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| Table 3: Teaching Tips and Scaffolding Strategies | | | |
|  | Students with growing knowledge and skills | Students with advanced knowledge and skills | Both groups |
| Obtaining information from reading and video | * Pause the video more often at the critical moments * Ask students to make notes on what they don’t understand | * Pause the video less often at the critical moments * Ask students to summarize the main points | * Provide briefs and guiding questions before using the reading and videos * Hold class discussions after using reading and videos |
| Exploring agent-based computer simulation | * Provide more explicit instruction to assist exploration * Allow more time * Pair with the students with more advanced knowledge and skills | * Leave exploration more open | * Work in pairs or groups of three * Let some students share their explorations with the whole class |
| Constructing the epidemic simulation | * Focus on grasp the conceptual meaning of the codes, less on the programming language * Allow more time * Pair with the students with more advanced knowledge and skills | * Focus on both conceptual meaning of the codes and the programming language | * Monitor students closely * Provide help to debug code * Thoroughly explain the conceptual ideas contained in the code * Connect to real-world scenarios |
| Collecting data | * Let students collect fewer data points * Let students collect data on one factor each time * Allow more time * Pair with the students with more advanced knowledge and skills | * Let students collect more data points * Let students collect data on multiple factors | * Ensure students’ simulation are identical * Demonstrate how to collect data from the simulation * Demonstrate how to input data into the Google sheet |
| Use mathematical thinking | * Plots the data for students * Allow more time * Pair with the students with more advanced knowledge and skills * Let students discuss one factor each time * Allow more time * Pair with the students with more advanced knowledge and skills | * Demonstrate data plotting at first, and then let students plot the rest data * Let students convert raw data to percentages. * Encourage students to connect more than one factors | * Facilitate students to identify the patterns in the data. * Hold class discussions |