

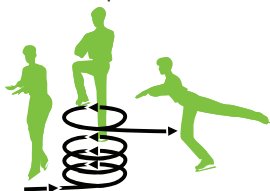
FIGURE SKATING

# Jumping is key to win

And the key to a successful quad toe loop, one of the most challenging jumps, is getting the right mix of height and rotation.

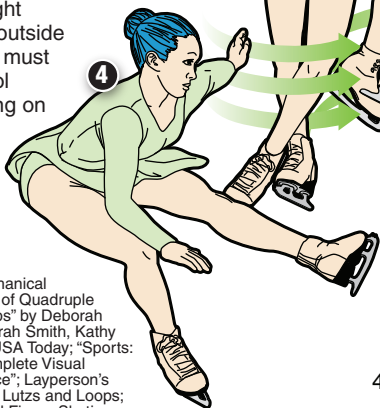
## Quadruple toe loop

Single toe loop invented in 1920s by U.S. skater Bruce Mapes



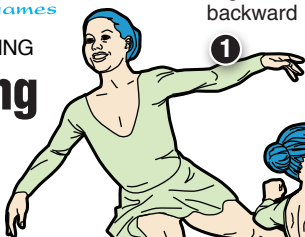
## Landing

On right back outside edge; must control twisting on skate



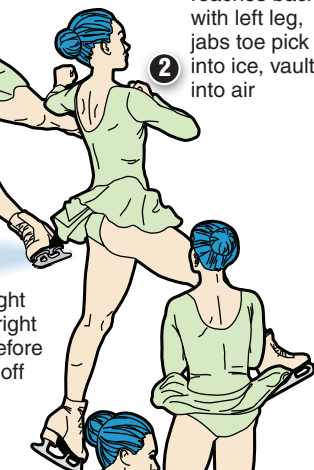
## Approach

Right foot going backward



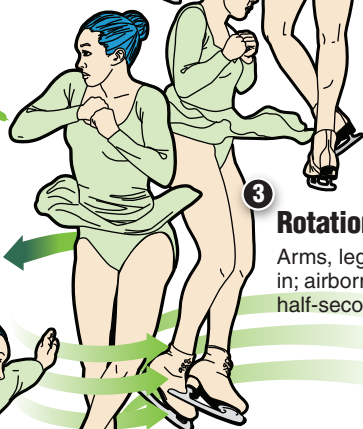
## Takeoff

Skater reaches back with left leg, jabs toe pick into ice, vaults into air



Weight over right foot before takeoff

**3**  
**Rotation**  
Arms, legs pulled in; airborne for a half-second



**Takeoff speed** About 12 mph (19 kph)

**Jump height** About 18 in. (46 cm)

**Rotation speed** 4.8 revolutions per second

Source: "Biomechanical Analysis of Quadruple Toe Loops" by Deborah King, Sarah Smith, Kathy Casey; USA Today; "Sports: The Complete Visual Reference"; Layperson's Guide to Lutzs and Loops; Technical Figure Skating