

Extra Credit Catastrophe

A classroom game related to climate justice
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Overview

Extra Credit Catastrophe is a classroom game designed to help students understand and appreciate various aspects of climate justice. It emphasizes a precautionary argument for mitigating climate change, as presented in Catriona McKinnon, “Runaway Climate Change: A Justice-Based Case for Precaution,” *Journal of Social Philosophy* 40 (2009): 187–203. The game also lends itself to discussion of many other aspects of climate justice. In a class of about thirty students, it takes 30–45 minutes to complete the game.

The basic idea of the game is that the students represent global society. Each student receives candy, such as Skittles, which represents their wealth. They must spend that wealth to mitigate climate change in order to avoid triggering a catastrophe, the threshold for which is uncertain. The catastrophe is the loss of extra credit. However, each student has an incentive to limit their own contribution to the mitigation effort because each student receives *additional* extra credit if they finish the game with at least ten candies.

Note that there is an Excel spreadsheet that accompanies these instructions, which can help you prepare for and play the game.

Instructions

These are the instructions that you will read to the students, adjusting the underlined phrases as necessary for your class. Familiarize yourself with them now.

To learn about certain aspects of climate justice, we’re going to play a game called Extra Credit Catastrophe. You are all playing the game together. If you win,

everyone in the class gets six extra credit points applied to the last exam. If you lose, nobody gets those six points. Here's how the game works.

I am going to roll a six-sided die eight times—once for each of the remaining decades in the twenty-first century. The die will determine how many tenths of a degree the Earth warms in each decade. So, if I roll a one on the first round and then a three on the second round, the Earth will warm by 0.1°C in the 2020s and by 0.3°C in the 2030s. This means that if you're astoundingly lucky, the Earth will only warm by 0.8°C over the rest of the century. If you're astoundingly unlucky, the Earth will warm by 4.8°C . Chances are very high, in this game, that the Earth will warm by somewhere between 1.8°C and 3.75°C by the end of the century.

The game focuses on the possibility of triggering irreversible and catastrophic changes in the Earth system. In real life, these catastrophes might be the unstoppable melting of the Greenland ice sheet or the unstoppable release of methane from permafrost. In our game, the catastrophe is that you will lose those six extra credit points. Let's assume that scientists have determined that this "extra credit catastrophe" will occur at somewhere between 1.5°C and 3.0°C warming. You don't know the exact threshold. I, however, do. For the purposes of the game, I determined the threshold using a random number generator. All I will tell you is that it could be anywhere between 1.5° and 3.0° , inclusive. That means it could be 1.5° , it could be 3° , or it could be anywhere in between.

So what can you do about this looming catastrophe? Each of you will receive a bag containing fifteen Skittles. Before each roll of the die, you can "spend" as many Skittles as you want to mitigate climate change in that decade. Each Skittle that someone spends will reduce the warming in that decade by one one-hundredth of a degree (0.01°C), with the very important limitation that you can't reduce warming below zero. For instance, if I roll a six, and the class has collectively spent thirty Skittles on mitigation for that decade, then the Earth will warm by only 0.3°C in that decade. (That's six-tenths of a degree minus thirty-hundredths of a degree.) If I roll a six and the class has spent sixty Skittles on mitigation, then the Earth won't warm at all in that decade. But—and this is really important to remember—if the class has collectively spent thirty Skittles on mitigation, but I roll a one, you still get zero warming, not -0.2° . Warming is irreversible in this game. It can't "go negative."

But there's a twist. If you personally have at least ten Skittles left at the end of the game, then you will get two extra credit points applied to your last exam, regardless of whether the class has triggered the Extra Credit Catastrophe. In other words, if the class triggers the catastrophe, but you have ten or more Skittles left, you get a total of two extra credit points; but if the class avoids the catastrophe and you have ten or more Skittles left, then you personally will get a total of eight extra credit points. So no matter what happens, you will be better off if you have at least ten Skittles left at the end of the game.

What questions do you have before we begin?

Set-Up

To prepare for the game, you will need to do a few things:

1. Determine what the threshold is triggering the extra credit catastrophe. To do this, go to <http://www.random.org> and use the True Random Number Generator to generate an integer between 0 and 20. Divide that number by ten and add 1.5 to it. That will give a number between 1.5 and 3.5. (For instance, if the Random Number Generator gives you 19, add $1.5 + 1.9 = 3.4$.)
2. Determine how many Skittles (or other candies) you want to give each student. For a class of between 25–35 students, 14 or 15 Skittles each is a good number. All else being equal, the fewer Skittles you give them, the more likely it is that they will face the hard choice between preventing catastrophe and giving up their individual extra credit. Similarly, all else being equal, you will want to give each student more Skittles in a smaller class than in a larger one. You can use the Instructor Use worksheet in the accompanying Excel spreadsheet to get a better sense of how many Skittles you should give each student to achieve a given level of difficulty.
3. Go buy some Skittles and some plastic bags. (I estimate that each 14 oz. bag of Skittles contains roughly 350 Skittles. See the Instructor Use worksheet in the spreadsheet to see how many ounces of Skittles you'll need to buy. *Protip*: if you buy extra Skittles as a precautionary measure, you get to eat the extra Skittles later.) Then spend some time packing bags of Skittles for each student.

4. Decide how many extra credit points to give. If you apply the extra credit points to an assignment, such as a previous exam, rather than to the final course grade, you can give a nominally larger number of points without distorting the final grades as much. Many students will be more motivated by the nominally larger reward. (Behavioral economics at work!)
5. For class, you will need to bring the individual bags of Skittles, a six-sided die, and two containers—one large (e.g., a shoebox or a grocery bag) and one small (e.g., a cup or mug). If you don't have a die, you can use the Random Number Generator on random.org to generate a number between one and six.

Game Play

1. Read the instructions to your class and answer any questions.
2. Distribute the bags of Skittles.
3. Optionally, project the Classroom Use worksheet from the accompanying spreadsheet onto the screen. You can use this to track warming during the game.
4. Go around the room with the small container and have each student deposit as many Skittles as they want to spend that round. As you go, announce the total number of Skittles in the cup after each student's contribution. ("We have one Skittle. We're now at three Skittles. Now we're up to five Skittles. Now six!")
5. Roll the die, announce the result, and update the spreadsheet.
6. Clear the small container by dumping "spent" Skittles into the large container.
7. Give students time to discuss what they want to do before the next round.
8. Repeat Steps 4–7 until:
 - a) warming triggers the Extra Credit Catastrophe, in which case you should announce to your students that they've crossed the threshold, triggered the catastrophe, and lost the extra credit.
 - b) you reach the end of the eighth round, in which case you should announce that the class has successfully avoided the Extra Credit Catastrophe.
9. Make a note of which students have at least ten Skittles so that you can give them their individual extra credit.

Afterward, lead a discussion about whatever aspects of climate justice the game revealed, such as precaution, fairness, transparency, priority for the worst off, etc.