VIDEO GUIDE: Introduction to Entomology

1. Entomology is the science or study of **insects**.

2. Fill in the blanks.

    a. Arachnida, includes examples such as **spiders and scorpions** and has **eight** pairs of legs, **no** antennae, and **two** body segments.
    b. Crustacea, includes examples such as **crabs and lobsters** and has **five** pairs of legs, **two** pairs of antennae, and **three** body segments.
    c. Chilopoda, includes examples such as **centipedes** and has **one** pair of legs per segment, at least **fifteen** body segments, and **one long** pair of antennae.
    d. Diplopoda, includes examples such as **millipedes** and has **two** pairs of legs per segment, at least **fifteen** body segments, and **one short** pair of antennae.
    e. Insecta has **six** pairs of legs, **one** pair of antennae, and **three** body segments.

3. What are some statistics about insect abundance and diversity?

There are estimated to be 200 million insects per human, with an average of 40 million insects and 400 pounds of insect biomass per acre (compared to 14 pounds of human biomass per acre). There are roughly 1.2 million insect and "Arthropod" extant species, dwarfing plants (~310,000), animals (~65,000), and viruses (~2000). Many believe this to be 1/7th to 1/5th of the actual number of insect and arthropod extant species, with the rest being undiscovered.

4. What makes insects so successful?

The chitin exoskeleton is extremely strong compared to its weight, which protects insects from environmental factors including infection, desiccation, and predation. Their jointed limbs allow insects to be extremely nimble. On top of this, many insects have wings that allow them to travel long distances, often very quickly, as well as making them more difficult to hunt.

Insects are also typically small. On top of this making them difficult to hunt, it means insects don't require anywhere near as much of anything to live as larger animals do. Namely, insects don't need very much food which allows them to live pretty much anywhere with any food at all.

One more reason insects are so successful is the fact they reproduce in massive numbers. Insect lifespan usually isn't very long, so they reproduce often and lay a huge number of eggs. The large generation sizes and high reproductive frequency enable insects to adapt to their environments far faster than other animal species. This, especially when combined with wings, enables insect populations to boom from essentially nothing in a very short period of time.

5. Describe the history of entomology and people.

It is estimated that bed bugs and humans were introduced from humans living out of caves inhabited by bats. Many insect-borne diseases have been spread such as malaria and African sleeping sickness from mosquitoes and tsetse flies, respectively.

During the agricultural revolution, huge population centers of nutrient-rich crops were grown. As a result, "pest" insect populations grew and spread. Humans moving into denser settlements made it easier for parasitic and household insects to survive in large numbers.

6. What are some benefits of insects?

Many insects are decomposers, and play a huge part in recycling nutrients in ecosystems. On top of this, they produce a number of valuable goods like honey, wax, and silk.

Insects are vitally important to the ecosystems they inhabit, as many plant and predator species have co-evolved to depend on them. Flowering plants depend on insects for pollination, and entire food webs depend on them existing in large numbers for larger species to feed on.

I saw a *Crime Pays but Botany Doesn't* YouTube video about a very early form of carnivorous plant that couldn't actually digest anything it caught. This shrub produced a sticky substance that would get small insects caught in it. The assassin beetle (if I remember correctly) that co-evolved with it would hunt the smaller insects without getting stuck, and the beetle's waste fed the shrub. There are countless interactions like this between insects and other species that would cease to exist if their complementary insect were gone.

7. When it comes to people and insects, what's trending now?

There's a lot of buzz about insects becoming a new staple source of protein. Personally, I'd switch to beans and lentils but eating bugs makes a way more interesting headline.

8. How do insects harm society?

Insects mainly harm humans in two ways. The first being the spread of disease and general injury (with venomous insects) to humans and animals that some insects are capable of. The second widespread negative effect of insects is due to the fact that they're more than happy to eat anything we eat. Insects eat huge amounts of food after it's been harvested, and cause crop loss by eating crops while they're growing, opening the plants to disease in the process.