TEACHER'S NOTES

EVOLUTION

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ABERDEEN

LESSON 1 WHAT IS EVOLUTION?

1. How does science work
2. Introducing the concept of evolution
3. How does evolution occur?
4. Natural Selection
5. Change and isolation (speciation)
6. Breeding

Come on…. What does a SCIENTIST do?

1. **In all activities dictionaries (on-line or book form) should be available. Teachers and students can use the links given below to practice pronunciation and to find the meaning of the words. I would begin all activities with pronunciation and English vocabulary warm ups which can be used as ASSESSMENT :**

www.howjsay.com
http://www.wordreference.com
http://dictionary.reference.com

Stand up: to continue in force or remain valid

See worksheets for further information

. Observation	- To do it again. Repeat
. Hypothesis	- To refuse. Reject
. Test	- An idea that has not been yet proved. Hypothesis
. Reject	- An idea intended to explain something. Theory
. Repeat	- The ability to watch someone or something. Ob
. Theory	- Method for trying or assessing. Test

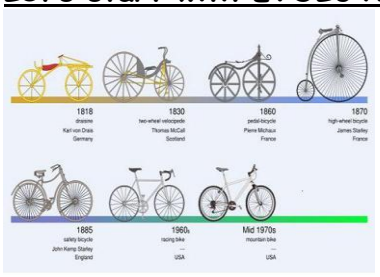
2. Fill in the gaps using the words given below:
(Discuss possible answers in pairs and then correct them during the plenary)

Darwin was a scientist who travelled around the world making…Observations…… (1) and collecting data (facts) about different animals , plants, earthquakes and rocks. He decided to make a….hypothesis…… (2) about the origins of life. He had to ……test…..(3) his hypothesis and sometimes had to…reject……..(4)the prediction he had made and had to …repeat……(5) it again or …improve……it (6). Finally in 1859, he published his …Theory……(7) known as **"On the origin of species."**

3. Explain what a scientist such as Darwin has to do. Put the statements below in the correct order and write the sentences out on your sheet to create a text:

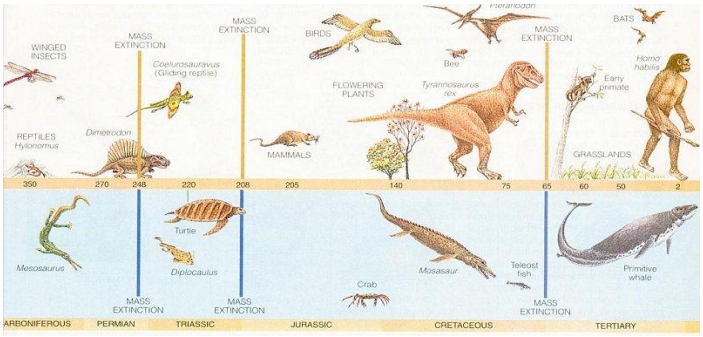
a. I am wrong, I will try it again. 4
b. Perhaps it is a good idea to put it in….2
c. This fact occurred because…5
d. Why did this fact occur? 1
e. I'll have to check it 3

Let's start with EVOLUTION Watch the video about Evolution (LINK)



commons.wikimedia.org/wiki/File:Bicycle_evolu...

Evolution is a……Change……



http://universe-review.ca/I10-03-evolution2.jpg

- If you click here you will see EVOLUTION in movement:

  http://cas.bellarmine.edu/tietjen/facultyseminar/ns01.gif

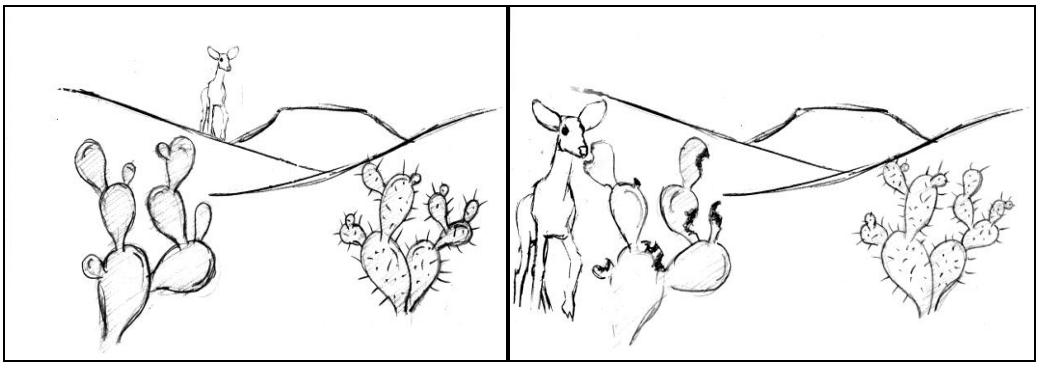
Charles Darwin and **Alfred Wallace** "***came up with***" ……..come up with:

THEORY:

The teacher explains each point whilst showing the images.

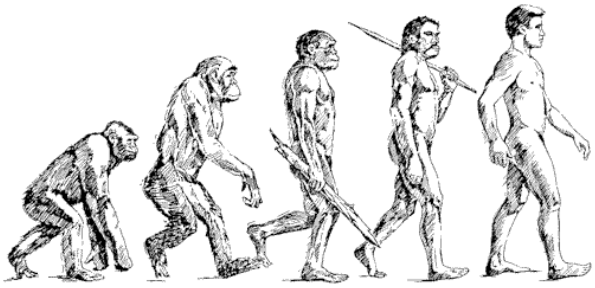
http://www.beverlyajackson.com/ladybugs.jpg

http://tr1.harunyahya.com/Image/makaleler/aslan_zebra.jpg



http://www.scienceteacherprogram.org/biology/Romero07.html

http://evolution.berkeley.edu/evosite/evo101/images/browngreenbeetles4.gif



http://softwarecreation.org/images/2008/human-evolution.gif

4. Circle the correct word and write a short sentence with each below.

1.	evulotion	evolution	avolution	envolution
2.	Darvin	Darrin	Darbin	Darwin
3.	organisim	organo	areganoi	organism
4.	environment	enverinemet	anveriment	invememn
5.	ofspring	theoffspring	offspring	offsummer
6.	notural	natural	noatural	nutural
7.	silection	solecton	eslection	selection
8.	species	spicegirl	espicee	espetial
9.	mutio	mition	mutation	meterere
10.	ansectrum	ancestor	encatorty	castert
11.	stroggle	struggle	striaggle	estriggele
12.	adobtr	adaptat	adaptation	indaptate
13.	treoi	threor	theory	triory
14.	servett	surbibe	srsuti	survive

5. Match each definition with a word

Watch the video about MUTATION (OPTIONAL)

1. Differences among members of a species Variation	2. A relation between animals in which one organism captures and feeds on others. Predator
3. Change in a sequence of DNA. Mutation	4. When an organism of the same species is separated. Isolation
5. To remain or continue in existence. Survive	6. Someone from whom you are descended. Ancestor
7. Rivalry for supremacy Competition	8. External factors surrounding and affecting a given organism at any time. Environment
9. Any immature animal. Offspring	10. A natural process resulting in the evolution of organisms best adapted to he environment. Natural selection

6. Word scramble

Write the correct word and write a short sentence below:

1. iobylgio biology
2. iotuvoenl evolution
3. eggltsur struggle
4. iitafrlaci ciontelse natural selection
5. fringpsof offspring
6. itaonviar variation

Teacher Hint

- Put each word into a short sentence which explains some aspects of the the unit. This is an open-ended activity. More able students should be encouraged to produce further sentences and make them into a report - this will encourage them to check on the register of their writing (i.e. to ensure that the kind of words used are appropriate for the science)

7. Complete the crossword

				[1]T						
[2]O	B	S	E	R	V	A	T	I	O	N
				A						
[3]E				I						
[4]V	A	R	I	A	T	I	O	N		
O				S						
L										
U		[5]S								
T		P								
[6]I	N	H	E	R	I	T	[7]A	N	C	E
O		C					D			
N		I		[8]C	H	A	N	G	E	
		E					P			
		S					T			
							A			
							T			
							I			
							O			
			[9]D	E	S	C	E	N	D	A	N	T

Across
2. OBSERVATION
4. VARIATION
6. INHERITANCE
8. CHANGE
9. DESCENDANT

Down
1. TRAITS
3. EVOLUTION
5. SPECIES
7. ADAPTATION

8. In pairs, discuss the text and fill in the gaps using the words given below:

Organisms tend to produce…more offspring…….than the environment will support. A…struggle for survival… follows and a large number of these offspring die before reaching reproductive age. Members of the same species…are not identical but show variation….in all characteristics. Much of this…variation…….. is inherited……..Those offspring better adapted to their environment have a better chance of surviving……Those offspring less well adapted to their environment die…….. This process is repeated generation after generation. The organisms with the best characteristics are …selected... and survive and eventually predominate in the…population……

9. Which of the following does NOT form part of the theory of evolution proposed by Charles Darwin? Discuss in plenary

A. A struggle for survival occurs because organisms tend to produce more offspring than the environment will support.
B. Members of the same species are not identical; they show variation.
C. Any detrimental change to an organism's phenotype is inherited
D. Those offspring less well suited to the environment are likely to die before producing offspring.

Teacher's Hints

The teacher can explain how three of the statements relate to Darwinian theory.

10. Match up the correct beginnings and endings. Then copy them onto your sheet or into your note book.

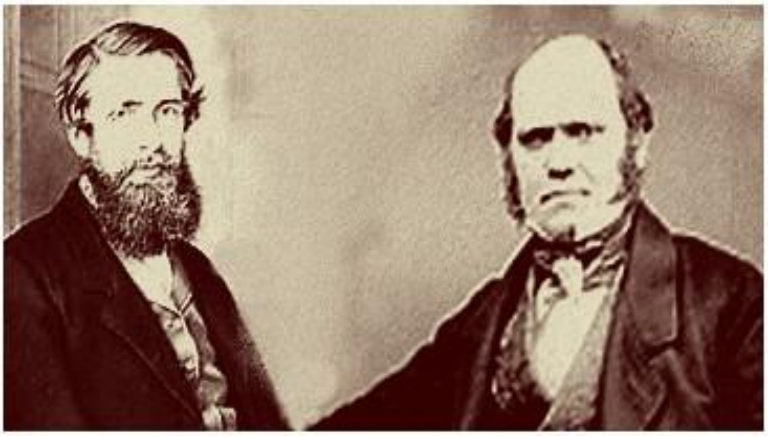
Beginnings	Endings
A. Every organism must… 4	1. …members of a species to survive and reproduce better than others.
B. Some variations allow… 1	2. …in a species are exactly the same.
C. Organisms pass… 5	3. ..which gradually selects better adapted organisms over billions of years
D. Not all of the individuals… 2	4. … struggle to survive.
E. Biological evolution is a process .. 3	5. .. their traits to their offspring.

NOTE:
The texts which the students produce in their notebook will form the basis of revision notes needed for a test.

11. **ICT ACTIVITY**

http://en.wikipedia.org/wiki/Alfred_Russel_Wallace

http://en.wikipedia.org/wiki/Charles_Darwin



- Where and when they were born;
- Where and when they died;
- What they did;
- Their nationality;
- They were known because..
- Problems associated with their theory.

http://thesecondevolution.com/wallace&darwin.jpg

Alfred Wallace and Charles Darwin

1. BIOGRAPHIES

Wallace: 8 January 1823 – 7 November 1913) was a British naturalist, explorer, geographer, anthropologist and biologist. He is best known for proposing a theory of natural selection independently which prompted Charles Darwin to publish his own theory.

Darwin: (12 February 1809 – 19 April 1882) was an English naturalist[I] who realised that all species of life have evolved over time from common ancestors. He published compelling supporting evidence in his 1859 book *On the Origin of Species* . Here he presented his scientific theory that branching patterns of evolution resulted from a process that he called natural selection.[1][2]

POSSIBLE DEVELOPMENTS/IDEAS:

The students can be encouraged to raise the sensitive issue of religious beliefs: many people believe that life was created by GOD which may have contradictions with Darwinian Theory.

Wallace and Darwin were known because of their theories of Natural Selection
This part of the activity about religious problems could be done all together with activity 8 of Lesson 3 on page 10.

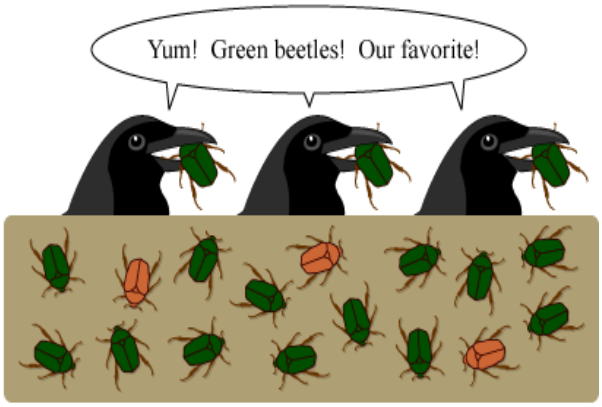
Natural selection

Explain that species which are less adapted die. Those which survive are better adapted. Encourage students to provide some examples and then provide some of your own.

"***weeding out***" : eliminating

Biotic and abiotic: The teacher explains something about

Natural selection, in a nutshell:



http://evolution.berkeley.edu/evolibrary/images/interviews/naturalselection1.gif

http://away.com/gifs/states/hi/puuoo3.jpg

http://www.fwi.co.uk/blogs/lincolnshire-farming-blog/penguins_1120746c.jpg

12. Dictionary activity. Look up the meanings of: "Weeded out"  **and "evolved" in the dictionary. Write the meaning below:**

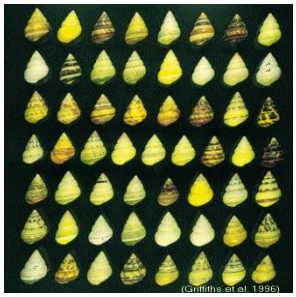
13. Match each picture with one word selected from the box below:

Be careful there are more words than pictures so you will have to select carefully:

1.

2.

3.



http://www1.umn.edu/ships/evolutionofmorality/text/30.htm 2.
http://www.strangezoo.com/content/item/149150.html 1.
http://www.woodka.com/2005/07/29/variation/ 3.
http://reference.findtarget.com/search/predator/ 4.
http://www.flickr.com/photos/15745225@N00/705454064 6.
http://www.lakelandwildlife.co.uk/species.htm 5.
http://www.wildlifeextra.com/images/Dwarf-Buffalo-drawing.JPG 7.

4.

5.

6.

7.

Evolved	Advantage	Struggle
Offspring	Variation	Species
Predation	Variant	Adaptation

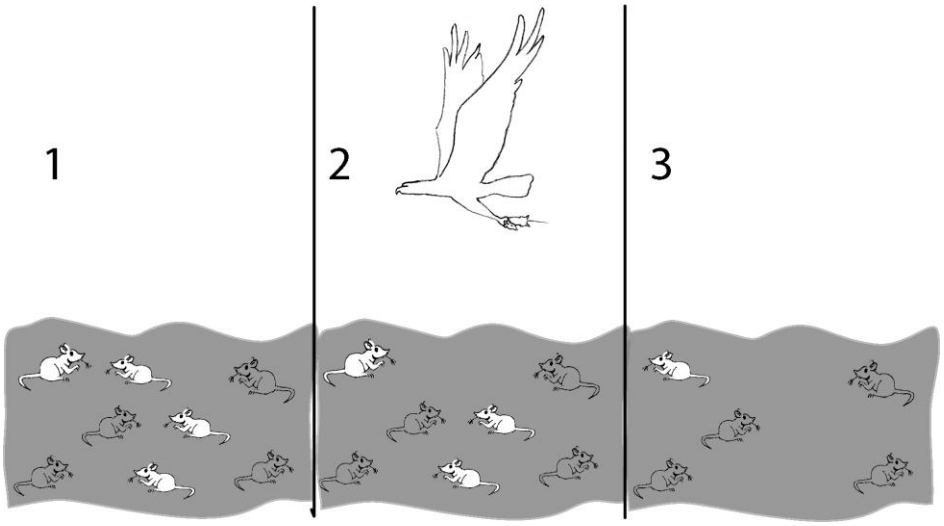
1. Adaptation 2. Struggle 3 Variation 4. Predation

5. Species 6. Offspring 7. Evolved

14. What name did Darwin give to the "weeding out" process which promotes the survival of the "***fittest***" in each generation?

Natural selection.

15. Describe what is happening in figures 1-3. Is the population of mice different in figure 3 than in figure 1? Explain why.



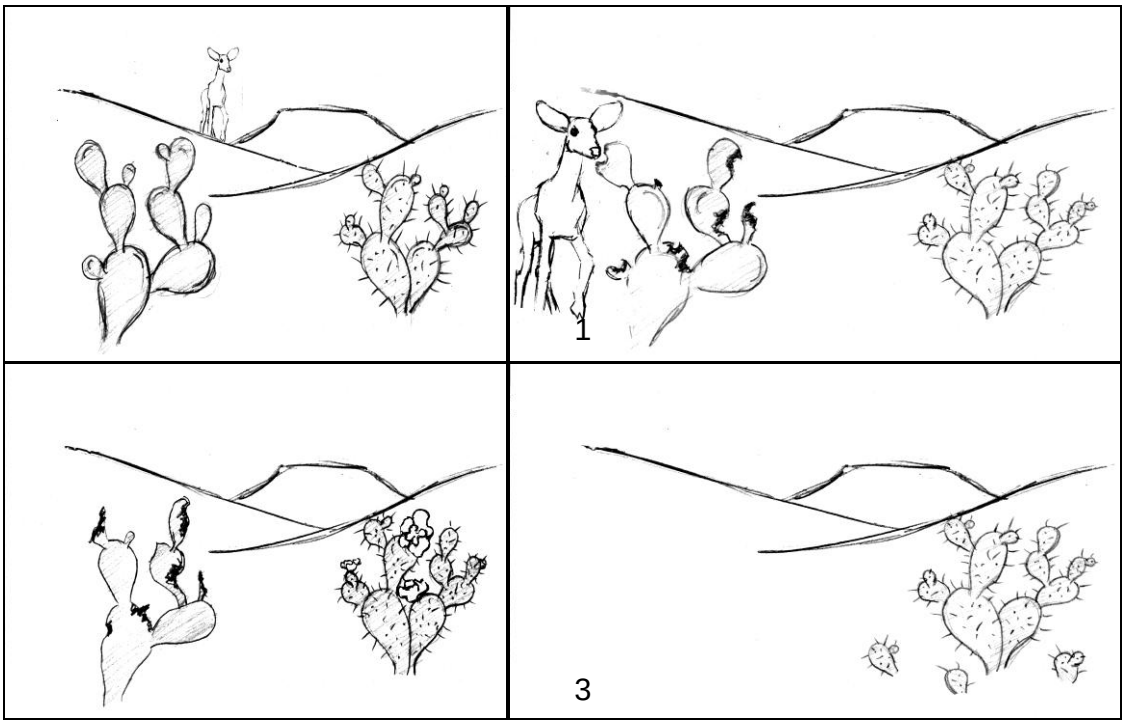
The colour. Explain the contrast with the background.

Teacher's suggestions

The teacher can find more information about this activity through the url links below and you can download this and other activities as a handout .
In the first url link it is possible to download many other activities about Genetics and Mitosi Meiosi.)
In the second address there is an interactive activity : **(NOWHERE TO HIDE)**

Essential to visit: http://serendip.brynmawr.edu/sci_edu/waldron/
http://www.scienceteacherprogram.org/biology/Romero07.html

16. Below is a series of pictures representing changes in a population of cacti. Pictures 1 and 2 show what happened when a "*deer*" came to eat, picture 3 shows the cacti a few weeks later (notice the flowers on the right-hand cactus), and picture 4 shows the situation a few months later.



http://serendip.brynmawr.edu/sci_edu/waldron/
http://www.scienceteacherprogram.org/biology/Romero07.html

Remind students that the three conditions listed below are necessary for natural selection to take place.

Answers are encouraged which lead to discussions about the following concepts: inheritance, best adapted are selected, natural selection, the genes pass on... The teacher can add any other comment.

1. **Variation in characteristics within the population:** In picture 1, what is the main difference between the cactus on the left and the cactus on the right?

The thorns…

2. **Differences in survival, reproduction and fitness**: Why would a deer be more likely to eat the cactus on the left than the cactus on the right?

The cactus on the left because it doesn't have thorns….

What effect does the deer's behaviour have on the survival and reproduction of these two types of cactus?

The behaviour of the deer will favour the survival and reproduction of the cactus with thorns…

3. **Heredity of characteristics from parent to offspring:** The difference between the cacti is an inherited characteristic (see picture 4).

The teacher can talk about the better adapted features that will pass on to offspring and will be inherited

Do you think that evolution by natural selection is occurring in this cactus population? Explain below why or why not:

The teacher can explain that natural selection choses the better acquired features from the animals and plants to be inherited.The best adapted survive

LOOK AT:

Industrial melanism in the "*peppered moth*" (*Biston betularia*).

Teacher's suggestions

The teacher can tell the story of melanism in the moth. The contrast lies between the colour of pepper and the background of the treetrunk (Adaptation). Looking through url links the students can learn more about the industrial revolution and melanism. There are links as well, about camouflage..

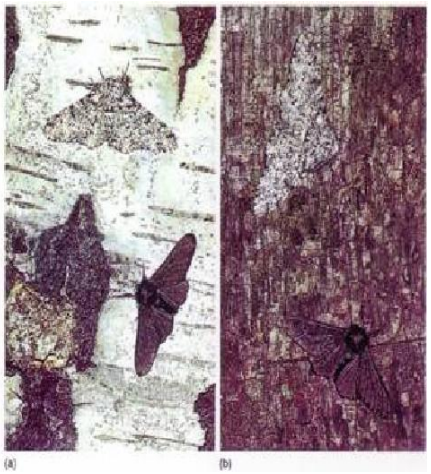


Figure 1.

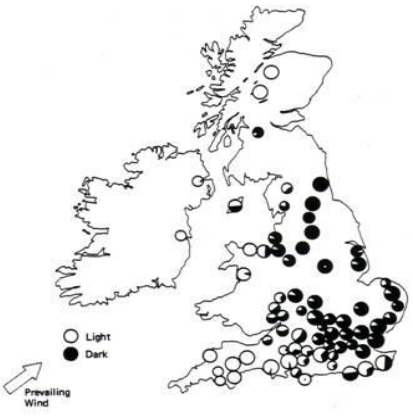


Figure 2.

http://www.cbu.edu/~seisen/PopulationGenetics_files/image007.jpg

http://www.globalchange.umich.edu/globalchange1/current/labs/Lab5_PepperedMoth/PepperedMoth.htm

. If you would like to know more about Industrial melanism link to these urls:
http://en.wikipedia.org/wiki/Peppered_moth_evolution
http://www.millerandlevine.com/km/evol/Moths/moths.html

17. **Dictionary activity:**

Look up in a dictionary the meaning of all the words with "**inverted commas**" from the text, and write them below:

17. Which form of peppered moth was most common in Britain before the industrial revolution? Give reasons

White, because of the contrast of the background colour….

18. Which form of peppered moth became the most common in industrial areas following the industrial revolution?Give reasons

Black, because of the contrast of the background colour…..

19. Do you think the cause of the environment changing was a biotic or an abiotic factor? Give reasons.

This is explained in the introduction of Natural Selection. The answer is abiotic

CAN YOU SEE ME?

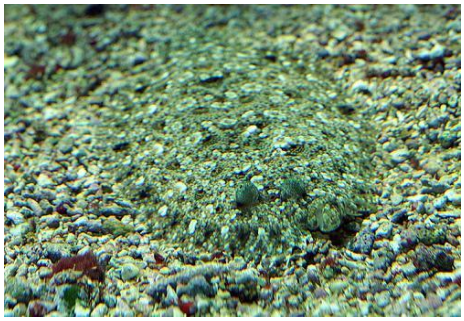
20. Look at the pictures and explain what kind of animal they are. Explain in your own words how <u>this camouflage</u> works by filling in the gaps with words from the box.

1.

2.

3.

.



It is an/a……and it has…adapted….this form to the…environment..... to avoid being…eaten……by a…predator……

eaten adapted predator environment

One sentence for each animal:

Chose any other photo from the web's iiii:

1. frog leaf http://conservationreport.com/2008/11/08/can-you-see-me-animal-camouflage-leaf-mimics/

2. butterfly or katydic insect http://conservationreport.com/2008/11/08/can-you-see-me-animal-camouflage-leaf-mimics/

3. Grey cicada http://www.oddee.com/item_96535.aspx

4. leaf insect http://conservationreport.com/2008/11/08/can-you-see-me-animal-camouflage-leaf-mimics/

5. Lizard **http://very-bored.com/index.php?option=com_content&task=view&id=94&Itemid=1**

6. Fish **http://very-bored.com/index.php?option=com_content&task=view&id=94&Itemid=1**

7. a bird http://www.oddee.com/item_96535.aspx

8. leaf insect http://conservationreport.com/2008/11/08/can-you-see-me-animal-camouflage-leaf-mimics/

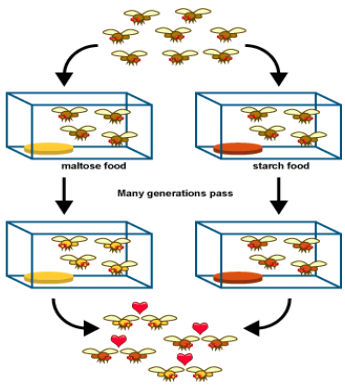
Solutions:

http://very-bored.com/index.php?option=com_content&task=view&id=94&Itemid=1
http://www.oddee.com/item_96535.aspx
http://conservationreport.com/2008/11/08/can-you-see-me-animal-camouflage-leaf-mimics/

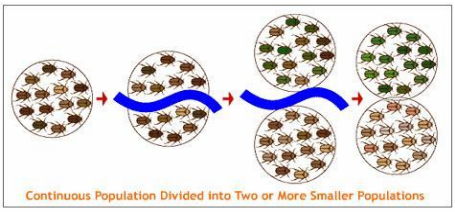
EVOLUTION CAN LEAD TO SPECIATION (Watch Video)

With the aid of images the teacher explains the meaning of speciation and all the steps involved in developing a new species. The students can read step by step and talk about and explain each stage.

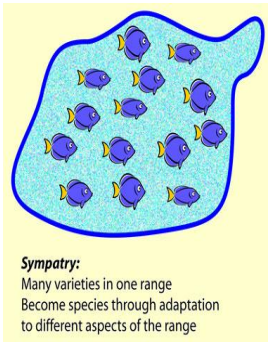
http://taxonomy.zoology.gla.ac.uk/~rdmp1c/teaching/L1/Evolution/l6/grandcanyon.gif



http://evolution.berkeley.edu/evosite/evo101/images/drosophila_experiment.gif



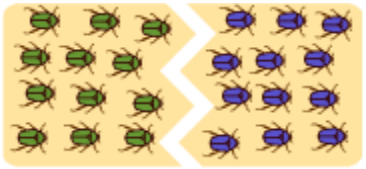
http://image.tutorvista.com/content/heredity-evolution/allopatric-speciation.jpeg



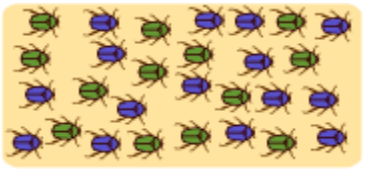
http://scienceblogs.com/evolvingthoughts/Sympatry.jpg

LOOK At these pictures

21. Match each with a different kind of speciation: Allopatric or Sympatric:



1.



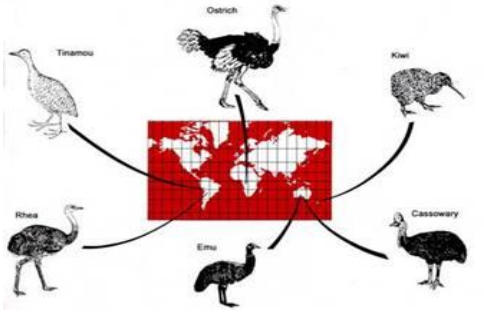
2.

http://evolution.berkeley.edu/evosite/evo101/VSpeciation.shtml

3.

http://evolution.berkeley.edu/evosite/evo101/images/appleflies.gif

4.



http://landresources.montana.edu/dward/pages/diversity_ecology_evolution/geog_isolation.htm

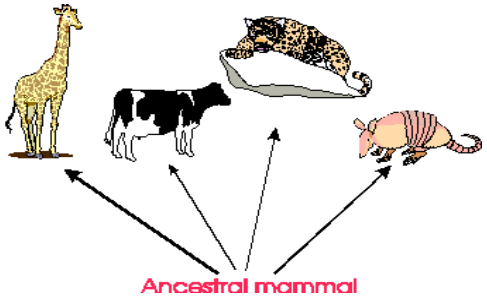
Teacher suggestion

In this url it is possible to find more pictures and activities about speciation !!!!

http://evolution.berkeley.edu/evosite/evo101/VSpeciation.shtml

1. Allopatric
2. Sympatric
3. Allopatric
4. Sympatric

http://farm4.static.flickr.com/3089/2588617068_f43457a2e8_o.jpg



http://www.biologie.uni-hamburg.de/b-online/library/cat-removed/u4aos2p4.html in this web there is more information,,,,

22. **Which of the following diagrams best represent the adaptative radiation (divergence) of Darwin's Finches. Discuss your reasons in the plenary**

Obviously C . Discuss the significance of the arrows

23. In the box below you will find different ways of collecting food by different species of birds. Decide what shape of beak would be needed for each type of food "gathering". Choose from the list of adjectives below:

OPEN ACTIVITY:

I'll provide the following solutions but some you can change by your self:

Duck: flat, **Sieves** its food out of **pond** water
Gull: hooked, It eats fish
parrot: hooked, eats seeds
flamingo: curved,It feeds by filtering

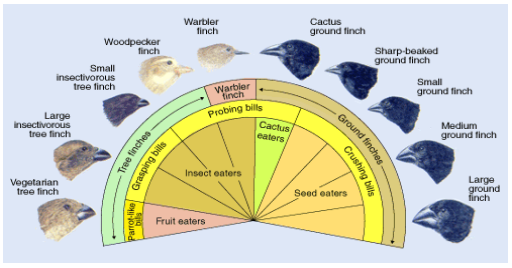
Eagle: hooked, It is a bird of prey kiwi: .long , eats invertebrates from under the ground ,

Night hawk: fine,it catches insects by flying spoon bill: spoon-like It eats ,small fishes and amphibians aquatics

Avocet: curved, It eats Crustaceans under water pelican: sack-like, It eats fish,

Wood pecket:sharp, It makes holes in the trees

Look up the words you don'tknow in the dictionary.!!!!



https:/.../Darwin.+Charles

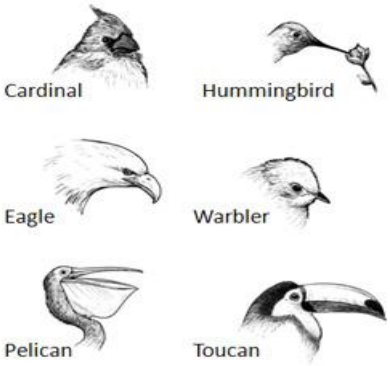
http://ez002.k12.sd.us/Chapter%20Thirteen%20Science.htm

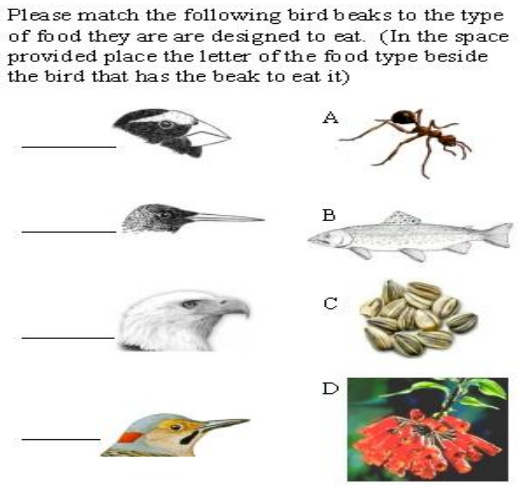
E.g.: The beak of a cross bill is crossed because it eats conifer-seeds

The beak of a …… is …….. because …….

¡¡¡ **If students are unclear about the above activity, then other similar activities can be used. For examples see below:**

http://www.fernbank.edu/Birding/BeaksToEats.htm

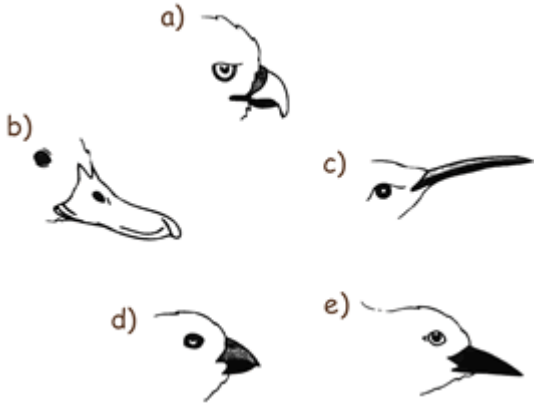




TEACHER'S SUGGESTIONS

It is possible to download a handout and browse the url below:

http://www.csulb.edu/web/labs/bcl/birdseyeview/intro.html



CURVY BEAKS

I. Match the bird's beak with the kind of food it eats

_____1. Hammering into trees

_____2. Grabbing small animals

_____3. Cracking seeds

_____4. Straining food from the lake bottom

_____5. Sipping nectar from flowers

http://idahoptv.org/dialogue4kids/season5/boprey/curvybeaks.cfm

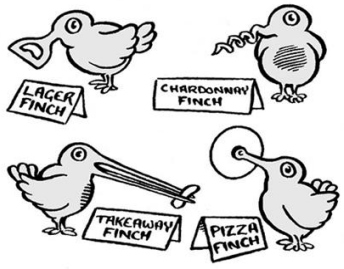
24. Why, when we live so far apart, do we look so similar?

Emu (Australia) : http://www.4staremuranch.com/images/emu3.jpg
Rhea (South America) : www.arthurgrosset.com/sabirds/darwin%27srhea.html
Kiwi (New Zealand) : http://www.worldcountries.info/NewZealand/a1-NewZealand-24.htm
Ostrich (Africa): http://animals.howstuffworks.com/birds/ostrich-facts.htm/printable

Because we share……a common ancestor……

TEACHER HINTS

To develop these ideas more deeply other examples can be discussed and explored including the pangea and the separation or rift of the continents

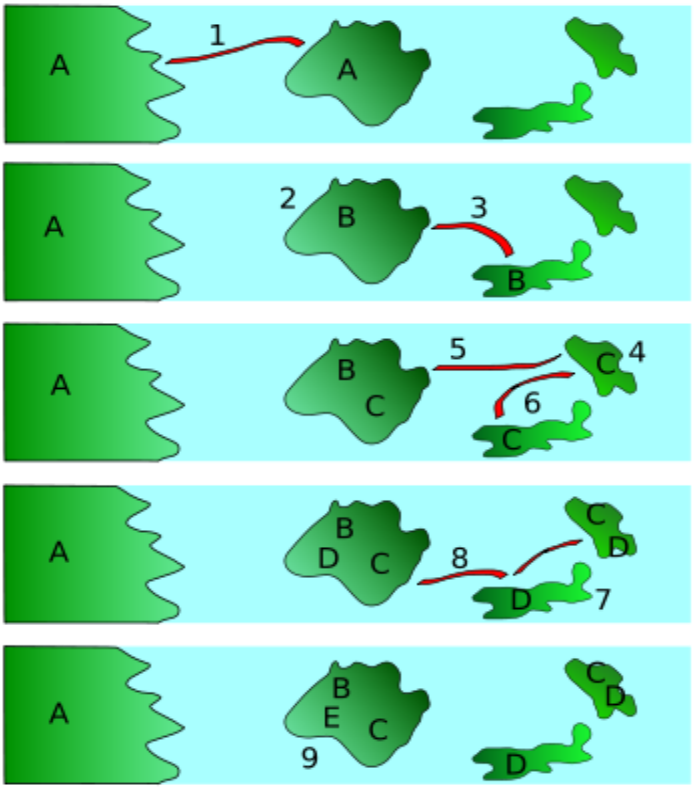


http://pool.org.au/text/peter_ravenscroft/good_one_charlie_but_can_you_tone_down_the_band

https://my.unsw.edu.au/student/academiclife/Forms.html

25. Darwin has a problem!!!, Can you help him?

This could be a paired activity where the teacher gives each pair a set of strips below cut into individual strips. Students have to put them in the correct order. They can check their own work afterwards by looking at a projection of the photo.



1. Species A migrates from the mainland to the first island.

2. Isolated from the mainland, species A evolves to species B.
3. Species B migrates to the second island.

4. Species B evolves in species C.
5. Species C recolonizes the first islands, but is now unable to reproduce with species B.
6. Species C migrates to the third island.
7. Species C evolves into species D.
8. Species D migrates to the first and second island.

9. Species D evolves to species E.

.

http://www.answers.com/topic/adaptive-radiation : There are more ionformation in this web

Use a dictionary to find the meanings of the new words !!

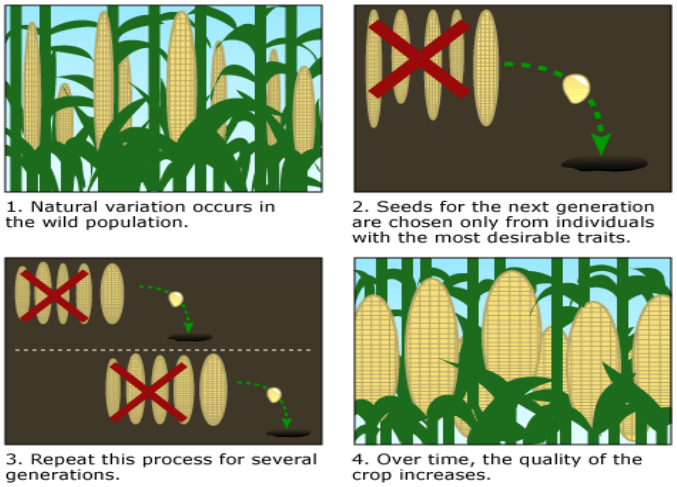
Breeding is Artificial Selection

- Students have to be aware of the importance of artificial selection in 21st century.
- How many kinds of food has it been possible to obtain through Artificial Selection?

The teacher explains the consequences of breeding.

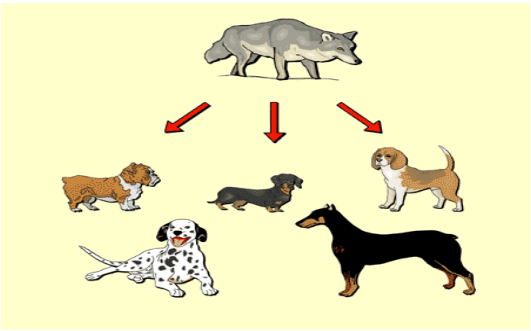
.

http://scienceblogs.com/bloggingtheorigin/2009/01/variation_under_domestication.php



http://evolution.berkeley.edu/evolibrary/news/070201_corn

http://theabundancefoundation.org/plant-breeding



http://schoolnet.gov.mt/biology/evolution.htm

26. There are different members of the cabbage family.. Several varieties have been selected to produce modern vegetables. Chose from the box the features which you think have been selected.

Use the dictionary to find the meaning of the words you don't know

1. http://www.ehow.com/how_5097355_grow-tasty-broccoli.html
2. http://www.beyondtheshaker.com/saltscribe/2009/08/farmers-market-ingredient-of-the-week-brussels-sprouts/
3. http://www.pattayadailynews.com/showfeature.php?FeatureID=0000000284
4. http://www.recipetips.com/glossary-term/t--36957/yu-choy.asp
5. http://en.zlfarm.com/?p=12&a=view&r=8





1. 2. 3. 4. 5.

Green-crinkled leaves small leaf white crinkled flower Large leaf purple leaf

Vegetable…1…… has been selected because of its …green-crinckled…leaves……..

There are extra words. !!!!!!

27: Make a sentence about one of these animals or plants, choose the correct words from the box. If you don't know or remember any name use the dictionary.

Sheep: http://www.jumpinmagonline.com/page22.aspx

Goat: www.yorkblog.com/onlyyork/goat_1.jpg

Cow : **http://www.map.es/ministerio/delegaciones_gobierno/delegaciones/galicia/actualidad/notas_de_prensa/notas/2008/12.html**

Pig: http://blogs.venturacountystar.com/vcs/dennert/archives/2007/06/

Hen: www.faqs.org/photo-dict/phrase/359/hen.htm

Corn: http://www.dreamstime.com/royalty-free-stock-photography-ear-of-corn-image2866427..

Rice: http://preparednesspro.wordpress.com/2009/04/

Onion: http://science.howstuffworks.com/onion-info.htm

Name of animal or plant	has been selected/ has been bred	to / to produce	improve the quality of	wool hide milk eggs
			a rapid growth of	meat-protein to diseases
			be resistant	crop- yield crop-field cereals-crop

e.g: corn has been selected to produce a rapid growth of crop-yield or crop-field..

28. You are noe going to test all you remember about Evolution. Fill in the gaps with the most suitable word from the box.

a. Natural…selection….favours those members of a population best……suited……..to an environment.
b. The members of a …species……form a natural …interbreding……..group which is reproductively isolated.
c. The process of……speciation……..depends on …barriers……..that divide a population into two or more …isolated…… groups.
d. Evolution is a ..continuous……. process. As new species appear, other less successful ones become…… extinct……..
e. Breeders use ……artificial……selection to selectively breed organisms useful to mankind.

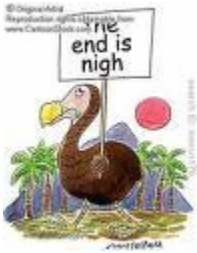
artificial	extinct	species	people	barriers	isolated	suited
selection	different	continuous	venue	interbreeding	variable	speciation

There are extra words !!!!! venue-different-people-variable

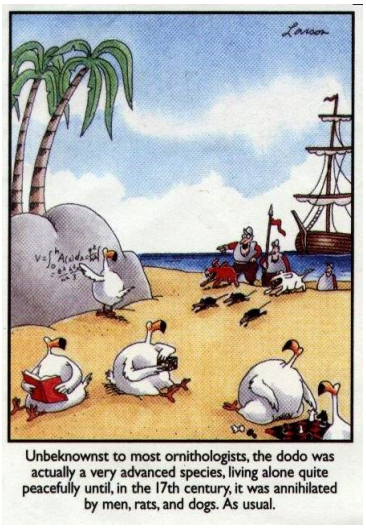
29. ***Find out*** **more information about the Dodo and other extinct species and write it beside the picture. Use an encyclopaedia, the internet and other sources. (Remember to write the source).**

REFLECTION and **OPEN ACTIVITY :**

The teacher can set up a reflection about extinct and endangered especies.
The students can find information in Wikipedia or other internet sources. Provide the students with the following urls but also ensure that they record any urls they use themselves.



http://www.cartoonstock.com/directory/p/placard.asp



http://userscripts.org/topics/19396

http://missfisherandmrsmcaffrey.blogspot.com/2009/01/getting-into-functional-writing.html

LESSON 2 EVIDENCE FOR EVOLUTION

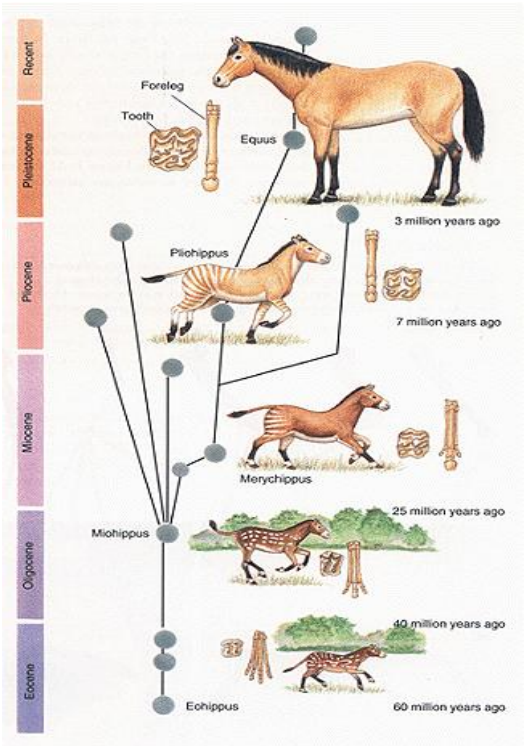
1. **Fossil record**
2. **Comparative anatomy and development**
3. **Vestigial organs**
4. **Similarities of embryos**
5. **Similarities of DNA**
6. **The Beagle trip**

FOSSILS (Watching the Videos is optional)

The teacher can introduce the topic by talking about the importance of preserving fossils. This enables students to a) to learn more about the past and b) the fossil record as evidence of gradual change. Note: not all fossils are represented.

Teacher's hints.

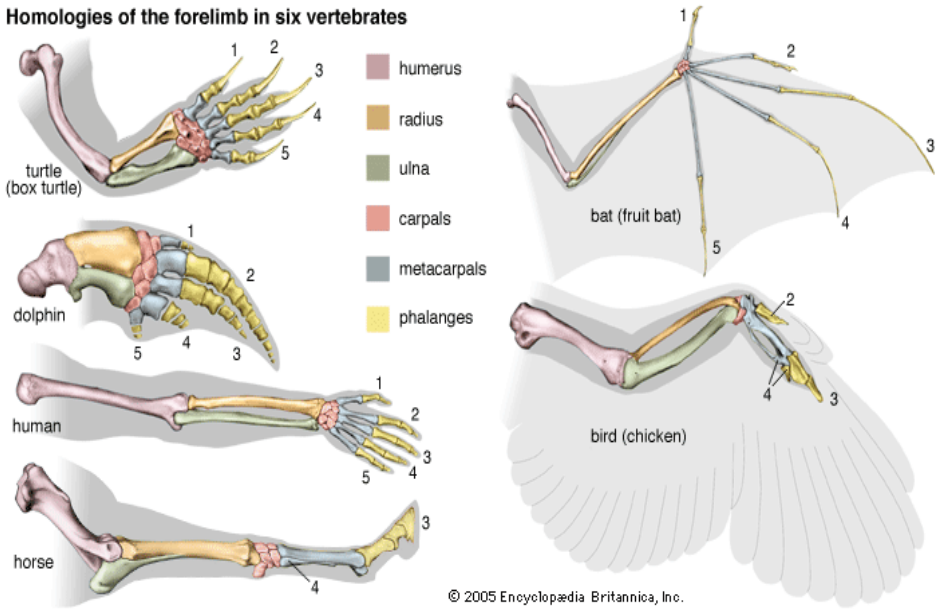
Explain the available evidence, and highlight that DNA is nowadays the most important evidence . The teacher might add any other evidence….or use any other suggestions.



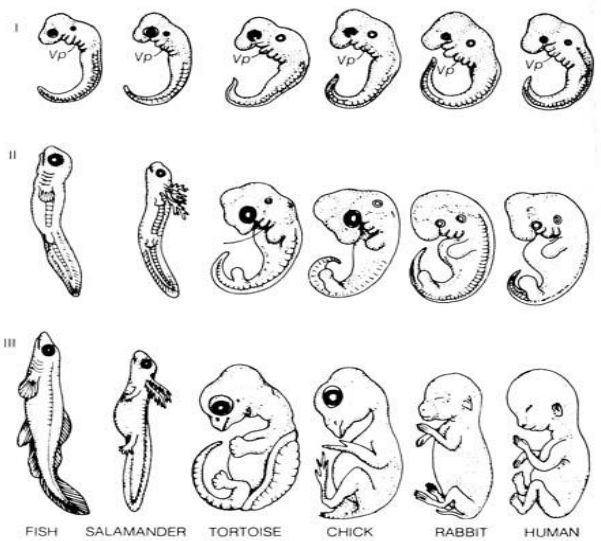
http://brianlean.wordpress.com/2008/08/

http://www.biology-blog.com/images/blogs/evolution-3221.jpg

Watch the Video about Homology



http://media-2.web.britannica.com/eb-media/90/52990-004-A7D8FB4A.gif



http://www.ibri.org/Books/Pun_Evolution/Chapter2/fig2-40.jpg

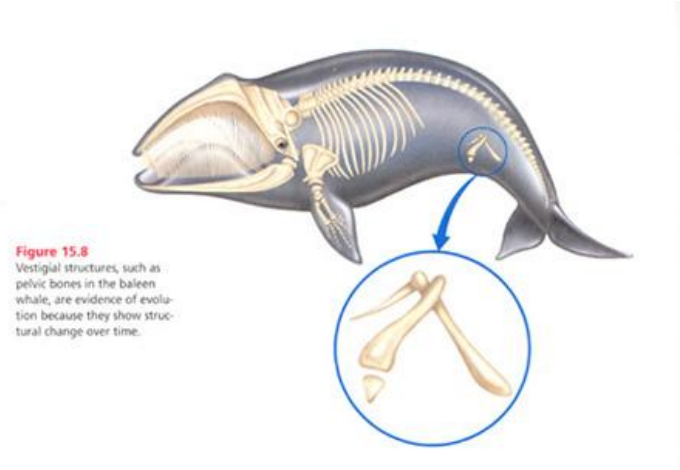
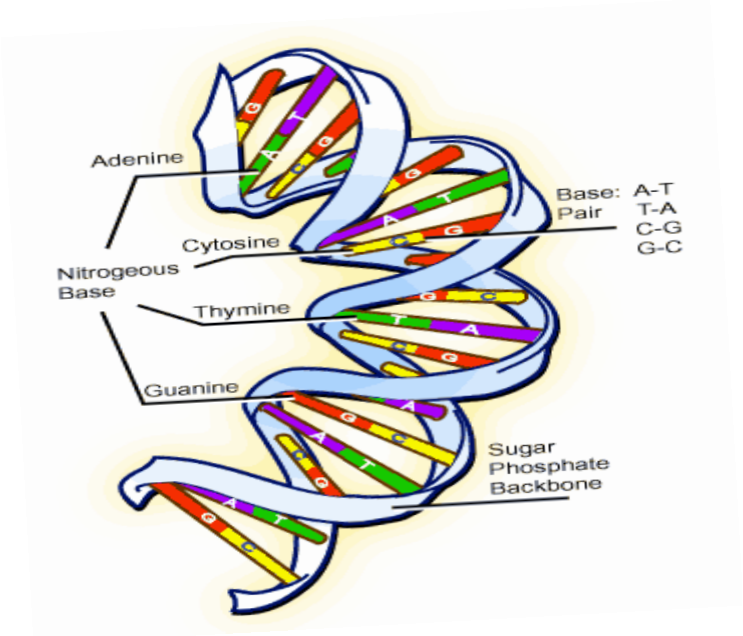


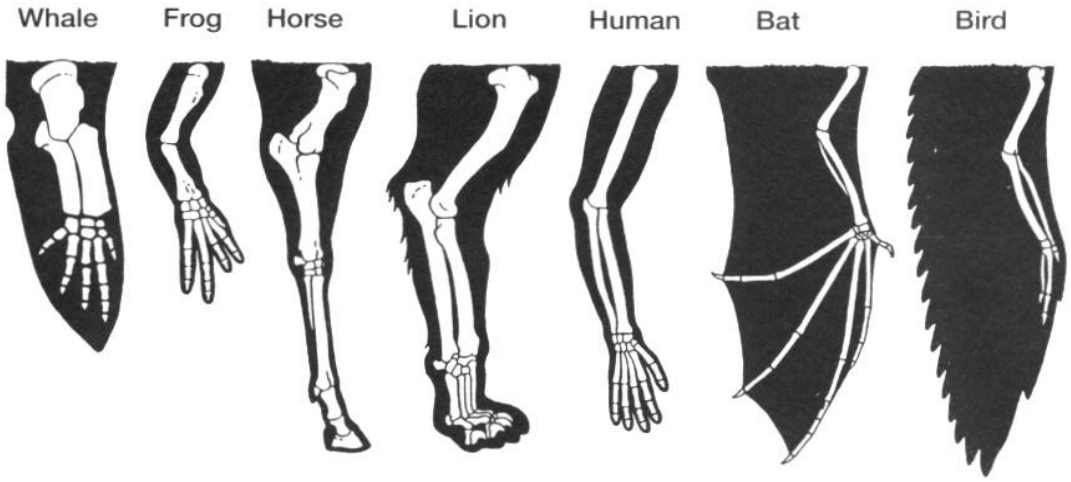
Figure 15.8
Vestigial structures, such as pelvic bones in the baleen whale, are evidence of evolution because they show structural change over time.

http://www.answersingenesis.org/assets/images/articles/ee/v2/whale-vestigial-structure.jpg



http://www.scq.ubc.ca/wp-content/dna.gif

1. Look at these pictures and answer the questions given below using the sentences given in the box. Work in pairs.



http://www.cbu.edu/%7Eseisen/homology.jpg

. Are they similar? Yes, the bones have the same origin but the function is different

. Count how many bones there are. Highlight these in different colours 6 (comparing the picture, there are 6 colours). Compare the bones of the whale "arm" with those of the rest of animals in this graph

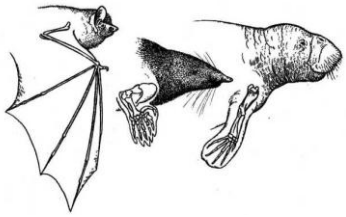
. What would be the best limb if you wanted to run? horse

. What about flying? bird

There are……6….. bones in each animal limb. They are/aren't similar, but they are used for …different…….actions. To run /fly the arm of…the …horse/bird……..is better……

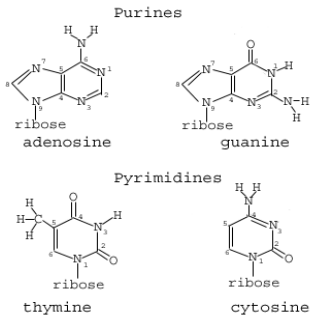
2. Match each picture with one piece of Evidence of Evolution

A. 

B. 

C. 

C. 

D. 

A. Fossil record : **http://www.woodcollection.com/fossil-shell240op.jpg**

B. Homologies: http://www.daylightatheism.org/images/VertebrateHomology.jpg

C. Embryos : http://www.infoniac.com/uimg/human-embryo.jpg

D. Vestigial organs : http://1.bp.blogspot.com/_a3CpCqQPyjk/SS-aorShVjI/AAAAAAAAAbg/osSjmyHQKww/s320/ap%C3%A8ndix.jpg

E. **Similarioties in DNA:** http://www.lpl.arizona.edu/undergrad/classes/spring2009/Hubbard_206-2/Lectures1/dna.gif

3. Read the three statements below:

a. The bone structure indicates that humans share a common ancestor with other vertebrates.
b. The bone structure indicates that humans have evolved from one of the vertebrates in **Diagram B**.
c. The bone structure of these limbs has adapted to different ways of moving as the organism has evolved.

Which of the statements are correct? Discuss in plenary.

1. Statements **a** and **c**.

2. Statements **b** and **c**.

3. Statements **a, b** and **c**.

4. None of the statements are correct.

I think ……. is the correct statement .because…all the structures are similar and have the same ancestor……..

4. The fossil evidence indicates that a new species has evolved from an ancient ancestral species. The new species survived, while the ancestral species became extinct.Discuss in plenary.

Which of these is most likely to have caused the extinction of these species?

1 An increase in existing predator numbers
2 An increase in prey numbers
3 A change in the environment
4 An increase in the rate of fossilisation.

I think the most probably could be…3….. because ……open..
Any other solution could be discussed with evidence

5. Complete the crossword:

									[1]F					
							[2]A	N	A	T	O	M	Y	
											S			
							[3]H				S			
				[4]V			[5]F	O	R	E	L	I	M	B
				E				M				L		
		[6]E		R				O						
	[7]V	E	S	T	I	G	I	A	L					
	I			E					O					
	D			B		[8]Q	U	A	G	G	A			
	E			R					Y					
	N			A										
	C			T										
	E			E										
				S										

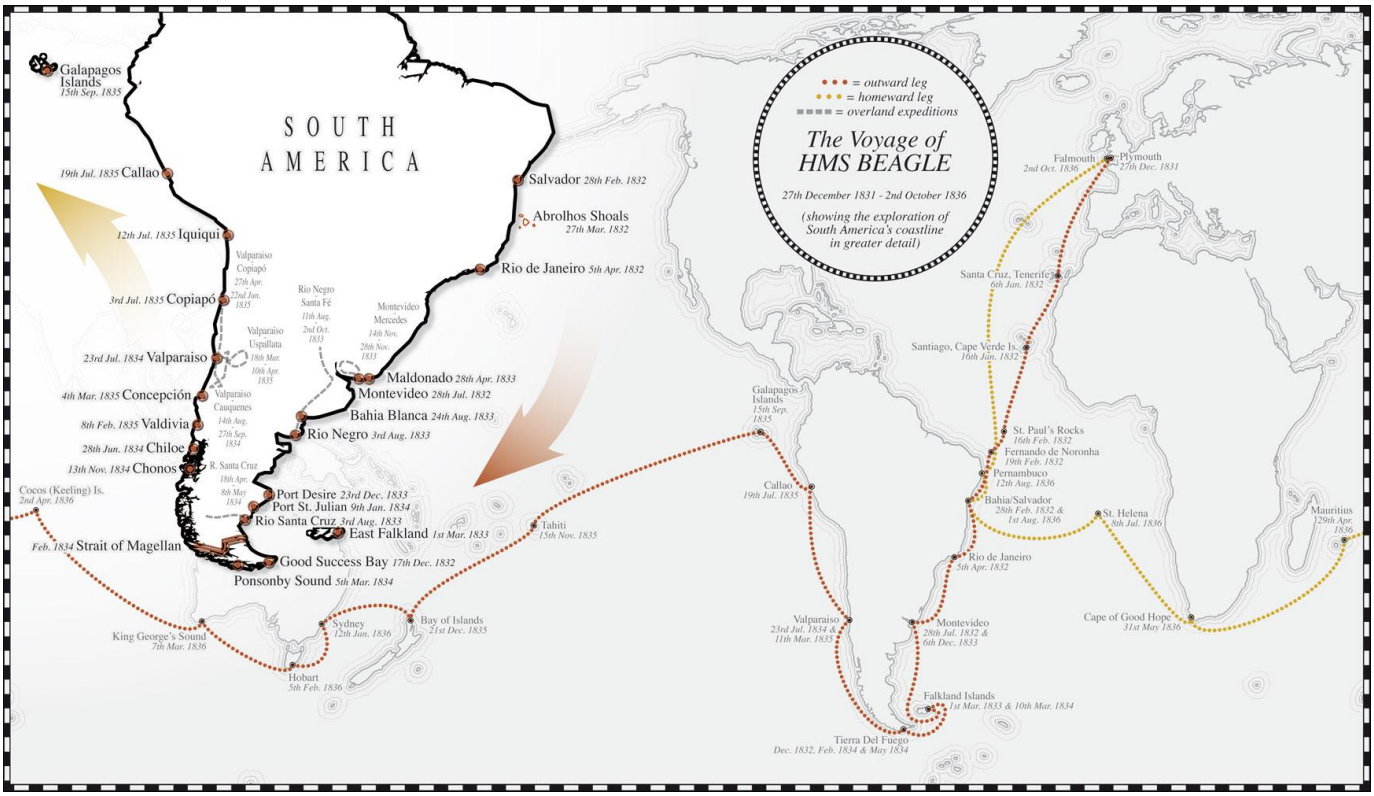
6. Imagine you are a scientist and you are sailing around the world. Describe all your experiences in a diary. The travel log should contain at least:

OPEN ACTIVITY

The idea is to encourage students to create an extended piece of writing in the form of a diary or a TRAVEL LOG. Some words and statements are given as examples. The TRAVEL LOG will cover a journey over 6 different days.
The English given is an extract from one such log. Students do not need to use complicated verbal structures.

TEACHER's HINTS

For scaffolding ideas refer to the worksheet
This piece of student work could be used as an assignment
There are other formats it could take e.g. a blog.



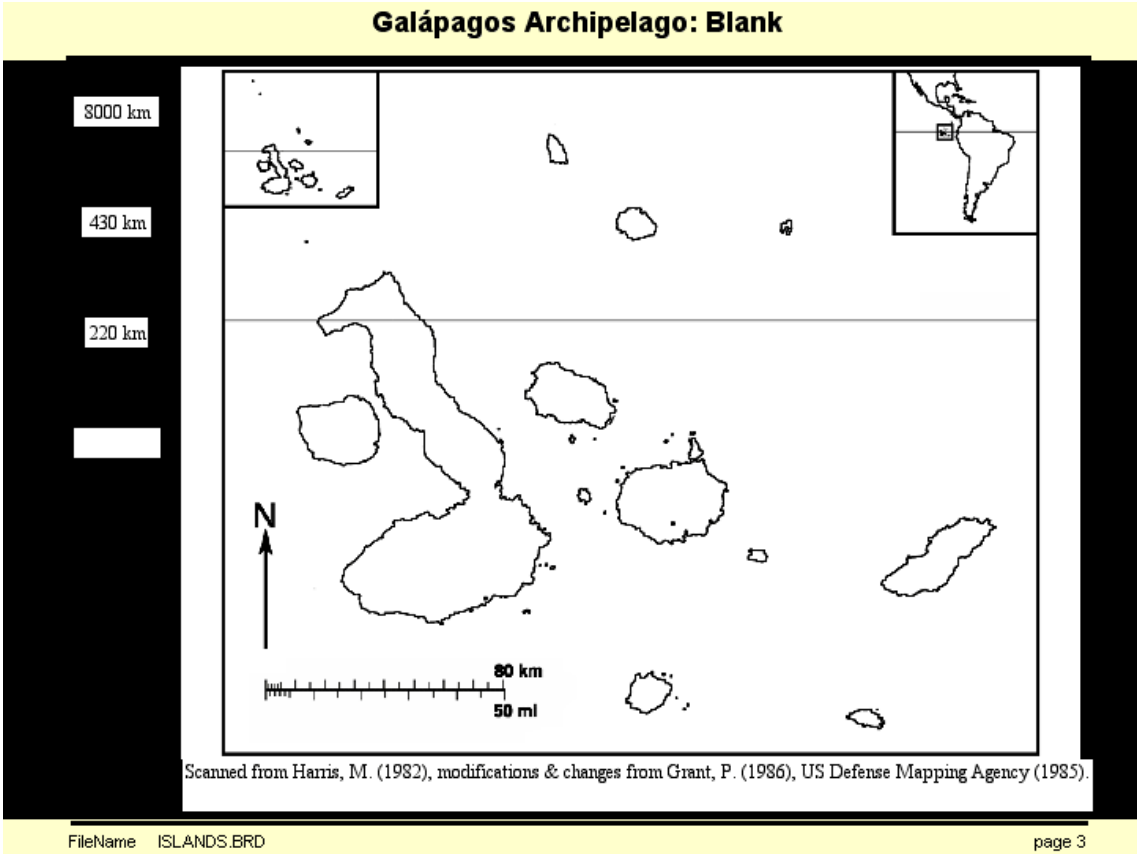
http://www.lostworldread.com/images/charles_darwin/beagle_map_large.jpg

http://www.gutenberg.org/files/16638/16638-h/16638-h.htm

7. Find out information about the Galapagos Islands and write the name of each island. Colour them with different colours. Remember to write the source.

http://tolweb.org/tree/ToLimages/blank_map.gif
Solution: http://printable-maps.blogspot.com/2009/01/map-galapagos-islands.html

Use an Encyclopeadia or the internet



http://www.galapagosmap.com/pictures/galapagos-islands.htm

8. Place the Australian town known as Darwin on the map.

Write below the map the reason why this name was given to this town. Remember to write the source.

http://www.ga.gov.au/image_cache/GA3030.gif
Solution:
http://en.wikipedia.org/wiki/Darwin,_Northern_Territory

http://www.cnn.com/WORLD/asiapcf/9810/09/fringe/australia.crocs/

9. Comparison of animals: Choose a pair. Why do you think they are related? Then compare the others. Fill in the gaps using the words or statements given below in the box:

Use a dictionary.

1. Mamut (extinct)

2.Elephant.

3. Archeopterix (extinct)

4.Iguana.

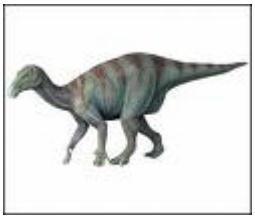
5. Zebra.

6. Cod fish

7.Ichthyosaurus (extinct)

8. Quagga (extinct)

9. Bird: sea-gull



10. Iguanodon (extinct)

____**The** ___zebra_____**looks like** _the_quagga____as_ **it has** _ horse-hair _**and**___ stripes _____. **The**

__quagga_____**seems/is**___similar_____ **to** ____the __zebra_____, **but now** ____quaggas____

are _____extinct_____ .

Extra words:

horse-hair	trunk	tie	ivory	tongue	wings	feathers	fins	eyebrow	eggs	scales
lenses										
taller	claw	anteater		spots	can swim	fatter				
stripes	extinct	smaller	similar	wider	different					

1 i 2 ivory and trunk **4 i 10 scales and claw**

3 i 9 wings anf feathers **6 i 7 fins and can swim**

In all the other cases the extinct species are taller, or conversely, the non-etxinct species are smaller

1. http://www.taringa.net/posts/1783535
2. http://bilia.wordpress.com/2009/06/
3. http://www.premiumorange.com/renard/revisions/SVT/lexBio.htm
4. http://www.mypets.net.au/flex/articles/200/iguanas-.cfm
5. http://www.shoarns.com/ZebraGallery.html
6. etc.usf.edu/clipart/6900/6997/codfish_6997.htm
7. http://home.arcor.de/daniel.bodach/dino/00000091e50936673/00000091e50936678.html
8. http://sorabji.com/zebra/2008/12/
9. http://www.slrphotographyguide.com/flying-birds-tips.shtml
10. http://www.linkandpinhobbies.com/Dinopric.htm

LESSON 3 DARWIN AND LAMARCK

1. Life histories of Darwin and Lamarck
2. Lamarck's theory
3. Darwin's theory
4. Points of agreement
5. Darwin's advantage
7. Religious controversy
8. Current theories.

Look at these pictures,

After examining the pictures the student answers can be supported as follows:

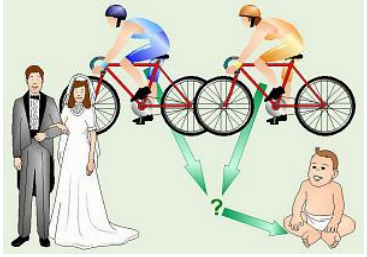
Yes/No because……. and

I agree/disagree because…., giving their opinion about it.

And answer the box as well.

1. Explain what will happen if this couple has children: do you think their children will they have the same muscles? Write your possible answers using the statements given in the box:

http://2.bp.blogspot.com/_TsXbsIcqW_Y/Rkz-bxT85YI/AAAAAAAAAYE/t6vbIsKlH14/s320/muscle-tech-buff-couple1.jpg

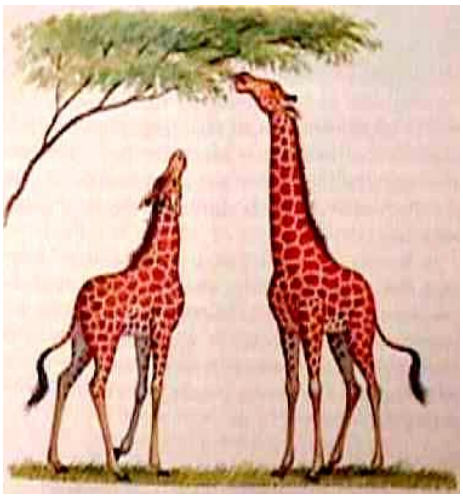


http://biology.clc.uc.edu/graphics/bio104/lamarck.jpg

Comparing Darwin and Lamarck

The teacher explains that acquired features are NOT inherited by offspring. The teacher can also compare theories of Lamarck and Darwin , giving reasons about how they agree and disagree showing examples such as : THE NECK OF the GIRAFFE.

This will lead into activities about THE TRUNK OF the ELEPHANT



DARWIN SAID: That organisms, even of the same species, are all different. Those which develop variations that help them to live in changing environments survive and have more offspring.

http://morriscourse.com/myths_of_evolution/images/lamarck_giraffes.jpg

2. Use the dictionary – keep a record of new words:

Acquired, features ???.....

3. Rewrite Lamarck's theory using as an example the "use" of an elephant's trunk. Use the statements given in the box below after a class discussion.

http://users.sch.gr/hartzoulakis/uv/Vergou/exercises/exercise5.htm

- Lamarck believed that all elephants used to have short trunks.
- When elephants could no longer reach water with their short trunks, their trunks became longer.
- They stretched their trunks in order to reach the water.
- Their offspring inherited long trunks.

http://bp3.blogger.com/_cgLmam-TsyI/RqpG7lh5B5I/AAAAAAAAAP4/BMGODV1VPAY/s400/unit4+review2+003.jpg

TEACHER HINT

This is an ideal url to download worksheets about Lamarck, Darwin and the ELEPHANT'S trunk :

http://www.stlzoo.org/downloads/IntrotoNaturalSelection.pdf

4.Use the dictionary – keep a record of the new words:

"**died off**": completely eliminated.

and others words……

5. Rewrite Darwin's theory using as an example the "use" of an elephant's trunk.Use the statements given in the box below after a discussion in plenary.

- Darwin believed that most elephants used to have short trunks, but some had longer trunks.
- When there was only a little water, they could not reach with their short trunks. The ones with short trunks died off,
- and the ones with long trunks survived and reproduced.
- This led to all elephants having long trunks.

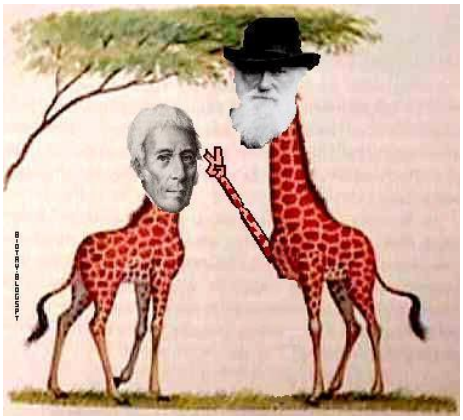
Test your Knowledge !! How much do you know????

Browse in this URL: http://www.stlzoo.org/downloads/IntrotoNaturalSelection.pdf

6. Answer this grid and discuss in plenary.

TOPIC	Who thought this- Lamarck? Darwin? or both of them.
1. Organisms have changed over time.	Both
2. Organisms changed because they wanted to survive.	Lamarck
3. There was variation in a population.	Darwin
4. Certain traits helped organisms survive and reproduce better than other organisms without those traits.	Darwin
5. Organisms can never become extinct.	Lamarck
6. The environment had something to do with why organisms changed.	Both
7. Parents are able to pass on at least some of their traits to their offspring.	Both
8. Parents are only able to pass on traits that they were born with.	Darwin
9. Organisms could decide to change something about their body and pass on that change to their offspring.	Lamarck
10. Organisms are still changing.	Both

Darwin's Advantage



http://3.bp.blogspot.com/_Fhby7Myul5Y/SejZ2VW398I/AAAAAAAABDY/ZH-KmPUaJB8/s400/Lamarck+vs+Darwin+2+BioTay.JPG

Further information goes to:
http://www.stlzoo.org/downloads/IntrotoNaturalSelection.pdf

We know a great deal about Darwin's life, but don't know much about Lamarck's life.

7. Do some research … Remember to note the source.

When was he born?

When did he die?

Which century does he belong to?

What was his nationality?

He is known because ….

http://www.nceas.ucsb.edu/~alroy/lefa/Lamarck.jpg

Look at the following information where you will find answers to the questions above:

Jean-Baptiste Pierre Antoine de Monet, Chevalier de la Marck (1 August 1744, Bazentin, Somme – 18 December 1829), often known as 'Lamarck', was a French soldier, naturalist and academic. He was one of the first people to put forward the idea that evolution occurred according to natural laws.

Lamarck fought in the Pomeranian War with Prussia, and was awarded a commission for bravery on the battlefield.[1] At his post in Monaco, Lamarck became interested in natural history and resolved to study medicine.[2] He retired from the army after being injured in 1766, and returned to his medical studies.[2]

Lamarck developed a particular interest in botany. He published a three-volume work *Flora française*, then he gained membership of the French Academy of Sciences in 1779. Lamarck became involved in the Jardin des Plantes . He was appointed to the Chair of Botany in 1788. When the Muséum national d'Histoire naturelle was founded in 1793, Lamarck was appointed as a professor of zoology. In 1801, he published *Système des animaux sans vertèbres*, a major work on the classifications of invertebrates, a term he invented. In his 1802 publication, he was one of the first to use the term *biology* in its modern sense.[3][4] Lamarck continued his work as a leading authority on invertebrate zoology.

Using the information about Darwin's life, write a short report about the similarities and differences between Darwin and Lamarck. Use the statements given in the box.

The students can write SOME EXAMPLES: **(OPEN ENDED WRITING)**

NOTE !! this activity is to encourage more creative use of language to express more in-depth understanding.

They both were naturalists but Darwin was more popular……

The main difference between them is that Lamarck pre-dated Darwin…

Darwin is similar to Lamarck because he was also interested in Natural History….

Lamarck is different from Darwin because he was French and Darwin was British…

Darwin and Lamarck were both interested in Evolution….

The teacher can suggest any other solutions.

8. Crossword

Can you find the hidden words?

M	K	P	U	T	H	L	B	V	V	E	Z	K	A	I
C	X	B	F	A	X	B	B	R	F	U	X	J	N	Q
B	X	B	D	L	E	C	E	F	Z	A	V	R	N	M
J	M	P	Z	K	C	A	O	T	Y	L	K	E	B	T
G	J	E	V	H	C	R	X	R	P	T	C	K	H	F
F	W	S	N	H	T	J	Z	F	N	K	C	C	V	C
M	N	J	T	E	H	Q	I	A	K	R	H	V	O	A
Y	R	L	M	R	G	D	H	O	A	N	A	T	A	H
A	Y	B	E	O	E	P	E	M	J	R	U	V	X	U
O	V	H	N	N	E	T	A	R	I	M	Q	R	G	R
D	P	V	X	L	G	L	C	E	I	C	I	E	T	J
D	Q	Z	E	B	K	H	D	H	R	U	Y	M	I	E
Q	V	I	K	P	G	I	T	T	E	R	Q	C	X	Z
M	D	F	S	M	C	V	W	T	K	D	Y	C	S	N
D	W	G	I	R	A	F	F	E	B	S	K	U	A	I

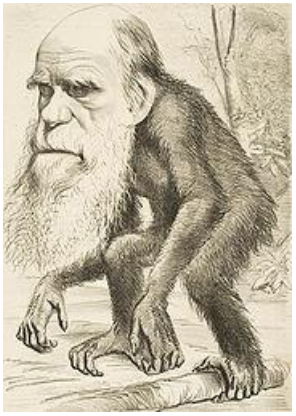
1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.

ANSWER KEY (Starting letter: x,y)

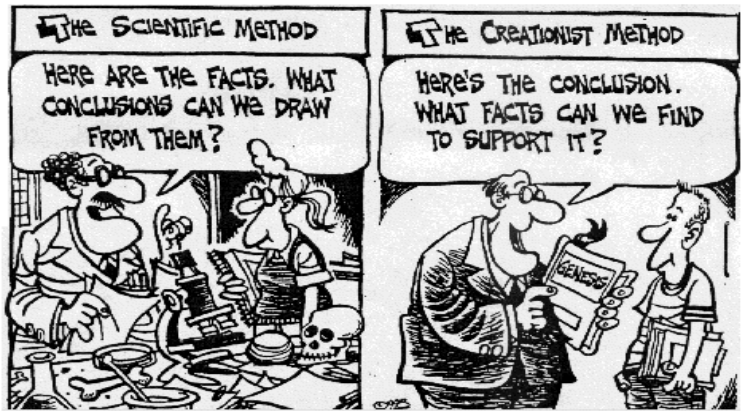
1. EFFORT(11,1)
2. GENE(6,8)
3. TRUNK(14,11)
4. LENGHT(3,8)
5. NECK(14,3)
6. VARIED(13,7)
7. STRETCHED(3,6)
8. ACQUIRED(14,15)
9. LAMARCK(7,11)
10. REACH(9,2)
11. ELEPHANT(4,12)
12. GIRAFFE(3,15)

Religious controversy

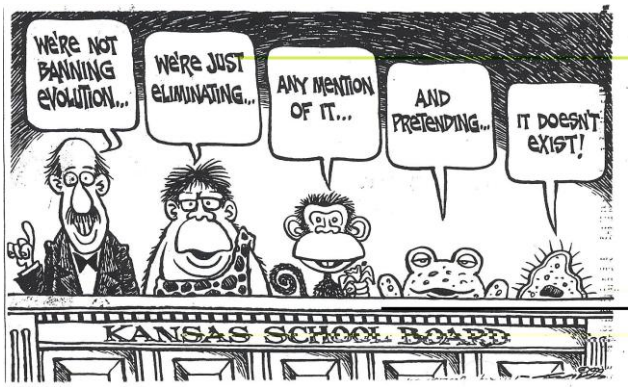
OPEN ENDED ACTIVITY !!!!!



http://upload.wikimedia.org/wikipedia/commons/thumb/9/9c/Darwin_ape.jpg/180px-Darwin_ape.jpg



http://www.rjfranz.net/Science_vs_Creationism.gif



http://t3.gstatic.com/images?q=tbn:GSv7uK4_FQFYrM:http://images.fanpop.com/images/image_uploads/Banning-Evolution-debate-236032_1480_1057.jpg

http://gal.darkervision.com/wp-content/uploads/2009/04/darwin-v-god-cartoon-cjmadden-400x313.jpg

http://www.kylebaker.com/www/cartoonweek/evolution.jpg

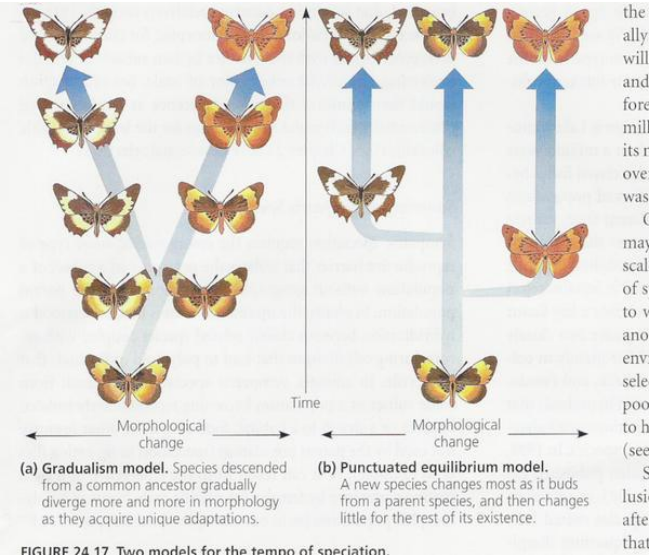
http://www.thelitestuffcartoons.com/iWeb/home/May%2011-23_files/creationism.jpg

http://farm2.static.flickr.com/1409/953714080_561ff52fb0.jpg

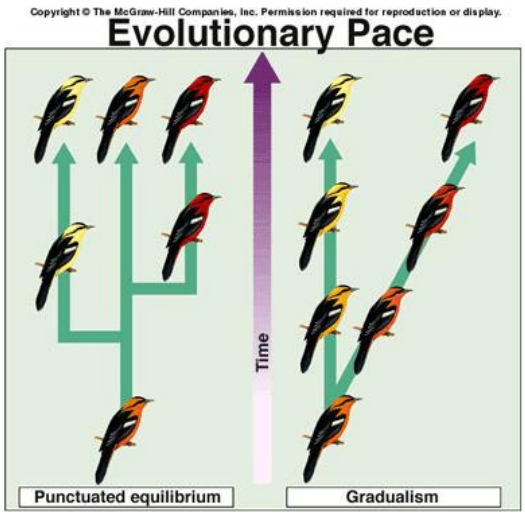
Current theories

Teacher's hints.

The teacher explains the theories of Gradulism, Punctuated Equilibrium and Neodarwinism.
The two first theories can be illustrated by using the pictures related below .



http://media.vidilife.com/image/2005/9/16/2263/42404L.jpg



http://www.biologycorner.com/bio3/images/evolution.gif

10. Darwin's theory of natural selection was published in 1859, but was not widely accepted at the time. Select from the list reasons why – not all the statements are correct reasons.

You could start with

Darwin's theory of natural selection was not widely accepted in the 19th century for the following reasons: Firstly,…….

1 It contradicted widely held religious beliefs that God created all life on Earth.

2 There was no knowledge of what caused genetic variation or how characteristics were passed on to the next generation.

3 Lamarck's theory was widely believed, and people were unwilling to believe an alternative theory.

4 There was insufficient fossil evidence at the time to convince many scientists.

Discuss why the odd one out is not a reason

11. The final challenge.

Here is a quiz to test how much you know about EVOLUTION

JUST TRY IT ii

http://school.discoveryeducation.com/quizzes6/muskopf/evolution1.html

Lesson structure

- **PowerPoint**

  .to introduce a general vision of my unit.

  . lesson 1

- **Handouts** contain both:

  .theoretical bases for the students

  .practical application

  - Students' activities related to theory
  - Quizzes
  - Crosswords
  - ICT activity

Some times students work in .

- **Assessment:**
  . Summarise information from a website, encyclopaedia.
  . The use of English in class (in content).
  . The use of English when they interact.
  . The use of English when they talk with the teacher.
  . Quality of notetakingfrom a text.
  . Comparing a picture and text.
  . Give examples of speciation, evidence of evolution and Darwin's and Lamarck's theories.

Internet Resources

All the websites have been included in the activities as needed.

Any constructive comment or suggestion welcome: jcasado2@xtec.cat

Some interesting material; good visuals and good variety of useful activities to practice vocabulary, reading and, writing and speaking..