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The reference extragalactic survey of ~0.83 deg^2 with The Space Interferometer for Cosmic Evolution (SPICE), exploiting its excellent sensitivity and its 1'x1' field of view will detect tens of thousands of star-forming galaxies and thousands of AGNs (in line and in continuum), thus probing the co-evolution of galaxies and AGNs, up to high redshifts (z~6). Moreover, SPICE's excellent (sub-arcsecond) angular resolution will allow us to resolve star formation in nearby galaxies. It will also permit us to study the evolution of the morphology of star-forming galaxies up to quite high redshifts (discriminating among galaxy formation and evolution models). Its high spectral resolution (R~3000), line sensitivity and broad spectral coverage will allow us to learn about the physical conditions (temperature, density, metallicity) of galaxies over the past ~12 billion years. By resolving the rich variety of far-IR spectral lines, SPICE will provide information on streaming motions due to feedback processes and on the relationships among the kinematics of different atomic and molecular gas phases. We present quantitative predictions for blind (photometric+spectroscopic) surveys and pointed observations and discuss the optimization of the observing strategy.