0:00:00.000,0:00:07.830

Nothing in Biology makes sense except in

light of evolution. Evolution by natural

0:00:07.830,0:00:15.009

selection is the bedrock of the

understanding of life. Everything from

0:00:15.009,0:00:24.160

biochemistry to ecosystems can only be

understood in light of Darwin's great

0:00:24.160,0:00:25.670

idea.

0:00:25.670,0:00:32.489

Unlike other big ideas humans have come

up with like quantum mechanics or

0:00:32.489,0:00:40.020

relativity, you can grasp the essence of

evolution by natural selection with a

0:00:40.020,0:00:48.010

few examples and a few statements of

facts and inferences. Organisms vary; if

0:00:48.010,0:00:53.030

you're in a classroom look around what

could be more obvious you are all

0:00:53.030,0:00:59.090

different from the neighbors sitting

around you and it's not just true for

0:00:59.090,0:01:08.799

humans true for fruit flies or corn kernels

any population. The origin of the

0:01:08.799,0:01:13.790

variation you can see around you is

genetic.

0:01:13.790,0:01:25.100

It's determined by our genes. Each acorn

like each human is different because of

0:01:25.100,0:01:33.270

sexual reproduction that will cover

later on in a video. More organisms are

0:01:33.270,0:01:41.189

born then the environment can support.

Pretty easy to understand with things

0:01:41.189,0:01:48.170

like salmon. Each female salmon filled with

thousands of eggs that get fertilized

0:01:48.170,0:02:01.799

or acorns from an oak tree. Not all those

acorns can survive. Something in the

0:02:01.799,0:02:09.959

environment is going to be limiting. It

could be the amount of space, the amount

0:02:09.959,0:02:12.410

of prey that's available, the amount of

0:02:12.410,0:02:20.080

Light, the amount of nutrients. Any one of

those factors can limit this vast

0:02:20.080,0:02:26.220

production of offspring and the critical

part to remember here is that who

0:02:26.220,0:02:34.110

survives is non-random. The organisms

that survived are those with the

0:02:34.110,0:02:43.190

variations that best suit them to the

current environment. Evolution can't look

0:02:43.190,0:02:44.860

ahead.

0:02:44.860,0:02:52.760

Natural selection occurs right here

right now. It can't predict the future. It

0:02:52.760,0:03:02.260

can only provide the selection on the

variation that's present. So think about

0:03:02.260,0:03:09.100

those acorns from an oak tree each of

them different, some of them better able

0:03:09.100,0:03:16.530

to survive in the current environment

Maybe they germinate a day earlier maybe

0:03:16.530,0:03:22.110

they grow their leaves and expose them

to sunlight faster than their neighbors

0:03:22.110,0:03:31.720

can. This bit this change this variation

lets them survive and the critical part

0:03:31.720,0:03:38.830

is, they passed those variations on to

their offspring. So that over time the

0:03:38.830,0:03:46.580

gene pool of that population changes. And

that's it. With a changing gene pool if

0:03:46.580,0:03:53.470

you just expand the time scale that

population has the possibility to become

0:03:53.470,0:04:00.540

so different that it can become its own

species. And there's the basis of

0:04:00.540,0:04:09.910

evolution by natural selection. Now this

is a deep and intricate field, thousands

0:04:09.910,0:04:14.510

of scientists all over the world work on

portions that relate to evolution by

0:04:14.510,0:04:21.230

natural selection and they don't always

agree on the details of the mechanism

0:04:21.230,0:04:28.220

or how important one variation is over

another. But evolution by natural

0:04:28.220,0:04:34.820

selection is not a controversial topic

scientifically. Nobody's out there

0:04:34.820,0:04:40.290

arguing that this isn't the mechanism

that explains us and the diversity of

0:04:40.290,0:04:41.690

life we see around us.