

13 Step Methods*

To Step Up

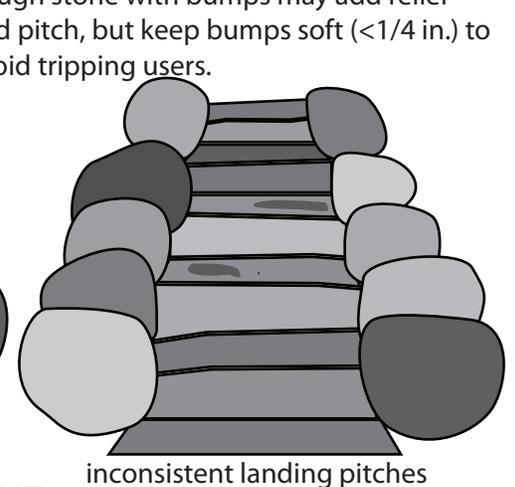
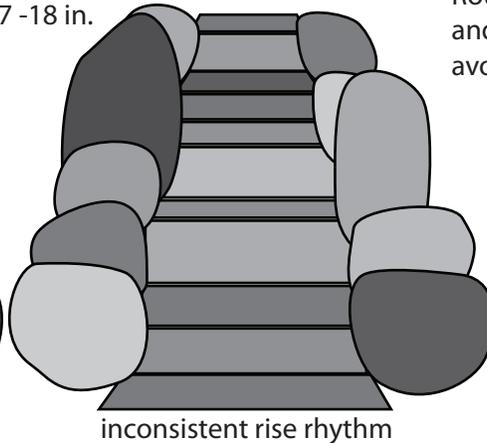
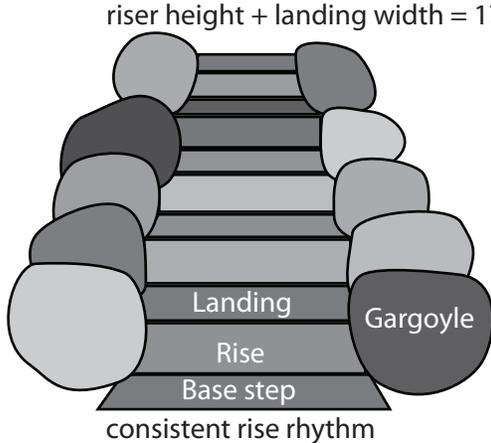
From Front Country

To Back Country

Stair Cases

1 and 2. RISE IT

Rise above/under the "ideal" 7-9 in. rise... to 4-14+ (usually 6-12), and if the lanscape allows include a few tall gargoyles rails/hand holds. If there are several flights on a trail segment try to stick to a height theme, even if variable, so users know what "rhythm" to expect. Most will expect a consistent rhythm, but back country means organic. Think jazz or bluegrass, not techno. Try not to make it too irregular or do too many high steps in a row. Provide 7-8 inch rises or users will start to go around steps. Normal Stair ratio: riser height + landing width = 17 -18 in.



3. PITCH IT

From "ideal" 0-2% slope in any direction To <15% l/r, r/l; <10% outslope. Don't inslope to the back of the landing to avoid puddles and ice. Think rhythm again. Changing the camber/pitch could twist ankles, and make slippery situations more dangerous so don't do this on smooth stone and wet areas. Rough stone with bumps may add relief and pitch, but keep bumps soft (<1/4 in.) to avoid tripping users.

4. FACE IT

Angle faces instead of making them perfectly perpendicular, and use faces with small imperfections. Consider minimum depths of close to 11 in.

5. LAND IT

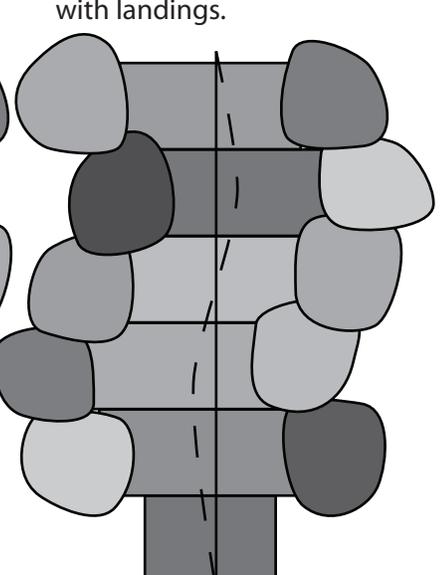
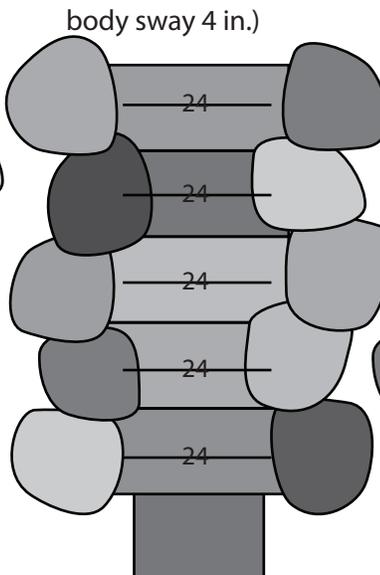
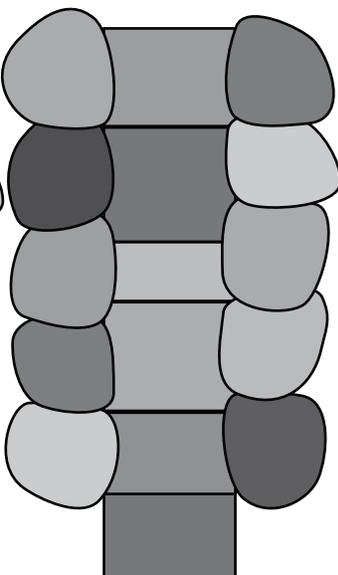
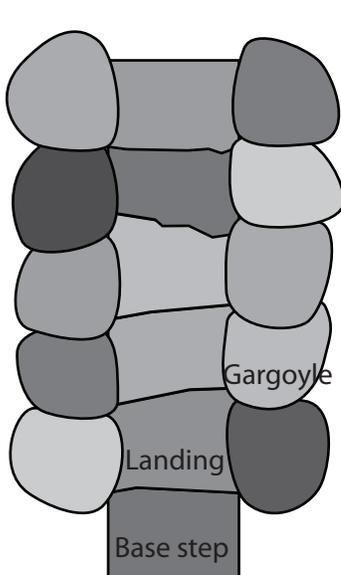
From "ideal" 11-18 in. To 9-18+ in. This may be necessary anyway to deal with different stone sizes and slope changes

6. NARROWIDE IT

Squeeze or pinch the landing widths. >42 in. for two people, +/-24 in. one lane, include some wide breaks or landings after +/-8 stairs. (average shoulder width 22 in., body sway 4 in.)

7. ZIGZAG IT

#4 will do this too, but here the width is maintained. Flights can be curved, and/or turned into L's or switchbacks with landings.



*Method 0, step away altogether and reroute the trail at 0-15% with frequent grade reversals to eliminate the need for steps. Some infrequent grades at 20-30% for <15 yards sandwiched with grade reversals may help gain elevation in place of steps (not ideal large tread watersheds, nor high clay soils where slopes over 20% can be slippery).

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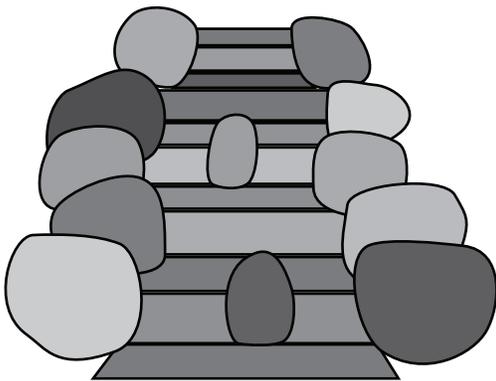
From Front Country

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Stair Cases

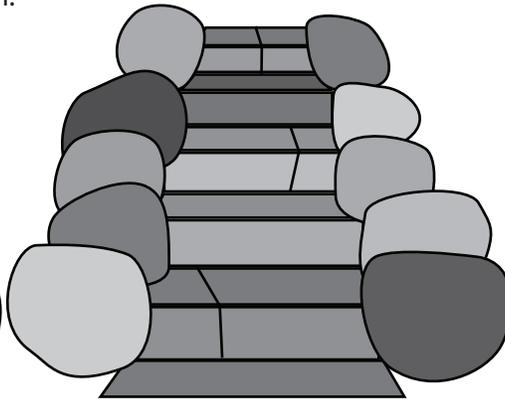
8. DIVIDE IT

Divide the flight with a central or off-center gargoyle. Think two stair cases side-by-side, and be sure to maintain structural integrity with good contact and stone selection.



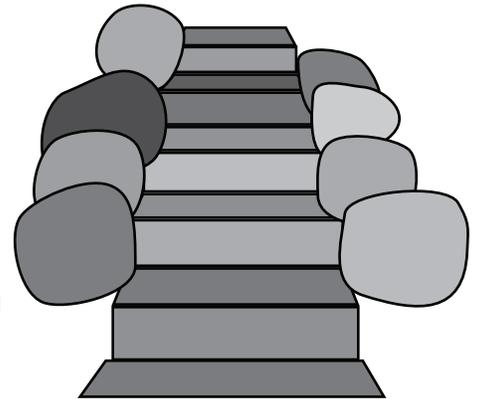
9. BREAK IT

Cut it with a diamond blade, use feathers and wedges, break out a slab splitter, or piece to stones together (consider grains and striations). Keep good contact and ensure the pieces are locked in and not going anywhere.



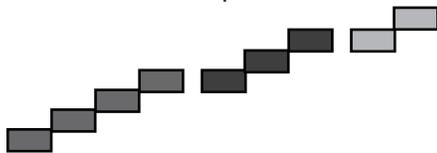
10. SKIP IT

Skip left, right or both gargoyles. Usually, but not exclusively, on the top and/or bottom steps. Or bury them to step height so they disappear, but still help lock the steps together.



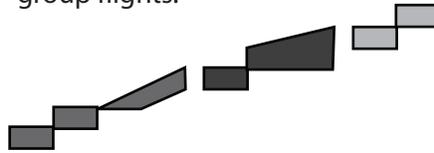
11. GROUP IT

Break one long case into smaller ones. Try to limit flights to no more than 12-15 feet without a 6+ ft landing to lower the chance of broken bones and death from falls from the top of the flight. The groups also provide a reprieve from a constant slog up, and quite often are necessary to deal with slope changes where steps can rise far above grade or get buried into the slope.



12. RAMP IT

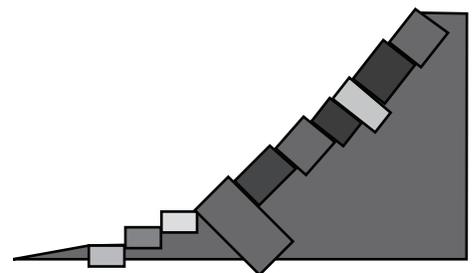
Use ramps instead of steps to gain elevation. Vary runs and intersperse between steps or as stand-alone structures. Ramps look less out-of-place than steps. Still consider base steps. <30% is not as slippery. They are not ideal for dusty or muddy areas where sediment can reduce ramp friction. Ramps can help when grades are between 20-40% where steps are hard to match the slope without low rises, long runs, or solitary base step steps and small group flights.



13. SCRAMBLE IT

On slopes over *80% a "scamble case" with irregular hand and footholds for users to "scramble" (or crawl on all fours). Gargoyles and embedding optional. See the separate Scamble Case diagram for limitations and safety concerns.

*most stairs (7-9 inch rises and 11-16 in. runs) are best suited for slopes between 43-82%. Steeper than that and they have to be turned or the rises have to increase and landings decrease, lower than that and the cases have to be grouped, or stand as single steps and base steps, or the first few buried in a self-created steeper slope.



**13 methods becomes several thousand possibilities
For example: 5 Methods can be done in 120 different ways.
120 combinations can be permuted: 5 factorial = 5! = 120
6! = 6x5x4x3x2x1 = 720 permutations or possibilities
7! = 5040
8! = 40,320
10! = 3,628,800
13! = 6,227,020,800
^this does not consider stone selection and orientation