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In this research, six participants who were enrolled in or had completed an inquiry-based geometry class were interviewed to evaluate how students develop conceptual understanding under guided discovery conditions. Specifically, students were introduced to an unfamiliar space, the flat 2-torus, and given tasks that were designed to guide students into an understanding of the properties of a straight line in this space. The students were also asked to compare their experience with inquiry-based learning to their learning experiences in other mathematics classes. Grounded theory techniques, as described by Strauss and Corbin, were used to analyze the transcript data. Results provide an interesting and insightful picture of how students construct their knowledge via guided discovery. These results have implications for nonlecture (e.g. inquiry-based, guided discovery) teaching. (Received September 02, 2007)