

Kitchen Design Basics

by Jerry Germer

A successful design fits
standard kitchen functions
to unique client needs

Kitchens have changed dramatically since Grandma ran the place single-handedly, whomping bread dough and transforming apples into applesauce. Today, with smaller families and more women in the work force, kitchens must suit a variety of family types and lifestyles. The conventional nuclear family makes up only about one half of American households. Single people, childless couples, one-parent families, and elderly people make up the rest. All make different demands on the kitchen and require different conveniences.

A working couple without children, for example, may want a place to quickly microwave take-out food during the week, but an elaborate workspace where two cooks can prepare gourmet meals on weekends. You won't come up with a responsive design for such a kitchen unless you thoroughly understand the user's needs and lifestyle.

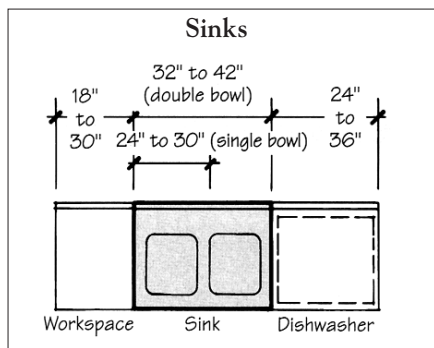
Of course, the kitchen's basic functions still revolve around the management of food and utensils. Food comes in and is stored, processed, and served; waste goes out. A good design is one that makes the management of these functions a smooth, efficient process. Knowing the basic elements of the kitchen and how they relate will help you plan any kitchen, simple or elaborate.

Essential Ingredients

Despite the proliferation of appliances, the most important elements of most kitchens remain the sink, the cooking surface, and the refrigerator.

The sink. Because of its use in both food preparation and cleanup, the sink is the most important item in the kitchen, and a good place to start the planning process. The workhorse of the past is the 32-inch-wide two-bowl sink. Still popular, it is but one of many choices today. An additional single-bowl sink helps if more than one cook is involved or if the kitchen is large. A three-bowl sink provides one basin that can be dedicated to washing raw foods.

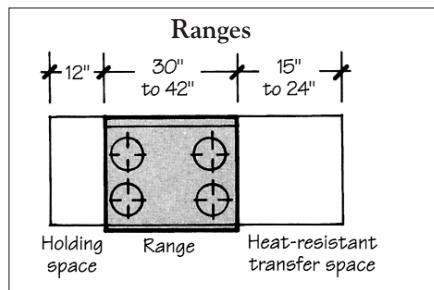
Sinks have expanded beyond the rectangle to



include ovals, circles, and other shapes. American Standard's double-circle *Connoisseur* and Kohler's *Porto fino*, for example, straddle corners elegantly.

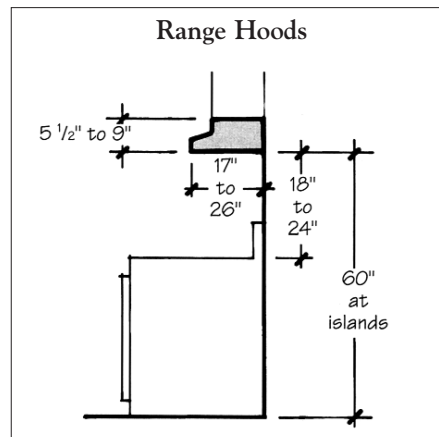
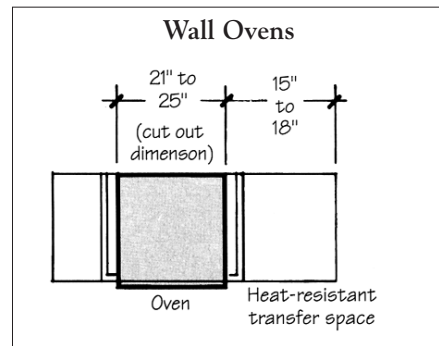
One useful option is an integral drainboard, which can be a real plus for people who use the sink for messy chores such as repotting plants.

Regardless of sink choice, remember that the sink is a center of activity and requires generous adjacent counter space. Allow at least 18 inches on one or, preferably, both sides. Increase the adjacent clearance space to 24 inches if a dishwasher is to be installed below. Overhead clearance space can be shared with the clearance required for an adjacent item, such as a cooktop, unless the adjacent space will be permanently occupied, such as by a dish-draining rack.



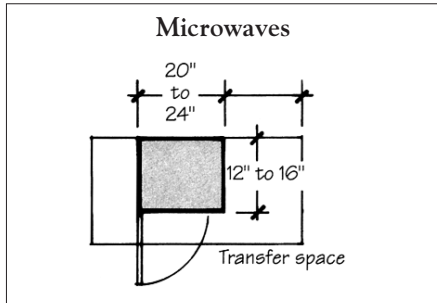
Ranges, ovens, and microwaves. After the sink, the cooking surface is the next most important item. The all-purpose range with a built-in oven has long filled this role. Now, however, with baking rarer and microwave ovens handling most other oven chores, the oven portion of a range gets less use.

If your clients opt for a range/oven anyway, they can choose between a standard free-standing range, a slide-in unit (sides unfinished), or a drop-



in unit (installed into a notch cut out of the counter).

If they don't need an oven, consider a cooktop installed in the counter with a separate microwave. If, on the other hand, your client specifically wants one or more ovens, a separate wall-mounted oven assembly will usually be more useful than a range, because neither oven nor cooktop block access to each other. Locate the oven assembly in a corner or at the end of a counter to avoid interrupting counter space. A



heat-resistant working surface, such as tile, should be installed next to the cooking surface and oven to place items before and after cooking.

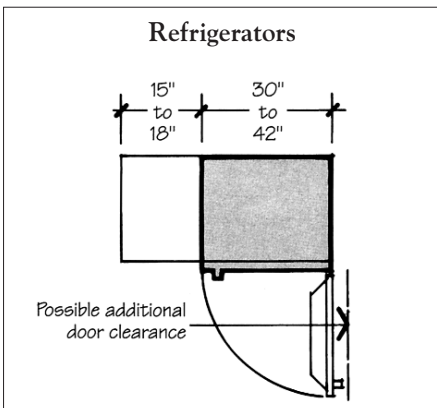
All cooking surfaces need devices to remove cooking moisture and gases. Ducted range hoods mounted above the cooking surface remain the most common and effective solution. Allow for a 4-inch-diameter duct from the fan through an outside wall.

An accessory until recently, microwave ovens are increasingly seen as necessities. Although they can adequately roast a whole chicken, they shine at rewarming leftovers or take-out foods — an asset in modern lifestyles.

Originally, microwaves lived on top of the counter. That's not necessarily the best place, because you lose the workspace in front of the unit, which must be kept clear for the door to open. If you are designing the kitchen from scratch, consider installing the microwave near the cooking surface or hanging it from a wall cabinet. Better still are the combination microwaves with built-in exhaust fans beneath; these mount above the cooking surface.

Refrigerators. The refrigerator must be convenient to the sink area, but not so close as to hog needed counter space. Like wall ovens, refrigerators interrupt counter space, making a corner or end-of-counter location a sound choice, except in kitchens where two cooks need constant access.

Refrigerator-freezers come in capacities up to 27 cubic feet. Models with the freezer above or below vary from 28 inches to 36 inches wide (30 inches and 32 inches are most common) and 65 inches to 68 inches high. Side-by-side units are



32 inches to 36 inches wide, 67 inches to 84 inches high. Remember that built-in ice makers and cold water dispensers require plumbing.

Countertop space for loading and unloading should be provided next to the opening side. The doors of most models open to a full 90 degrees inside the width of the unit, but some models require an additional 5 inches clearance on the hinge side. If that's the case, make sure to allow this extra space if you intend to install the unit in a corner or next to a wall.

Dishwashers. Like microwaves, dishwashers are becoming standard equipment. Front-loading units installed under the counter to the right of the sink (for right-handed people) are the most common, followed by top-loading units that slide in and out from under an open counter space. When you lay out the kitchen, sketch the unit showing the door in the open position to avoid awkward conflicts.

Garbage disposals. If your clients' home is served by a septic system, you should advise them that a disposal will mean pumping the tank 30% more often. Another caveat: Drain lines higher than 17 inches from the floor make disposals work harder to pump waste uphill and may eventually cause malfunction. Standard models are rated from 1/2 to 3/4 horsepower and require 120v power.

Noise plagues all disposals, but the better ones are quieter. The thin walls of stainless steel sinks particularly amplify disposal noise. An optional coating on the underside of some sinks (such as Kohler's *Hushcoat*) can deaden some of the sound.

Trash compactors. By reducing the bulk of non-food kitchen waste — packaging and glass — compactors prove useful in locations where trash disposal is costly or difficult. Standard 12-inch to 18-inch-wide units 34 1/2 inches high can slide under a counter. Pulled out, the top surface serves as a chopping block.

Residential units come with 1/2- to 3/4-hp motors that require 120v power. The pricier compactors have odor and sound control devices. Although the compactor's location will probably be decided by where under-counter space is available, the best place is probably between the sink and refrigerator or close to any recycling bins. As with dishwashers, sketch in the position of the open door to ensure access and minimize traffic conflicts.

Small appliances. Small appliances such as toasters, mixers, blenders, and processors should

ideally be stored near the work area where they are most often used. Processors and blenders, for example, logically fit next to the sink, where vegetables are washed. Mixers are best put where baking will occur.

But because mobile appliances are mobile, their position is likely to change. Locate abundant power outlets around the work counter to allow for flexibility. The electrical code requires a minimum of one receptacle for each separate counter area. Your client will be happier if you provide at least double that.

Kitchen Clearances

Designing a successful kitchen is a challenge. You not only have to organize a slew of parts into a workable whole, but you must also make the space a pleasure to be in. One key to success is making sure your layout handles traffic well. Avoid plans where people have to pass through the main kitchen work area to get from one part of the house to another.

For a two-cook operation, create separate work areas by locating shared appliances (range, refrigerator, and sink) convenient to both cooks. A second, smaller sink can help eliminate conflict. Studies show that two cooks working together tend to prepare individual dishes, rather than do stages of the same item. That is, it's "I'll make the salad, you do the lasagna," rather than "I'll chop the vegetables, you cook."

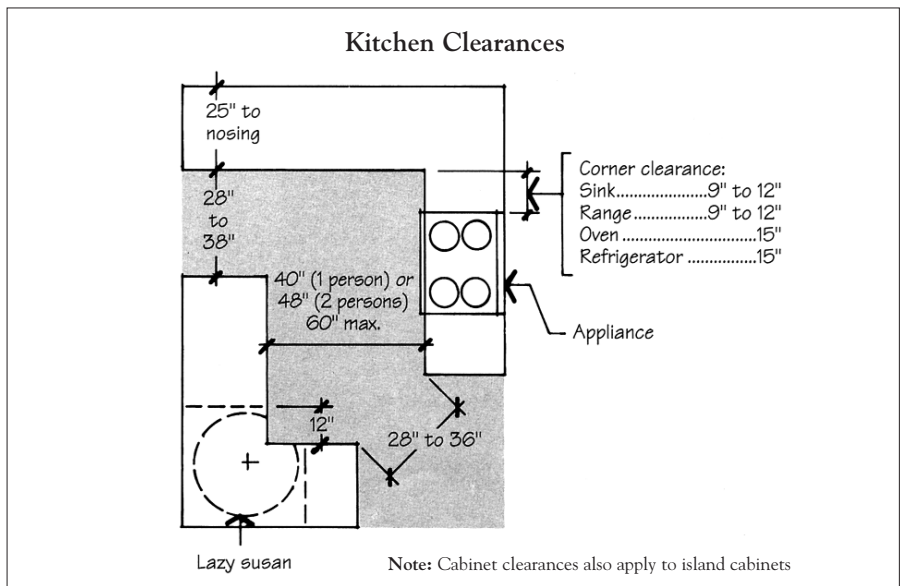
To maintain enough clearance between cabinets for people to work and pass each other, draw all doors and drawers in the open position. The HUD Minimum Property Standards (1980) stipulates a minimum clearance between cabinets of 40 inches for one person and 48 inches for two. A more generous allowance is 60 inches. Anything over 60 inches just means extra walking between one counter and the next and reduces efficiency.

Basic Layouts

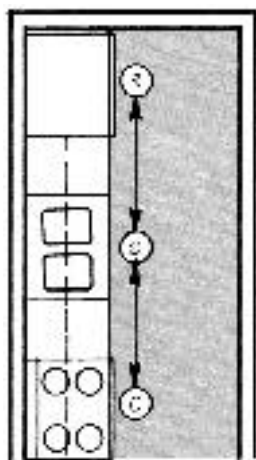
"Go with the flow" is a useful concept to remember when laying out a kitchen. The usual flow sequence goes something like this:

Raw materials → Storage (cabinets, refrigerator) → Preparation (sink, countertops) → Cook (range, oven, microwave) → Serve (table, breakfast bar) → Cleanup (sink, dishwasher) → Store (cabinets, refrigerator) or Dispose (wastebasket, garbage disposal).

In a well-organized layout, food flows through



One-Wall In-Line



C — Cooking surface
S — Sink
R — Refrigerator

this sequence with ease; the paths between the successive stages are short and direct. If two people work together, they shouldn't have to trip over each other.

In the 1950s, researchers at the University of Illinois Small Homes Council identified three critical points in the kitchen — the sink, refrigerator, and cooking surface — and contrived a set of rules to make the “work triangle” efficient. Most of those rules still stand:

- No leg of the triangle should exceed 9 feet
- The total distance between all three points should fall between 12 and 26 feet
- Traffic patterns and cabinets should not obstruct any leg of the triangle

Though the work triangle concept predated the days of two-cook kitchens and the proliferation of specialized appliances, it can still help you organize the space efficiently.

One-wall in-line arrangements are the most cost- and space-efficient. Better suited to apartments than homes, they are definitely one-person kitchens. If enclosed by a back wall, as shown above left, don't waste the wall. Fitted with a peg-board, it can store numerous utensils to compensate for the lack of cabinet storage.

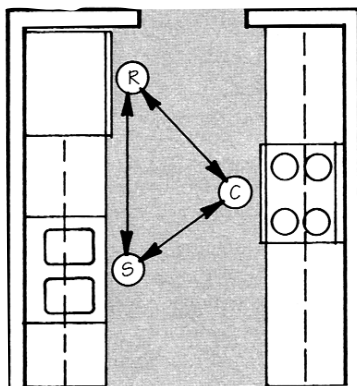
Parallel wall (galley) plans, also compact, add a second work center on an opposite wall. Besides adding more workspace, this plan allows two people to work simultaneously if the space is wide enough. The open end presents no problem if it leads to a pantry or laundry room, but it invites conflicting traffic if it's an entrance door.

L-shaped kitchens offer the most flexibility. They have plenty of easily accessible work surfaces and can be combined with an adjacent island, dining table, or dining area (off either end of the L) for auxiliary preparation space.

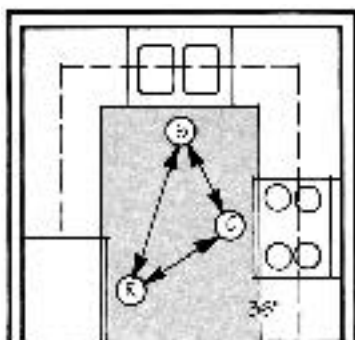
U-shaped plans make good use of limited space and have the added benefit of blocking through traffic. The tradeoff is some loss in flexibility. You can't, for example, stick a dining table in the middle without blocking the work triangle.

Variations. The above proven layouts make good starting points. But because they reflect an “average” user's requirements, you may need to vary them to reflect your client's specific needs and desires. Creative use of angles, curves, peninsulas, and islands can make a basic plan extraordinary. Backing counters or islands with eating or desk spaces can help integrate the kitchen into

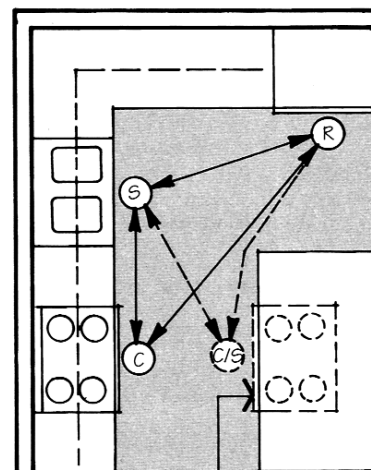
Parallel Wall (Galley)



U-Shape



L-Shape (Optional Island)



Alternate cooktop or sink

age that states: The amount of storage needed in any kitchen exceeds that available by one half.

Storage needs vary with family size and shopping and cooking patterns. People who shop once a week need more space than those who shop more frequently. See the table at right for the National Kitchen and Bath Association's suggestions for kitchen storage capacity.

However, the type and location of storage spaces are as important as the amount. Small kitchens suffer not because they contain less storage, but because things crammed into every available piece of real estate are harder to find. If well-organized, such kitchens can be a pleasure to use. Modern prefab cabinets equipped with adjustable shelves, pull-out racks, and various inserts can help meet these and most other storage requirements.

Kitchen expert Ellen Cheever suggests the following guidelines:

- Store items close to where they are used. For example, store dishes either near food preparation areas, their first place of use, or the sink, the last place of use.
- When necessary, duplicate storage space for smaller, less expensive items so that a set may be kept near each likely spot of use. If the owner bakes a lot and measures both at the sink and at a baking area across the kitchen, provide storage for measuring tools and mixing bowls at both locations. This guideline is particularly important for two-cook kitchens.
- Stored items should be easy to locate. Shallow shelves and variable-depth drawers can help here. Consider glass doors or no doors on cupboards.
- The most frequently used items should be the easiest to retrieve. The most accessible location is the front of a cabinet shelf between hip and eye level.
- Stored items should be easy to grasp. Heavy pans at eye level are a bad idea, as is nesting one item inside another. To avoid nesting, provide several shallow drawers or shelves, rather than a few deep ones. Store heavy items in base cabinets.

Your clients' preferences also clue you in as to how to handle garbage. They may opt for the simple route where food waste is sent down the disposal and everything else gets chucked into an under-sink waste receptacle. But with recycling

other everyday activities.

For instance, an island or peninsula with three or four sides that are easily accessible can extend the workspace (a real boon for two-cook kitchens), provide an informal eating area, and add storage. Locate them with care; they should neither obstruct the paths to other key points nor be so far removed that they go unused.

Locate any cabinets above the island or peninsula so that their bottoms are at least 61 inches from the floor, to allow people to see under them. (Find out the eye level of your occupants!) A ventilating hood above an island or peninsula should have a higher capacity — of, say, 600 cfm — because there is no wall behind it to help funnel the smoke upward.

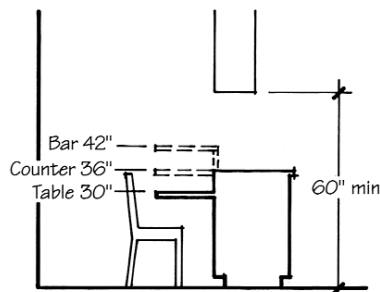
Storage

There must be a Murphy's Law for kitchen stor-

Suggested Kitchen Storage Capacity

	Kitchen 150 sq.ft. or less	Kitchen larger than 150 sq.ft.
Base cabinet frontage	156 in.	192 in.
Wall cabinet frontage	144 in.	186 in.
Drawers (individual total frontage)	120 in.	165 in.

Sit-Down Counters



on the rise, they may want to set aside wet waste for composting and sort dry garbage into separate containers. At the extreme, you may need separate storage for wet waste, paper, different colors of glass, plastics, and everything else. If so, allow an extra 3 feet or so of base cabinet frontage near the sink for waste bins, unless there is an adjacent utility room or garage that can serve these needs.

Time to Sit and Eat

Because dining can consume a lot of space, make sure you understand your clients' patterns. A dining surface built into a peninsula or island is suitable for quick snacks and meals on the run. The height depends on how the surface is used. Table height (29 or 30 inches) accommodates standard chairs and creates a distinction between an abutting 36-inch-high preparation counter, making it less likely the eating space will get overrun by pots, pans, and other cooking items pushed aside.

Raising the dining side to a 36-inch counter height eliminates this distinction, but gains you the flexibility of a larger, unbroken countertop. Stools rather than chairs can provide seating at this height.

If you boost the surface up higher still, to bar height (42 inches), it will be higher than the adjacent counter (providing the same distinction between eating and cooking space) and just right for either stand-up access or high stools.

A sit-down table makes for more sociable and relaxed dining, either in addition to or in place of a dining counter. Round tables require more space than rectangular ones for the same amount of seating, but they are more flexible and easier to move around.

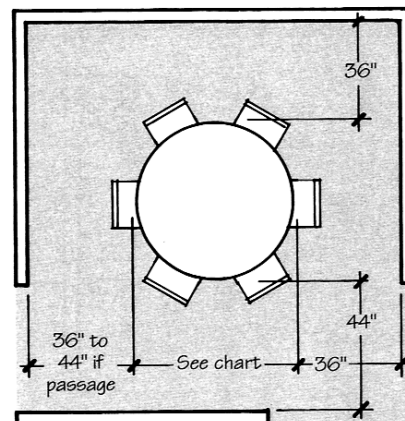
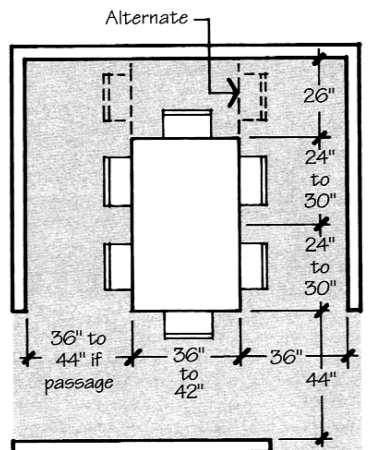
The Accessible Kitchen

Minor adjustments to a standard kitchen can eliminate many accessibility barriers. Better lighting and larger print can aid people with poor eyesight. For the hard of hearing, aural signals, such as buzzers on appliance timers, can be replaced with light signals.

Accommodating the needs of wheelchair-bound people, unfortunately, changes the kitchen in ways that makes it less useful to ambulatory users. This can be a major problem if an ambulatory person shares in the cooking, and it can compromise the resale value of the house. On the other hand, the market for wheelchair-accessible kitchens will grow as elderly people make up an increasing share of the population.

Wheelchair accessibility requires changes in both horizontal and vertical dimensions. Start with an open space on the floor 60 inches minimum in diameter to allow a wheelchair to turn around. No point of passage should be narrower than 32 inches.

Dining Tables



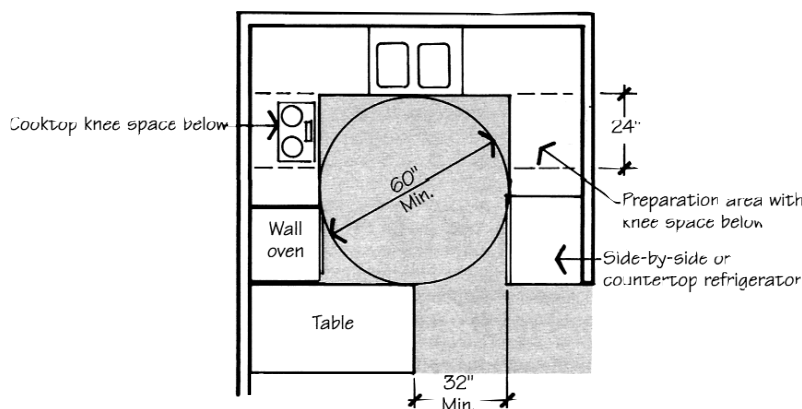
Rectangular Tables

Capacity	Width	Length
6	36" to 42"	60"
8	36" to 42"	78"
10	36" to 42"	96"
12	36" to 42"	120"

Round Tables

Capacity	Diameter
4 to 5	42"
5 to 6	48"
6 to 7	60"
7 to 8	72"
8 to 10	84"
10 to 12	96"

Wheelchair-Accessible Kitchens



Counters should be 30 to 32 inches high instead of the usual 36 inches. Because wheelchair users can't reach work surfaces without wheeling under them, you'll need to provide open spaces at least 24 inches wide and 24 inches deep under three work centers: the cooking surface, sink, and preparation area. Having that space below the main work counters will help, too. The most flexible design is a counter continuously open below, except for the refrigerator and possibly a bank of drawers.

Insulate hot water piping below the sink to prevent burning the user's legs. This leaves only 6 to 8 inches to accommodate sinks and cooktops — not impossible, but make sure the depth of the sink you specify stays within that dimension. The cooking surface can be one or two two-burner cooktops with their burners and controls near the front.

Storage is tricky. Because people in wheelchairs can't easily reach shelves higher than 48 inches or lower than 10 inches, make the best use of this space for storage. Shallow shelves on the backside of cabinet doors are easy to get at when open. Shallow adjustable shelving and pegboards between the counter and wall cabinet will provide additional utility (people in wheelchairs can't easily reach the back 8 inches of a 24-inch-wide counter, anyway).

Ovens, even wall-mounted ones, are awkward for wheelchair users. Microwave ovens are safer and more convenient. Side-by-side refrigerator-freezers offer better access than units with the freezer above. Small refrigerators mounted on top of a counter with knee space below are even better if the person's needs are modest. ■

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