Fire-Starter

CHESS OPENINGS AND NATURAL SELECTION

I don't teach science, I teach various social studies classes. However, I find it essential from time to time to explain the scientific activities causing or coming from some historical events. Einstein and atomic power come to mind. Another, of course, is Darwin, the topic of this Fire-Starter. I use it to explain how natural selection works when my history students are just beginning to study the era when social Darwinism and imperialism arose. Science teachers at my school have also used it in their classes.

The key idea is to illustrate the tremendous number of combinations of cells that is possible in a human, and in the species as it evolves. At the same time, only some of those combinations of cells are viable, and so nature selects those it wants to keep for the good of the species and discards the rest. That's how evolution takes place.

One way to illustrate this is through the metaphor of a chess game, in which 32 pieces, 16 on each side, move and combine. The first 10 moves or so are called the opening; there are hundreds of set openings that serious chess players memorize because of their proven efficacy. However, how many possible openings are there, considering all 32 pieces and the first 10 moves for each side? The number is:

$$169{,}518{,}829 \times 10^{21}$$

Nature (that is, serious chess players) has naturally selected out those relatively few openings that work; the rest, the vast majority, have been discarded. Occasionally some player will try a new opening. If it works, it – and the player – is kept. If not, it is rejected. This process is the same one that natural selection uses.

For this Fire-Starter you need to know how to play chess, at least well enough to explain how the pieces move and what an opening is. (If you don't play, maybe a student who plays chess could help here.) You will need a chessboard and pieces, or some projection device that allows you to display the board and move the pieces. Let's assume you use a real board: Place it in the middle of the room and ask the class to gather around it. Put the number of possible combinations for the first 10 moves, both sides considered, on the blackboard. Discuss how huge this number is and how it only involves 32 "cells."

Next, briefly explain how each piece moves. If you have the time, point out the objective of the game, how pieces are captured, what an opening is, and so on. Illustrate a well recognized and effective opening (Ruy Lopez, for instance) and a poor one (Fool's Mate in two moves), and simple wastes of time (randomly moving pawns forward for no purpose).

This should only take a few minutes. For the discussion, ask the students how this relates to natural selection. Using the chess openings as examples, discuss what sort of "bad" combinations nature might have rejected from our evolution; what sort of "good" combinations might have been saved, both physical and psychological; what "bad" and

"good" mean in this sense; how more complex the process is for humans than it is for a chess opening (how many cells are involved); how innovations (mutations) are tested; and so on. Another interesting point for discussion is how long evolution takes. (Chess has been played for thousands of years; some of the most accepted openings are a couple hundred years old.) This is also a good time to address whether this evolutionary process of trial and error applies to political and economic systems, organizational schemes, educational methods, religions, the writing process, and the like. Are all of these evolving to some limited number of viable forms, just as chess openings have?

Whenever I have used this Fire-Starter it has inspired questions not only about Darwinism, but also about Platonic forms (although the students usually didn't know that idea) and the relationship of the species and the environment. Here, too, chess provides a good metaphor: your opening needs to consider the moves and abilities of your opponent. Finally, students are sometimes inspired to find out more about chess and even take up the game.

REFERENCES:

Stevenson, Leslie, and David L. Haberman. *Ten Theories of Human Nature*, 3rd edition (New York: Oxford University Press, 1998), pages 89-109, 207-221.

Stout, Rex. *Gambit* (New York: The Viking Press, 1973), page 8.