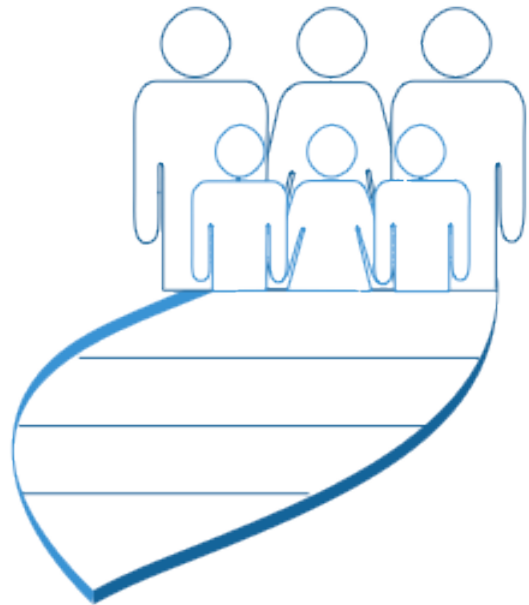


Life Sciences/HHMI

OutReach
PROGRAM



Summer 2006 Workshop
in Biology and Multimedia
for High School Teachers

The Origin of Life

Introduction

_____ : All living things come from other living things.

_____ : Living things arise from nonliving things.

Introduction

Biogenesis: All living things come from other living things.

*****Can you give one example?***

_____ : Living things arise from nonliving things.

Introduction

Biogenesis: All living things come from other living things.

Spontaneous Generation: Living things arise from nonliving things.

*****Assuming you have no knowledge of Powerpoint or computers, which of the two terms above comes closest to explain what just happened? Why?***

Experiments

Redi: Used jars of _____ in his experiment.

_____: Used broth in sealed flasks in his experiment.

Pasteur: Used _____... in his experiment.

Experiments

Redi: Used jars of **food** in his experiment.

*****What was the big deal with using solid jar covers? Why were they substituted for mesh covers? Why was Redi considered a “rebel”?***

_____ : Used broth in sealed flasks in his experiment to disprove spontaneous generation.

Pasteur: Used _____... in his experiment.

Experiments

Redi: Used jars of **food** in his experiment.

*****What was the big deal with using jar covers? Why were they substituted for mesh covers? Why was Redi considered a “rebel”?***

Spallanzani: Used broth in sealed flasks in his experiment to disprove spontaneous generation.

*****Using the term “vital force”, explain how skeptics dismissed the findings of Spallanzani for many years.***

Pasteur: Used _____... in his experiment.

Experiments

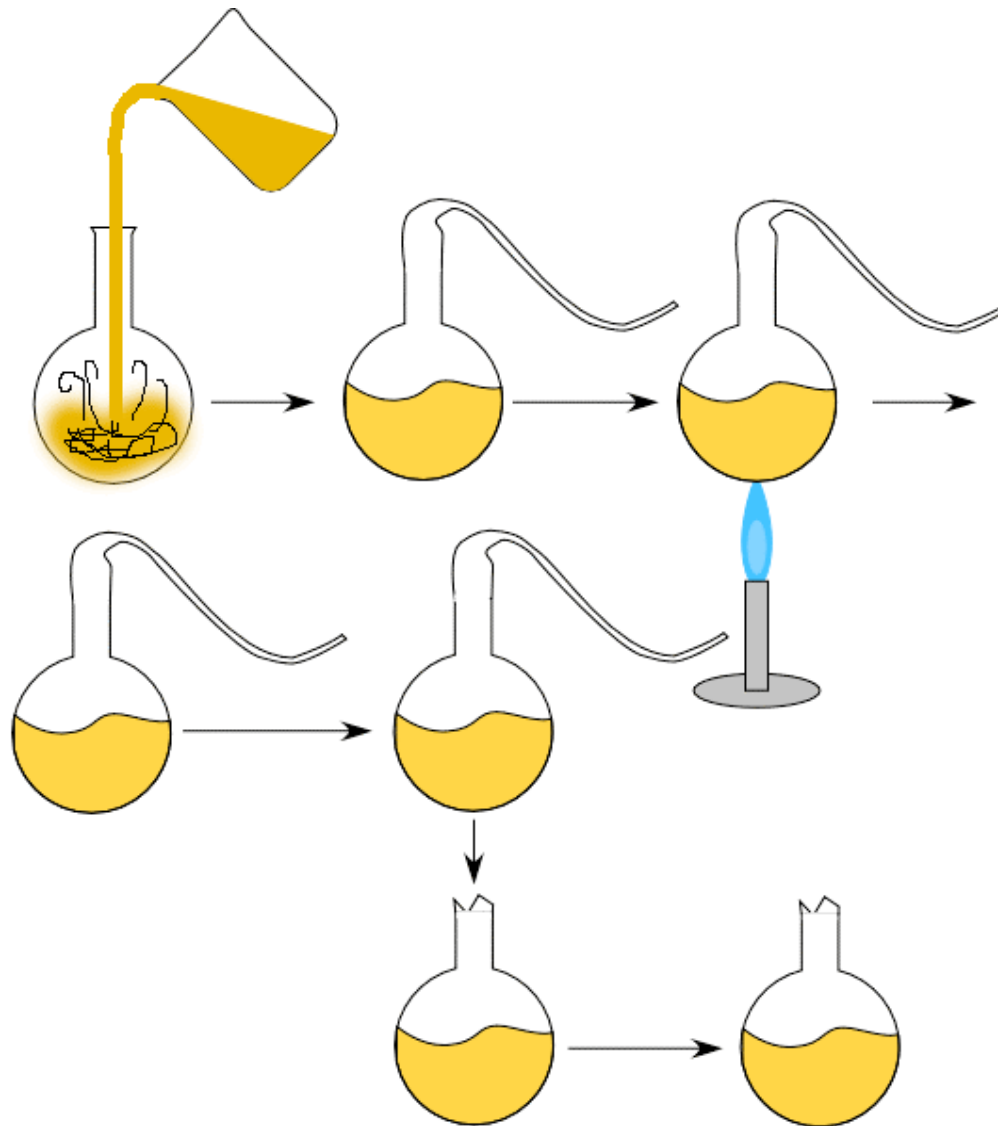
Redi: Used jars of **food** in his experiment.

*****What was the big deal with using jar covers? Why were they substituted for mesh covers? Why was Redi considered a “rebel”?***

Spallanzani: Used broth in sealed flasks in his experiment to disprove spontaneous generation.

*****Using the term “vital force”, explain how skeptics dismissed the findings of Spallanzani for many years.***

Pasteur: Used **flasks with curved necks allowing air to enter but not dust carrying bacteria** in his experiment.



How was Pasteur's experiment different from the others to the point where he finally disproved spontaneous generation?

Earth's History

The earth was formed _____ billion years ago.

Atoms of the same element but with varying numbers of _____ are called _____.

The total of _____ and _____ make up the mass number.

Earth's History

The earth was formed 4.5 billion years ago.

Atoms of the same element but with varying numbers of _____ are called _____.

The total of _____ and _____ make up the mass number.

Earth's History

The earth was formed 4.5 billion years ago.

Atoms of the same element but with varying numbers of neutrons are called isotopes.

*****Why can't we use protons as our first answer?***

The total of _____ and _____ make up the mass number.

Earth's History

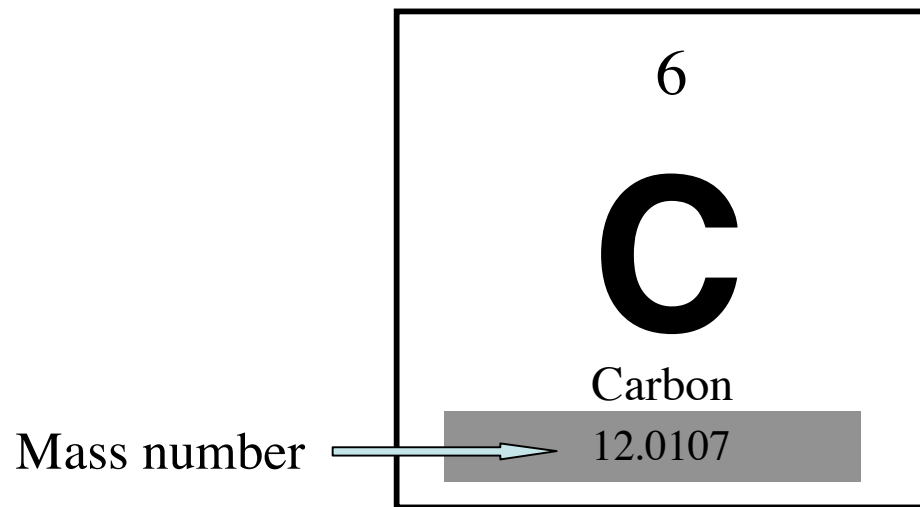
The earth was formed 4.5 billion years ago.

Atoms of the same element but with varying numbers of neutrons are called isotopes.

The total of protons and neutrons make up the mass number.

*****Why aren't electrons included?***

*****Why do elements like carbon have fractional mass numbers if its determined simply by adding the number of two types of subatomic particles?***



Radioactive isotopes are ones that _____...

Half-Life is the length of time it takes _____ of any size sample of an isotope to _____.

If carbon-14 has a half-life of 5730 years and a total of 10 half-lives, how much time must pass before it can no longer accurately measure the age of a fossil?

Radioactive isotopes are ones that **release particles and/or energy**.

*****So, based on your definition, how are radioactive isotopes like someone “going crazy”?***

Half-Life is the length of time it takes _____ of any size sample of an isotope to _____.

If carbon-14 has a half-life of 5730 years and a total of 10 half-lives, how much time must pass before it can no longer accurately measure the age of a fossil?

Radioactive isotopes are ones that **release particles and/or energy**.

*****So, based on your definition, how are radioactive isotopes like someone “going crazy”?***

Half-Life is the length of time it takes **one-half** of any size sample of an isotope to **decay**.

*****If this scallop shell was one color, what would it look like after one half-life?***



Carbon-14 has a half-life of 5730 years and a total of 10 half-lives. How much time must pass before it can no longer accurately measure the age of a fossil?

Radioactive isotopes are ones that **release particles and/or energy**.

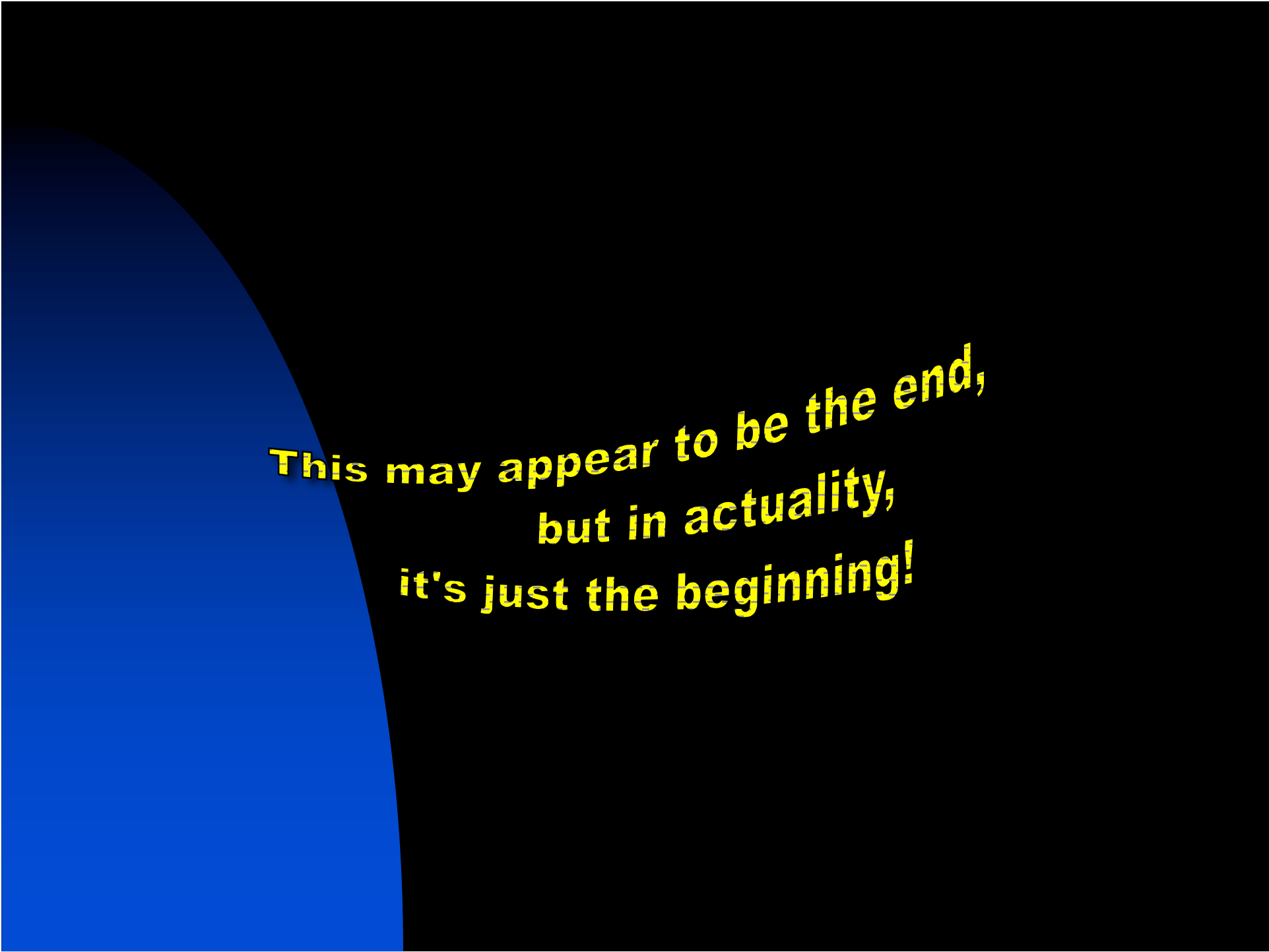
*****So, based on your definition, how are radioactive isotopes like someone “going crazy”?***

Half-Life is the length of time it takes **one-half** of any size sample of an isotope to **decay**.

*****If this scallop shell was one color, what would it look like after one half-life?***



Carbon-14 has a half-life of 5730 years and a total of 10 half-lives. How much time must pass before it can no longer accurately measure the age of a fossil? **More than 57,300 years**

A blue curved shape, resembling a quarter-circle or a large arc, is positioned on the left side of a black background. The text is centered within the black area, slightly overlapping the blue shape.

**This may appear to be the end,
but in actuality,
it's just the beginning!**