

Sujets pour s'entraîner



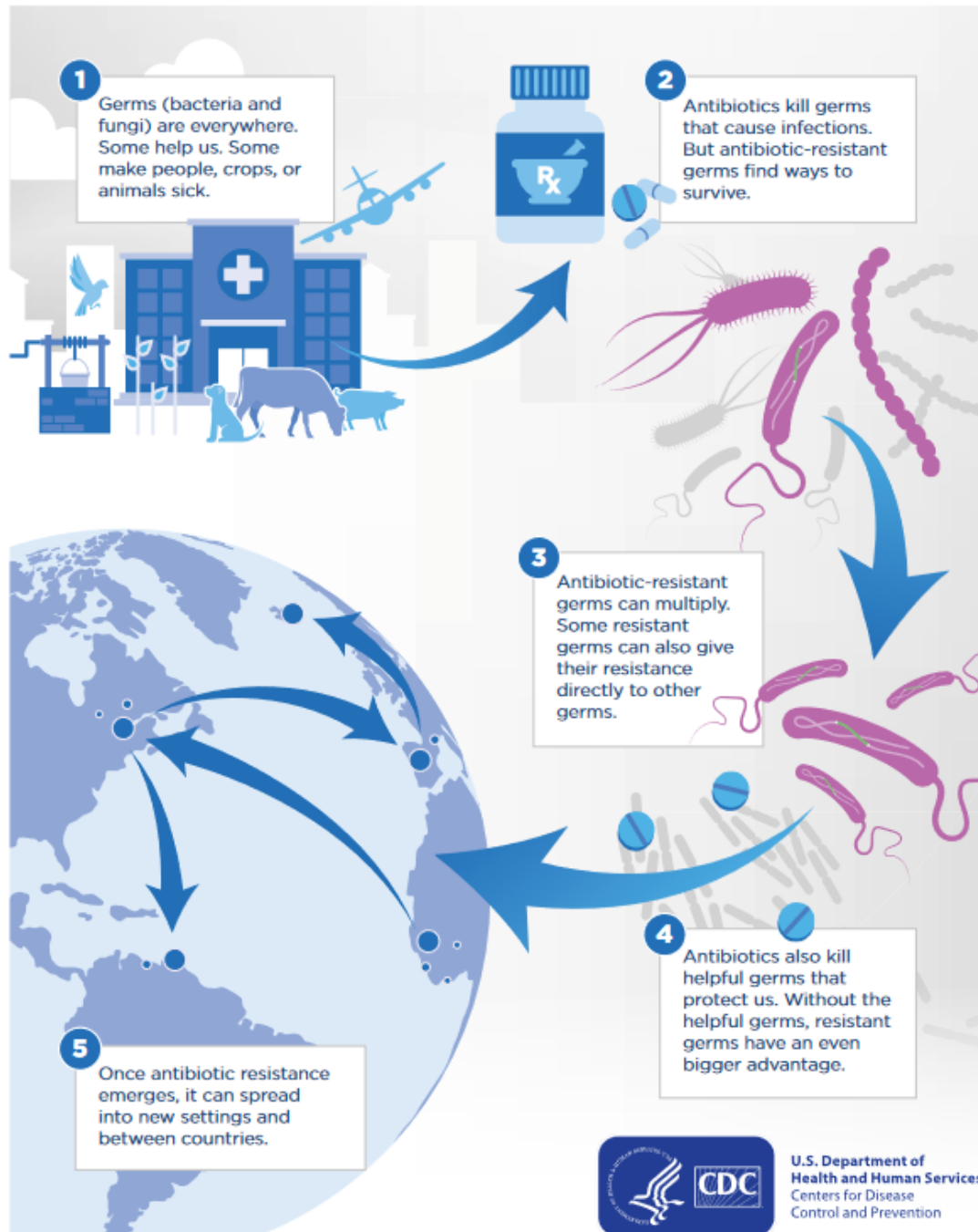
The **diamondback moth** (*Plutella xylostella*), sometimes called the **cabbage moth**, is a moth species of the family Plutellidae and genus *Plutella*. The small, grayish-brown moth sometimes has a cream-colored band that forms a diamond along its back. The species may have originated in Europe, South Africa, or the Mediterranean region, but it has now spread worldwide.

The moth has a short life cycle (14 days at 25 °C), is highly fecund, and is capable of migrating long distances. Diamondback moths are considered pests as they feed on the leaves of cruciferous crops and plants that produce glucosinolates. However, not all of these plants are equally useful as hosts to the moth. Because of this, studies have suggested using wintercress as a trap crop around agricultural fields because diamondback moths are highly attracted to that plant but their larvae fail to survive when eggs are laid on it.

Originally, pesticides were used to kill the moths but diamondbacks have developed resistance to many of the common chemicals. For this reason, new biological and chemical controls, as well as different planting methods are being pursued to reduce the destruction caused by the moths.

**Use the example of the diamondback moth to explain how human practices can lead to pest resistance.**

# How Antibiotic Resistance Spreads

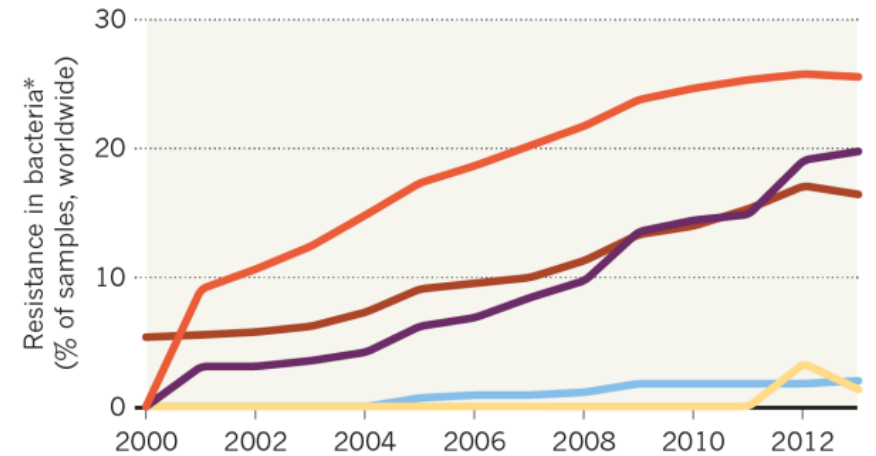


Antibiotics save lives but any time antibiotics are used, they [can cause side effects](#) and lead to antibiotic resistance. Since the 1940s, antibiotics have greatly reduced illness and death from infectious diseases. However, as we use the drugs, germs develop defense strategies against them. This makes the drugs less effective.

## THE SPREAD OF ANTIBIOTIC RESISTANCE

An increasing proportion of bacteria display resistance to common antibiotics.

Fluoroquinolones    Cephalosporins (3rd gen)    Aminoglycosides  
Carbapenems    Polymyxins



\*Enterobacteriae, including *Escherichia coli*, *Klebsellia pneumonia*, *Enterobacter* and *Salmonella*

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Source: CDDEP ResistanceMap, based in part on data obtained under license from IMS MIDAS

**Explain what is antibiotic resistance and why it's a problem today.**

## Before 'Lucy', there was 'Ardi': first major analysis of early Hominid published in Science

Adapted from *Science Daily*  
Oct. 1, 2009

An international team of scientists has thoroughly described *Ardipithecus ramidus*, a hominid species that lived 4.4 million years ago in what is now Ethiopia. This offers the first comprehensive description of the *Ardipithecus* fossils, which include a partial skeleton of a female, nicknamed "Ardi", who weighed about 50 kilograms and stood about 120 centimetres tall.

The last common ancestor shared by humans and chimpanzees is thought to have lived six or more million years ago. Though *Ardipithecus* is not itself this last common ancestor, it likely shared many of this ancestor's characteristics. For comparison, *Ardipithecus* is more than a million years older than the "Lucy" female partial skeleton of *Australopithecus afarensis*. Through an analysis of the skull, teeth, pelvis, hands, feet and other bones, the researchers have determined that *Ardipithecus* had a mix of "primitive" traits, shared with its predecessors, the primates of the Miocene epoch, and "derived" traits, which it shares exclusively with later hominids. Because of its age, *Ardipithecus* takes us closer to the last common ancestor.

These hominids appear to have lived in a woodland environment, where they climbed on all fours along tree branches and walked, upright, on two legs, while on the ground. They do not appear to have been knuckle-walkers\*, or to have spent much time swinging and hanging from tree-branches, especially as chimps do. Overall, the findings suggest that hominids and African apes have each followed different evolutionary pathways.



A Gorilla knuckle-walking

\* To be knuckle-walker: marcher en prenant appui sur le dessus de la main

### Use the text and your culture in the field:

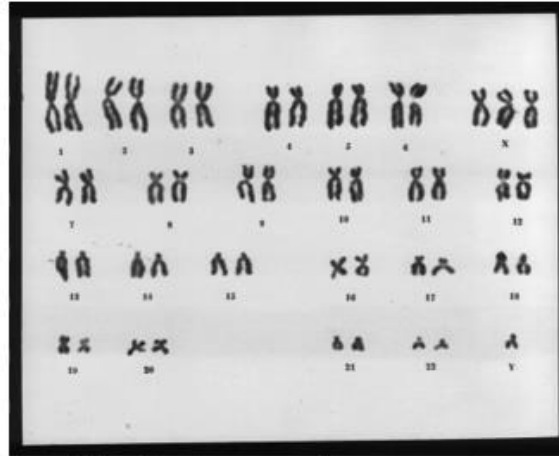
- to explain how scientists can establish relationships between organisms
- to discuss the place they give to *Ardipithecus*.

You may use these key words:

**Bipedalism – tools - phylogeny**

## XXXY syndrome

Extract of an article published in 2008,  
by 'Rare Chromosome Disorder Support Group'



XXXY syndrome is a chromosome condition that only affects males. It is rare and there is little specific information

Individuals with 48, XXXY have their own unique physical and behavioural characteristics and should not be considered a variant of Klinefelter syndrome.

Males with Klinefelter syndrome have a single extra X chromosome. During puberty their testosterone production is decreased and while having normal sexual function, they generally do not father children of their own. As a result of early language deficits, they have increased propensity for reading and spelling problems and social difficulties. Their overall IQ may be below their age-matched typical peers, and they have a lower verbal IQ due to language delay.

The additional X chromosome in 48, XXXY has more influence on physical, cognitive and behavioural features than in 47, XXY. For instance, they may have delays in motor skills, language and social development. So early and ongoing intervention and educational planning are critical in ensuring that boys continue to progress in their developmental skills: therapies such as physiotherapy and speech therapy, individual educational plans and ongoing support will maximize their potential. (...)



**Different boys**  
L to R:  
14 months;  
26 months;  
7 years;  
21 years

In boys with 48, XXXY, puberty generally follows the pattern common in boys with 47, XXY: it starts at the appropriate time with normal levels of the male hormone testosterone. The penis starts to grow, body hair appears, and the voice changes and deepens. However, typically, levels of testosterone start to decline and secondary sexual characteristics do not fully develop. The testicles do not enlarge fully and towards the end of puberty penis growth slows and body and facial hair is sparse. You may find that the point at which your son's testosterone levels start to decline is earlier or later than puberty and in some cases, puberty does not start until testosterone replacement is given. Your son should be evaluated by an endocrinologist and once testosterone levels have started to decline he will generally benefit from testosterone treatment.

**After presenting the features of a boy with XXXY syndrome, explain how such a chromosome condition occurs.** You may use a sketch to help you.

You may use the following keywords:

**non-disjunction – meiosis – puberty – physical features**

**Pick a theme, then use your lesson and the Internet to build a quick presentation about it.**

**Themes:**

- The links between life and the atmosphere composition over time.
- The formation of the ozone layer and its importance for life
- The natural carbon cycle and the effect of human activities on its balance.
- The link between the different factors which are part of the positive feedback increasing the Earth temperature.