Surfing surface gravity waves NICK PIZZO, Scripps Institution of Oceanography — A simple criterion for water particles to surf an underlying surface gravity wave is presented. It is found that particles travelling near the phase speed of the wave, in a geometrically confined region on the forward face of the crest, increase in speed. The criterion is derived using the equation of John (Commun. Pure Appl. Maths, vol. 6, 1953, pp. 497–503) for the motion of a zero-stress free surface under the action of gravity. As an example, a breaking water wave is theoretically and numerically examined. Implications for upper-ocean processes, for both shallow- and deep-water waves, are discussed.

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