Topic	Evolution and antibiotic resistance	Level	GCSE (or any other course for students aged (11-16)
Outcomes	1. To explain the process of evolution by natural selection 2. To explain how antibiotic resistance can evolve in a population of bacteria		

Antibiotic Resistance: modern day evolution

Sally is working on a farm and cuts her hand whilst opening a gate.
The cut becomes infected with bacteria that then invade the tissues of the finger.

The bacteria begin to multiply, each division doubling their number.
There are now too many bacteria for Sally's immune system to cope with. The infection spreads.

Sally goes to the doctor to get some antibiotics. The doctor prescribes penicillin tablets and Sally begins to take the medicine. Many of the bacteria are killed by penicillin. Some bacteria however are naturally resistant to the antibiotic and so are not killed. These bacteria are said to be adapted to their environment.

The resistant individuals then multiply, increasing their numbers a million fold in a day. Soon the antibiotic resistant bacteria become very common in the population. Sally's infection is now very serious and will soon spread throughout her entire body. She returns to the doctor.

Questions:

1. What trait has been selected for in the bacterial population?
2. What trait has been selected against in the bacterial population?
3. Does the antibiotic cause the resistance to the antibiotic?
4. In this example, how do you know that antibiotic resistance has a genetic basis?
5. What should the doctor now do to help Sally get better?
6. What causes the selection pressure?
7. What advice would you give to a doctor who wanted to prescribe antibiotics to a patient who was suffering from a minor cold?
8. Why can adaptation occur much quicker in bacterial populations than human populations?

Progress: further resources on evolution are available here:
http://thescienceteacher.co.uk/evolution/