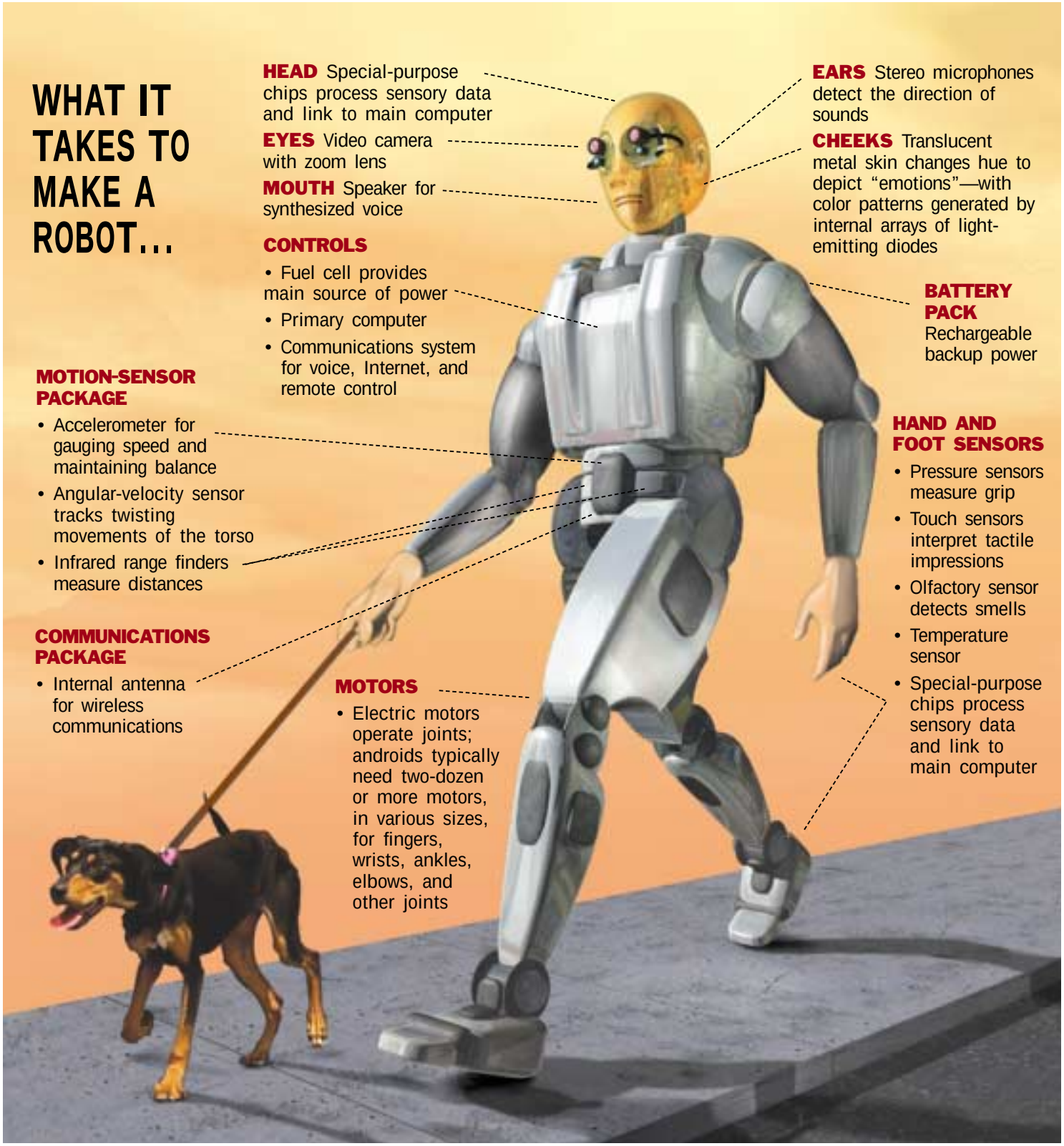
WHAT IT TAKES TO MAKE A ROBOT...



HEAD Special-purpose chips process sensory data and link to main computer

EYES Video camera with zoom lens

MOUTH Speaker for synthesized voice

EARS Stereo microphones detect the direction of sounds

CHEEKS Translucent metal skin changes hue to depict "emotions"—with color patterns generated by internal arrays of light-emitting diodes

CONTROLS

- Fuel cell provides main source of power
- Primary computer
- Communications system for voice, Internet, and remote control

BATTERY PACK Rechargeable backup power

MOTION-SENSOR PACKAGE

- Accelerometer for gauging speed and maintaining balance
- Angular-velocity sensor tracks twisting movements of the torso
- Infrared range finders measure distances

HAND AND FOOT SENSORS

- Pressure sensors measure grip
- Touch sensors interpret tactile impressions
- Olfactory sensor detects smells
- Temperature sensor
- Special-purpose chips process sensory data and link to main computer

COMMUNICATIONS PACKAGE

- Internal antenna for wireless communications

MOTORS

- Electric motors operate joints; androids typically need two-dozen or more motors, in various sizes, for fingers, wrists, ankles, elbows, and other joints