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Interactive worksheets for connecting symbolic and visual representations of 3D vector equations.

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Summary: Learning the connection between symbolic and visual representations is a key to conceptual understanding of three-dimensional (3D) vector equations. For learning such a connection, it is valuable for students to manipulate and transform the graphic objects directly while observing the simultaneous change of related symbolic equations. The interactive change of graphic and symbolic objects provides the students with opportunities to recognize these relations experimentally. This article describes how such interactivity is designed as digital worksheets, introduced into our lessons, and what reflections the worksheets received from students and teachers.

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