Thought Lab 4.1: Evolving "Superbugs"

Purpose: Show how antibiotic resistance could occur in a population of *Staphylococcus aureus*.

Procedure

1. Review the data shown in the table below. Based on the data, when is bacterial resistance to a particular antibiotic likely to occur in *Staphylococcus aureus*?

Historical Progression of Antibiotic Resistance of *Staphylococcus aureus*

Antibiotic	Year introduced	First reports of resistance in patients
penicillin	1941	1945–1946
streptomycin	1944	1945
tetracycline	1948	1955
erythromycin	1952	1950s
methicillin	1961	1961
gentamicin	1964	1976
ciprofloxacin	1988	1990
vancomycin	1956	1997

2. Using different-coloured playing chips, model how a population of *Staphylococcus aureus* could become resistant to an antibiotic. (**Hint:** Use one colour of chip for bacteria that are resistant to an antibiotic.)

Analysis

1. Explain how the following situation might lead to antibiotic resistance of *Staphylococcus aureus* in patients. A patient is prescribed the antibiotic erythromycin for an infected cut. The prescription instructs the patient to take the antibiotic for two weeks. After one week, however, the cut seems to have cleared up and the patient stops taking the antibiotic.

2. With a partner, choose one of the following questions to research. Prepare a written, oral, or computer presentation to share your findings.
   - How can the overuse of antibiotics lead to antibiotic resistance in bacteria?
   - Why do some agricultural practices contribute to antibiotic resistance in some bacteria species, and how can this contribute to antibiotic resistance in bacteria that cause diseases in humans?