AH, NO—YOU WANTED ENTOMOLOGY-MAN, SPelled WITH AN “N.” SEE, IT’S FROM THE GREEK ENTOMON, MEANING “INSECT,” WHICH IS ITSELF THE NEUTER FORM OF ENTOMOS, MEANING “SEGMENTED” OR ...

“Wrong Superhero”
http://xkcd.com/1012/
What is not an insect?
What is it?
What is it?

Myriapoda (house centipede)
What is it?
What is it?

six legs

false legs (prolegs)

Hexapoda (caterpillar)
What is it?
What is it?

Chelicerata (spider)

just another leg
What is it?
What is it?

Hexapoda (aphid)
siphunculus
What is it?
What is it? Crustacea (isopod)
Part 1/3

• Thysanura (silverfish)

• Pterygota “things with wings”
  – Odonata (damselflies, dragonflies)
  – Neoptera “things that fold their wings”
    • Dictyoptera “net-wing”
      – Mantodea (mantises)
      – Blattaria (cockroaches)
      – Isoptera (termites)

• […]
Thysanura: silverfish

cerci

caudal filament
Pterygota

things with wings
short antennae

Odonata: damselflies and dragonflies

dragonfly
damselfly
Neoptera

things that can fold their wings
Dictyoptera

“net wing”

mantises, cockroaches, termites
Mantodea: Mantises

- Compound eyes
- Simple eyes
Blattaria: cockroaches

- long filiform antennae
- cerci
- pronotum
Isoptera: *termites*

- **Alate** (winged reproductive)
- **Monoliform** (bead-like) antennae
QUIZ #1
Odonata

Dragonfly or damselfly?

damselflies
Thysanura
Isoptera

antennae like beads
Part 2/3

• Neoptera “things that fold their wings”
  – […]
  – Phasmatodea (stick & leaf insects)
  – Orthoptera (grasshoppers, katydids, crickets)
  – Phthiraptera (lice)

• Hemiptera
  • Heteroptera (“true” bugs)
  • Homoptera (cicadas, aphids)
  – […]
Phasmatodea: *stick insects*
How do they hear?

- tympanum
- Orthoptera
- katydid
- grasshopper
- cricket

Orthoptera
Phthiraptera

dorsoventrally flattened; tarsal hooks; biting/sucking mouthparts
Hemiptera

Homoptera + Heteroptera

“true bugs”
Heteroptera: bugs

(Heteroptera + Homoptera = Hemiptera)
Heteroptera: bugs

leaf-footed bug

shield bug

water strider

bed bug

"X" wings
Homoptera: cicadas & relatives

"tent" wings

(Heteroptera + Homoptera = Hemiptera)
Heteroptera + Homoptera = Hemiptera

Homoptera: cicadas & relatives

aphid

planthopper

“tent” wings

(Heteroptera + Homoptera = Hemiptera)
*Orthoptera*

*katydid/cricket or grasshopper/locust?*

hooded grasshopper

short antennae

tympanum?
Homoptera (thorn-mimic treehopper)
Orthoptera

*(mole cricket)*

tympanum
BONUS ROUND!

“You’re not an ant”
Orthoptera

Katydid/cricket or grasshopper/locust?

Katydid

Long antennae
Homoptera (ant-mimic treehopper)
All of these have complete metamorphosis!

- Endopterygota “things with metamorphosis”
  - Coleoptera (beetles)
  - Hymenoptera (wasps, bees, ants)
  - Lepidoptera (butterflies, moths)
  - Siphonaptera (fleas)
  - Diptera (flies, mosquitoes)
complete metamorphosis (holometabolism)

egg – larva – pupa – adult
The lifecycle of the darkling beetle, *Alphitobius diaperinus* (Panzer), from egg to adult. Scale bars = 1mm.

**complete metamorphosis**

*(holometabolism)*

*egg – larva – pupa – adult*
The Life cycle of a Bee

Egg – Larva – Pupa – Adult

complete metamorphosis
( holometabolism )

egg – larva – pupa – adult
incomplete metamorphosis (hemimetabolism)
incomplete metamorphosis
(hemimetabolism)

complete metamorphosis
(holometabolism)
Thysanura

Odonata

Orthoptera

Phasmatodea

Mantodea

Isoptera

Blattodea

Phthiraptera

Heteroptera

Homoptera

Coleoptera

Hymenoptera

Lepidoptera

Siphonaptera

Diptera

**wings**

**hemimetabolism**

**complete metamorphosis**

**holometabolism**
Endopterygota

things with metamorphosis
Coleoptera: beetles

- pronotum
- elytra
- scutellum
Hymenoptera: 
bees, ants, wasps

hamuli

distinctive pinched abdomen
Lepidoptera: butterflies and moths
Lepidoptera: *butterflies and moths*
Lepidoptera: *butterflies and moths*
Lepidoptera: *butterflies and moths*
Lepidoptera: butterflies and moths

moth

butterfly
Diptera

halteres
Siphonaptera

sucking mouthparts; jumping legs; laterally flattened
QUIZ #3
Heteroptera
Hymenoptera
(honeypot ants)
Coleoptera (giraffe weevil)
Hymenoptera (wasp)
BONUS ROUND!

“You’re not a wasp”
Lepidoptera

Butterfly or moth?
moth
Coleoptera
BONUS BONUS ROUND!

“Camouflage”
Blattaria
Orthoptera (katydid)
Lepidoptera (butterfly)
Know what you don’t know

- Dermaptera (earwigs)
- Neuroptera (lacewings)
- Mecoptera (scorpionflies)
- Trichoptera (caddisflies)
- Strepsiptera (twisted-wings)
- Raphidioptera (snakeflies)
- Megaloptera (alderflies)
- Pscoptera (barkflies)
- Thysanoptera (thunderflies)
- Zoraptera (angel insects)
- Plecoptera (stoneflies)
- Notoptera (rock crawlers)
- Embioptera (webspinners)
LUKE...
/I AM YOUR FATHER...

NOOOOO!!!
THAT'S IMPOSSIBLE!!

haplo-diploid system
FTW