite.

The dosage required to introduce 1 ppm of 10 percent sodium hypochlorite to 10,000 gallons of pool water is 12 fluid ounces. Therefore, adding 1 ounce of sodium hypochlorite (or 2 ounces of Clorox) to your wash water raises the chlorine level to 83 ppm — far more fading power than you’ll probably ever encounter in a pool!

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INFORMED CHOICE

please...

BY DR. ALISON OSINSKI

Q We want to put a new pool in our backyard. Our pool contractor wants us to pay an additional fee to hire a geotechnical engineer to do a soil survey before deciding whether or not to build on our property. Is this extra expense really necessary?

A Having a soil survey done before building a pool on a particular piece of property is money well spent: Your contractor gave you good advice!

What can geotechnical engineers or soil specialists tell you? They do test borings to determine soil stability; they analyze soil samples for moisture content, composition, elasticity and plasticity (that is, the soil's ability to bear pressure); they identify ground conditions and load-bearing capacity; they determine if there is suitable drainage; they identify groundwater or water-table-level conditions; and they look for underground hazards or unexpected obstacles such as large buried rocks or subterranean cavities.

In other words, geotechnical engineers can determine if the proposed site is an appropriate location for pool construction. You wouldn't, for example, want to build over a spring or in a flood plain!

Inappropriate soil conditions or unstable ground often lead to settling, sinking, cracking or floating of the pool; heave from freezing or wet, expanding soil; hill-side erosion and landslides; and ground creep from seismic activity.

One of the measures the experts rely on for relevant information about soil conditions is soil-particle size, which is divided into four categories: *gravel* (particles that are larger than 1/4 inch), *sand* (particles less than 1/4 inch in size where individual grains are large enough to see with the naked eye), *silt* (fine-grain talc) and *clay* (particles less than 0.002 microns in size).

How can these soil types affect your pool? Yards with silts and sands can be susceptible to frost-heave problems, while some clay soils are highly expansive and will swell after heavy rains or from seasonal moisture variations.

The geotechnical engineer will let you know before construction whether you

need to modify or stabilize the soil by compacting or dewatering, whether installation of drain tile or the use of sump pumps will be necessary, whether there is a need to build retaining walls, and what changes to the topography (or earthwork) and rough grading will be needed prior to construction of the pool structure. The engineer may also recommend that the soil be pre-saturated prior to shooting the pool or pouring the deck.

Finally, soil specialists can even give you advice about what types of plants and landscaping around the pool will stabilize or decrease your soil's moisture content. Again, it's well worth the investment to get all this information up front — before the digging begins!

Q We've always just rinsed down our pool decks with water from a garden hose. Because of all the recent talk about disease transmission and resistant bacteria, I was wondering if there's something else we should be doing to clean the decks.

A Pool decks should be cleaned and disinfected regularly not only to prevent the spread of disease but also to inhibit the slipperiness that results from biofilm growth.

Depending on the type of deck-surface material — brushed concrete, textured modified cement or other cementitious coatings, ceramic tile, rubber granules, stone, brick or epoxy aggregate — cleaning procedures may vary slightly. Your

best bet is to always follow the manufacturers' recommendation for properly cleaning and maintaining the surface.

In most cases, however, dirt, grease and scum can be removed by scrubbing the decks with a stiff brush and any of a number of non-abrasive, commercially available cleaning solutions. Just remember to read the MSDS sheet or check with your supplier before you start work to make sure that the cleanser or detergent is compatible with pool water in case some of it gets in the pool.

Pool decks can also be cleaned using TSP (trisodium phosphate), which is available at most hardware stores. You can make up the cleaning solution by mixing together 1 cup of TSP for every gallon of water. In addition — or even *instead* of scrubbing — pool decks can be steam cleaned or pressure washed.

Whatever cleaning method you use, just remember the old saying, "you can't clean germs — you have to *kill* them." To kill bacteria and other harmful pathogens, pool decks should also be disinfected.

Commercial disinfectants are available, but the least expensive method of disinfecting a pool deck is to spray a mild solution of one part sodium hypochlorite (liquid chlorine) to 20 parts of water onto the deck.

For best results when applying the disinfectant solution to the deck, use an air-pressure sprayer and wand purchased specifically for this purpose at the local hardware or gardening store. Then rinse with fresh water immediately afterwards.

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INFORM please...

BY DR. ALISON OSINSKI

Q What should I look for when selecting plants for landscaping our backyard, which includes a new inground swimming pool?

A Trees, shrubs, perennials and vines that can withstand splashing are ideal for poolside landscaping, as are plants that are adaptable to containers and that have large oval or broad rounded leaves. Plants that double as windbreakers are a good choice, too.

Along those lines, most evergreen vines work well, as do trees such as palms, ficus and tree ferns; Korean grass and other zoysias; and shrubs such as camellias, junipers and succulent jade plants.

A large variety of perennials also thrive around pools. Among the options here are aloes and agave succulents; lilies, especially agapanthus (Lily of the Nile), torch lilies, ginger lilies and day lilies; ornamental vegetables such as artichokes; evergreen perennials such as African iris and yuccas; tuberous rootstocks such as canna, taro, elephant ears and amaryllis; birds of paradise; philodendrons and bog plants such as papyrus.

As you design your landscaping, stay away from plants that shed, create litter or have large fruit or fronds. Small debris that constantly falls into the pool will clog the recirculation system, while heavy debris may fall on and injure swimmers.

Also to be avoided at poolside: Plants that attract insects, particularly bees; plants that are prickly or have sharp thorns that might injure bathers; and trees that develop very deep or extensive root systems that might eventually break up and destroy the pool or deck.

For safety reasons, remember to keep plants away from the edges of the pool or from areas where they might obstruct the vision of the pool from the house. You should also be careful not to plant any trees or bushes where they could be used to scale a safety fence that surrounds the pool!

Q My son attended a pool party at a friend's house last week and came home excited about having played a game called "Greased Watermelon." I vaguely remember playing this pool game years ago when I was a child. Could you provide the rules?

A This perennial favorite has been around for decades. To play, you'll need a watermelon, a jar of petroleum jelly, four plastic safety cones — and, of course, a pool. Grease the watermelon with a light coating of petroleum jelly and then mark the goals by setting up two safety cones approximately 6 feet apart on the deck at each end of the pool.

Any number of players may participate, but the swimmers should be divided into two teams of the same size and similar swimming ability. Players must have intermediate- to advanced-level swimming skills if the game is played in deep water, but people with limited swimming ability can play if the game is moved to the shallow end of the pool.

The game consists of two five-minute play periods and a three-minute rest at halftime. (Teams switch sides at the half.) If the score is tied at the end of regulation play, a period of "sudden death" is played until one team scores the winning goal.

At the start of each half and after each goal is scored, the teams line up in the water along the end of the pool opposite their goals. Players must hold onto the

edge of the pool until the watermelon has been put into play.

To start the game, the referee drops the watermelon into the pool midway between the two teams. Players swim toward the watermelon and try to gain possession for their team. After gaining possession of the melon, players try to advance the fruit in the direction of their goal by pushing it through the water, tossing or handing it off to a teammate or swimming with it at the surface or underwater.

Opposing players try to strip the melon away from the player who has possession in order to gain possession for their team. A goal is scored when the melon is lifted out of the pool and placed on the deck between the goal cones. Goals count one point each.

Attacking, striking, hitting, pinching, dunking, grabbing, pushing, pulling, elbowing or intentionally hurting an opponent; holding an opponent under water; or obstructing the movements of a player who is not in possession of the melon is not permitted.

Players may rest at any time by holding onto the edge or standing on the bottom of the pool, but they may not touch the watermelon when doing so. Substitutes may enter the game at any time by tagging a teammate who has exited the water. The game should be stopped immediately if players get exhausted or if the competition gets too rough or out of control.

At game's end, the winning team gets to eat the watermelon.

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INFORM

please...

BY DR. ALISON OSINSKI

Q Isn't being exposed to chlorine harmful to my health? Why is it necessary to put all that chlorine in pool water anyway?

A Chlorine is added to pool water for two primary reasons: to sanitize and to oxidize.

Chlorine acts as a bactericide, sanitizing pool water by killing off harmful bacteria and viruses that might cause the spread of disease. Chlorine also oxidizes and removes algae, ammonia and organic waste products dissolved in the water — the material on which bacteria feed. It accomplishes this by using oxygen to "burn off" the unwanted organic products in the water.

Chlorine does all this in pool water at levels that are not harmful to human health. And although it is frequently blamed for turning swimmers' hair green or irritating their eyes, chlorine is not the culprit.

Here are the details:

The most effective sanitizing and oxidizing form of chlorine in pool water is what is known as *free available chlorine*. It is added to water in commercial, apartment and other public pools at levels often regulated by state health and safety codes. Although regulations vary somewhat from state to state, they typically require minimum levels of 1 part per million (ppm) or 1.5 ppm in pools stabilized with cyanuric acid.

In small, warm-water pools and spas, health officials look for minimum sanitizer levels in the 3 to 5 ppm range because the chlorine not only dissipates much more rapidly but it also must handle relatively higher levels of bather wastes in the form of hair, skin and sweat. Sanitizer residuals therefore must be maintained at elevated levels as necessary in order to be effective.

The same general standards apply to residential pools and spas, although no public health officer will come around regularly to enforce them the way they do with public vessels. That's not to say, of course, that you do not have an obligation to maintain the quality of the water — and ensure the health of bathers.

But please note: No matter whether it's a public or residential vessel, swimmers or soakers will not be harmed even when free-chlorine levels are maintained at 10 to 15 ppm.

Note as well that chlorine in the water is not what causes a swimmer's eyes to burn: This happens when there is not *enough* chlorine in the water to completely remove organic matter and waste products. In such cases, hypochlorite ions — formed when chlorine was added to the pool water — have combined with ammonia and other compounds introduced as waste products by swimmers to form *chloramines*.

It is these high chloramine levels that are the main cause of eye irritation, itchy skin and mucous-membrane irritation — although pH imbalance, sun reflection or high levels of particulate matter in the water can contribute to eye irritation as well.

To avoid such problems altogether, the basic idea is to make sure you are swimming in a well-maintained and chemically balanced pool — and to wear goggles while swimming.

Consider, too, that maintaining proper chlorine levels has less to do with the quantity of chlorine added to the water and more to do with having enough chlorine in the water to achieve the chemical reaction needed to remove harmful bacteria and waste products.

To determine whether chlorine levels are adequate, knowledgeable operators of public pools monitor the *oxidation reduction potential* or ORP of pool water. ORP is a standard method of measuring the chlorine's ability to oxidize and sanitize the water.

ORP takes into consideration all the water constituents — including chemicals, oil, grease, dissolved solids, cyanurates and organic-waste contaminants such as sweat, urine, cosmetics, hair products, soap and deodorants — and is a true measure of water cleanliness.

Chlorine in the water is not what causes a swimmer's eyes to burn: This happens when there is not enough chlorine in the water to completely remove organic matter and waste products

For residential purposes, a variety of test kits, testing instruments and inexpensive ORP monitors are available at pool and spa supply stores. Just follow their instructions to the letter and, if problems arise, or you're unsure of the results, back up your own testing by taking water samples to your retailer for a full analysis.

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Q We're thinking about buying a new home that has a swimming pool in the backyard. We'd love to have a pool, but we have two small children and are concerned about their safety. Do you have some home pool-safety tips for us?

A Many potential pool owners with young children or grandchildren have similar concerns about pool-safety issues. Homeowners can help thwart pediatric submersion accidents and most serious pool-related injuries by supervising children while they are in the pool, and by preventing young children from gaining access to the pool when they or other adults are not present.

You must also make sure to teach your children to swim and to enjoy but respect the water.

Beyond that, following these few common-sense safety tips can help alleviate your fears:

- Supervise children at all times when they're around the water. Never leave children unattended in or around the pool for even just a few minutes. Never!
- Designate a specific person to be the pool supervisor. Don't just assume someone is watching the kids.
- Do not leave children unattended to answer the door or the phone. Let the door bell or phone ring. If it's important, they'll come back or call back.
- Install and properly maintain a multiple-barrier system. Barriers include: fences, gates, pool safety covers, pool and deck alarms and resettable alarms that can be installed on sliding doors and windows that open to the pool area.
- Make sure that children cannot climb your fence and that there are no holes or spaces in the fence through which children could slip.
- Make sure gates open away from the pool and self-close and positively self-latch from any open position. Gates should be locked when the pool

is not in use.

- Teach your children good water-safety habits. Post and enforce your pool rules.

- Don't allow the pool to be used if water clarity is poor, electrical storms are in the area, main-drain grates are broken or missing, or the pool cover has not been completely removed from the surface of the pool.

- Keep toys, tricycles and other items attractive to children away from the pool when it's not in use.

- Don't rely on flotation devices or toys to keep a child afloat.

- Purchase rescue equipment and have it available for immediate use near the pool. Learn basic rescue skills.

- Keep a portable telephone by the pool to call for help in emergencies.

- Learn what to do in an emergency. Enroll in first aid and CPR courses.

Q While watching the wildfires on television as they roared through Southern California this past year, I noticed some homeowners were battling the flames with water from their pools. Is it possible to attach a commercial fire hose directly to my pool circulation system for use in fighting fires?

A Wildfires are common in much of the western United States during

the dry seasons of the year. The fires are sometimes caused by lightning strikes but are often set intentionally by arsonists or accidentally by individuals who carelessly discard cigarette butts or matches. The fires are fueled by dry vegetation and hot desert winds.

Homeowners should be comforted to know that several manufacturers have developed fire-fighting systems that allow fire hoses to be connected directly to swimming pool or spa recirculation equipment so that water stored in pools can be used to fight fires. Obviously, a pool owner is more likely to be successful at fighting a fire with a professional fire hose than with a garden hose.

Before the inferno gets close, homeowners can use the fire hose to soak the exterior of the homes with pool water. Water also can be siphoned out of a pool and onto a burning roof or vegetation surrounding a home as the fire roars up canyons and hillsides.

You can use an electric pump, the pool's own circulation pump or a separate gas-powered pump, the latter of which keeps going even if the electricity fails. The fire-fighting systems can be installed during the initial construction of the pool or can be added at a later time.

Most commercially available fire-fighting systems come with diverter valves, 100 feet of fire hose and an adjustable nozzle and are capable of delivering about 50- to 60 gallons of water per minute for fire fighting.

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Q Is there any way to dye the water in my pool green for a St. Patrick's Day party without harming the water or swimmers?

A Sodium fluorescein can be used to dye the water in your swimming pool a greenish color for St. Patrick's Day, and it won't hurt bathers to swim in the pool while the dye is present. While dyed, the pool water will even glow in the dark when exposed to black light.

This is the chemical used by the City of Chicago each year to dye its river green in honor of St. Patrick's Day. As a matter of fact, sodium fluorescein is also the substance your optometrist puts in your eyes during your annual eye exam. And if you ever undergo fluoroscopy — a medical procedure used to view various internal organs in motion — you will be asked to ingest a 25-percent solution of the fluorescent dye.

Pool operators commonly use this water-soluble dye to test water-circulation patterns, to look for circulation "dead spots" and leaks in pools, and to evaluate inlet operation. The water will change colors but will not cloud up.

If sodium fluorescein is not available at your local pool store, it can be purchased from a specialty chemical manufacturer. You'll need about 3 ounces per 100,000 gallons of water — or about 1-1/2 tablespoons of dye for the average-sized residential pool.

Before getting started, read the Material Safety Data Sheet (MSDS) for sodium fluorescein provided by the chemical distributor. Put on protective goggles and disposable latex gloves to prevent skin contact with the concentrated powdered dye — and do not inhale or swallow the dye! Clear the pool of swimmers and make sure the water is at the proper level.

Pour the dye into the skimmer basket or gutter drain located nearest the pool recirculation pump. After approximately one to three minutes, water dyed a bright fluorescent yellow-green color will enter the pool through the return inlets. The dye should reach all areas of the pool within 10 minutes. Depending on the turnover time, the water soluble dye should disappear completely within one to four hours.

If you spill any dye on the pool deck, just dilute it with water and rinse. If you get full strength powdered dye on yourself, scrub with soap and water. (It may take a day or so to remove all traces of color.) If you spill dye on your clothes, just wash them as you normally would in the washing machine with detergent and water.

You can further decorate your pool by cutting out shamrocks from green plastic soda or water bottles and floating the shamrocks on the surface of the water.

Q Was my mother right? Is it dangerous to swim after eating, and do you really have to wait at least 30 minutes after eating to avoid stomach cramps and possible drowning?

A This old wives' tale has been around for quite some time and has been perpetuated generation after generation by well-meaning but incorrectly informed parents.

There is not even one recorded case of anyone experiencing stomach cramps and drowning while swimming immediately after eating. As a matter of fact, long distance swimmers eat *during* their endurance events.

Consumption of low-fat, high-carbohydrate foods can be nutritionally beneficial to elite competitive swimmers. Not eating at all or eating particular foods immediately before swimming, however, will neither harm nor enhance the swimming ability of most typical recre-

ational swimmers.

Engaging in any intense exercise immediately after eating a heavy meal is not beneficial to proper digestion. You shouldn't try to run a marathon immediately after consuming a Thanksgiving feast — nor should you compete in a long-distance competitive swimming event.

Just as it wouldn't hurt to go for a short walk around the block after a moderate meal, it won't be dangerous to swim a few laps. Just use common sense to decide when it's appropriate to swim after eating.

Q Can you contract AIDS from swimming in pool or spa water?

A You can't catch AIDS (acquired immune deficiency syndrome) while swimming in a pool or soaking in a spa unless

you engage in sex or some other high-risk behavior — or come into direct contact with blood, vomit or other bodily fluids while in the pool or spa with an infected person.

The HIV virus does *not* transmit through water, even in the absence of normal levels of bactericide, such as chlorine or bromine.

For the most up-to-date information on AIDS or for information on other diseases that *can* be transmitted through water, contact the Centers for Disease Control & Prevention in Atlanta at (404) 639-2317.

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INFORMATION

please...

BY DR. ALISON OSINSKI

Q Why do you need to superchlorinate or shock a pool?

A Pool water needs to be shocked or superchlorinated in order to destroy impurities, dissolved waste products, algae and chloramines that can irritate swimmers, give off an unpleasant odor and cause an increased chlorine demand.

Superchlorination — or “breakpoint” chlorination, as it’s also known — occurs when a quantity of 8 to 10 parts per million (ppm) of chlorine is added to the pool in order to oxidize or chemically burn out the unwanted organic contaminants in the water.

Reaching the breakpoint is an all-or-nothing reaction: The concentration of chlorine in the water must be increased to the point where bacteria and other organic matter are completely destroyed. At that point, nitrogen and other wastes will “gas off.”

Superchlorination of pool water should be done periodically — at least once a week in most pools and daily in heavily used spas or therapy pools — or when the level of chloramines present in the water is greater than 0.2 ppm.

Products used for superchlorination include chlorine in any form and commercial-brand non-chlorine oxidizing agents. Stabilized chlorine products such as trichlor or dichlor should not be used for superchlorination.

Before superchlorinating, make sure the water is chemically balanced. Shocking a pool with unbalanced water — particularly with a high (basic) pH or high total alkalinity — will result in the formation of a white carbonate precipitate that will cloud the water!

Q How do you know how much chlorine to add to the pool in order to reach the breakpoint?

A There is an easy formula you can follow to calculate the breakpoint when super-

chlorinating your pool:

- Use a diethylphenylene diamine (DPD) test kit to find both the free and total available chlorine levels.

- Subtract the free available chlorine (FAC) from the total available chlorine (TAC) to find the combined available chlorine (CAC) level.

- Multiply the CAC by 10 to find the dose of chlorine you must introduce into the pool in order to reach the breakpoint.

- Finally, refer to the directions on the chlorine container label for exact amounts.

Although chlorine is not dangerous to humans in concentrations normally found in pool water, some health-department regulations may prohibit swimmers from using the pool when chlorine concentrations are elevated.

It is therefore best to superchlorinate in the evening or during hours when the pool is not in operation to allow the chlorine to drop back to “acceptable” levels.

Note: If the chemical reaction takes place and breakpoint is reached, the large amount of chlorine added to the water will be used up in the process. Free chlorine will return to normal operating levels, and the combined chlorines will be eliminated.

Q Can you shock a pool with a product other than chlorine?

A Potassium peroxymonosulfate can be used instead of chlorine to superchlorinate, shock or oxidize chloramines and other organic contaminants from the water.

This product is a buffered chemical compound that uses oxygen to prevent or destroy the eye-irritating and odor-causing qualities of pool water.

Unlike chlorine — which must be added in sufficient quantity to reach a “breakpoint” in the pool — any amount of potassium peroxymonosulfate added to the water will oxidize some material. Normally, though, 1 pound per 10,000 gallons of water is added on a weekly basis to pools and a daily basis to spas.

Non-chlorine oxidizers will not raise chlorine levels, are totally soluble, do not cause bleaching and don’t affect water balance or pH. Peroxymonosulfates are especially recommended for pools or spas with high bather load to water volume ratios where total dissolved solids and ammonia normally build up at a rapid pace.

The pool owner should be cautioned, however, that regular use of potassium peroxymonosulfate will add sulfates to the pool water, which may cause bathers irritation and itching. Potassium peroxymonosulfate is also known to affect DPD reagents and may cause a falsely high free-available-chlorine reading.

Dr. Alison Osinski is the owner of Aquatic Consulting Services in San Diego.

For more information, call Dr. Osinski at the Swimming Pool Hotline between 8 a.m. and 6 p.m. PST at (900) 446-6075, ext. 820. (Callers will be billed \$2.95 per minute. You must be 18 years of age to call.)

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Q What causes spa water to foam?

A Foaming in warm pools and spas can be caused by lots of things: soft

water, tile cleaners, quaternary ammonia algicides, high levels of total dissolved solids (TDS), air pollution, body lotions and suntan oils, body fats secreted by sweat glands and/or oils from a bather's skin.

Foaming water is usually an indicator that the water in the pool or spa needs to be changed or diluted. Spa water generally should be drained and replaced when total dissolved solids readings exceed 1,500 parts per million (ppm). To control TDS build-up that might also be interfering with the chlorine's ability to sanitize and oxidize, dilute the water regularly with fresh water.

Defoamers — that is, wetting agents that prevent foaming or that neutralize and dissipate suds — should not be used on a continual basis: They only change the water's surface tension and hide, rather than correct, the problem.

If use schedules or local regulations enacted as a result of drought prohibit the draining and refilling of a pool, owners of commercial pools might consider employing a nanofiltration system to purge the water of dissolved solids.

Q Does too much chlorine in the water cause that disagreeable "chlorine smell" in indoor pools?

A Chlorine in the water does not cause the unpleasant "chlorine odor" in pools. The offensive odor is caused by poor ventilation in the pool area and by chloramine levels in excess of .02 ppm.

When chlorine is added to water, both hypochlorous acid and a hypochlorite

ion form. Hypochlorous acid is an effective sanitizer and oxidizer. It actively kills bacteria and breaks down organic matter into inactive compounds.

When there is not enough chlorine in the water to completely degrade the organic matter, ammonia and other nitrogen compounds introduced as waste products by swimmers combine with hypochlorite ions to form chloramines.

Much the same process occurs with rotting garbage: When the garbage or waste matter has completely biodegraded, there is no more odor. Similarly, when there is enough chlorine or some other non-chlorine oxidizer present in the water, wastes are completely destroyed, leaving only free chlorine and a pleasant smelling and non-irritating pool.

Q Why do my hair and skin smell like chlorine after swimming?

A You perspire in order to dissipate heat generated when you swim or exercise in a pool. You may lose as much as one half to three pints of sweat per hour, depending on the water temperature and how hard you've been working.

The chlorine smell on your skin and hair is the result of the chlorine in the water combining with and trying to oxidize the ammonia in your sweat.

Q What can I do to protect my hair from damage caused by swimming in chlorinated pools?

A Rinse your hair with fresh water immediately after swimming

and don't allow chlorine to dry on your hair. Wash your hair when you're finished swimming with a shampoo designed to repair damage caused by swimming in chlorinated pools — or look for a shampoo that is pH balanced, contains sodium thiosulfate (to dissolve chlorine) and will replace protein eroded by chlorine exposure.

Also, don't brush your hair when it's wet: Let it dry naturally, then use only a wide-tooth comb to lessen the chance of breakage. Try to limit the use of blow dryers, electric curlers and curling irons — they further dry out already dry hair!

Damaged hair can be partially repaired by conditioning while you swim. Before beginning a workout, apply a protective conditioner to your hair and cover it with a latex or silicone bathing cap. The heat generated during water exercise or swimming will then provide a heat conditioning treatment. Wearing a conditioner while swimming will also prevent chlorine from being absorbed into and damaging your hair in the first place.

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