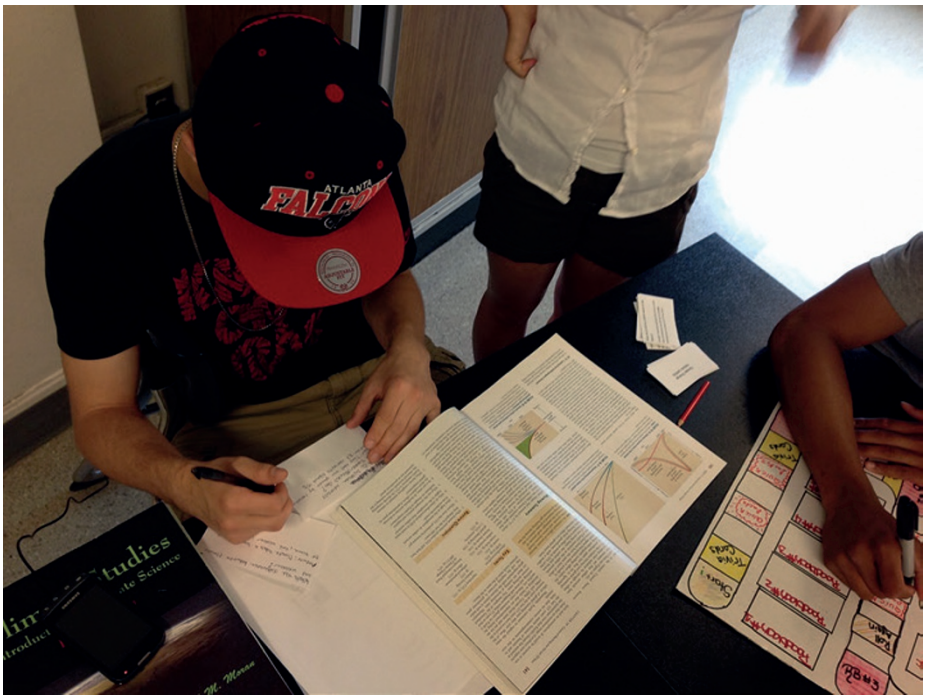
Games and climate literacy

To the Editor — Climate literacy has gained importance in the standards and curricula for primary and secondary science education[1]. Teaching climate science is an opportunity for students to meaningfully engage with science, as well as with its societal implications and the actions they themselves can take to help mitigate climate change. We therefore created an interactive board-game activity (Supplementary Information) to teach students about climate, how humans impact the environment, and the future implications of climate change.

The activity relies on students both playing the original game, and learning enough about the subject to design an improved game for their peers. The lesson progressed in four stages: (1) Students play a climate board-game designed by the teacher, paying attention to what they like and dislike about the game and tracking changes they want to make in their own version; (2) Students critique the original board-game and in groups design their own version of the game; (3) Students swap their finished board-game with another class and play their peers' versions of the game; (4) Students evaluate their peers' final board game.

Mimicking the popular board-game The Game of Life, as players travel around the board, they 'grow up' and have to make life decisions that have a direct impact on their surrounding environment. As players move forward, they collect climate awareness tokens by responding to questions on three types of cards. These tokens represent environmentally friendly actions, and the player with the most tokens wins the game. The three card types — Roadblocks, Climate Quick Facts, and Trivia — provide the opportunity to learn about climate change and the interactions between humans and the environment in three different ways. The six Roadblocks the players encounter are intended to relate climate change to personal lifestyle choices. For example, the first Roadblock forces players to decide what type of car to purchase. Climate Quick Facts may ask students to define the greenhouse effect and list greenhouse gases, whereas Trivia cards ask students whether melting sea ice contributes to sea level rise or which surfaces have high albedo.

Game-based learning (http://serc.carleton.edu/introgeo/games/index.html) has been shown to enhance learning by immersing students in the curriculum in an exciting and interesting way. The redesign of the game provides an opportunity for peer-to-peer learning, which allows the students to take leadership[2], gives them a sense of accomplishment with the completed board-game, and creates a dynamic competitive atmosphere[3].



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We used the full version of a game in two Earth Science classes for 15–18-year-olds at Troy High School (Troy, New York). These students had previously failed all science courses, including Earth Science, qualified for free or reduced-price lunches and at least some had a number of educational special needs and supports (including physical and emotional disabilities); a few were also non-native English speakers.

The effectiveness of this program was shown through increased class attendance, willingness to learn, and overall enthusiasm in the classroom. The subject matter is both reinforced and made relatable and relevant to the students. Even during subsequent school years, previous participants continued to express interest in the game.

We also used a modified version of the activity in which high-achieving students from a similar age group played the redesigned games, without designing their own. Students displayed high levels of engagement, including jumping out of their seats and shouting out answers. We received positive feedback from both students and their high school teachers after the workshop, showing that the game was a success.

We therefore suggest that the board-game is an effective means to engage students with questions of climate change across a range of academic levels, even without progressing through Stages 2 through 4 of the module. ❐

References
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Additional information
Supplementary information is available in the online version of the paper.

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