Study Guide – Texas 4-H Entomology ID Contest
Mecoptera

1. Review the Mecoptera YouTube video for your age level at the Bexar Entomology page.
2. Follow along with your 4-H Entomology Study Guide (https://entomology.tamu.edu/extension/youth/4-h/4h-contest/)
3. Review the definitions for the key words for Coleoptera.
4. Read the Mecoptera Facts
5. Answer the study guide questions
6. Quiz yourself to identify the species of Mecoptera and if they are a pest/beneficial/ inconsequential and where they are found in nature and/or their host.

Key Words to Know for Mecoptera:
Holometabolous
Mandibulate

Mecoptera Facts:
There is only one species of Mecoptera to know. The common name is scorpionfly, although they are not true flies.

Scorpionflies get their name from the male genetalia being enlarged into what appear to be a stinger, but they are not stinging insects. Females do not have this stinger looking object.

Scorpionflies have mandibulate mouthparts and are holometabolous.

They are usually only present for a few weeks out of the year and not considered to be a common insect.

Study Guide Questions:
Are scorpionflies beneficial? Why?
How can you differentiate between male and female scorpionflies?

Study Guide – Texas 4-H Entomology ID Contest
Neuroptera

1. Review the Neuroptera YouTube video(s) for your age level at the Bexar Entomology page.
2. Follow along with your 4-H Entomology Study Guide (https://entomology.tamu.edu/extension/youth/4-h/4h-contest/)
3. Review the definitions for the key words for Neuroptera.
4. Read the Neuroptera Facts
5. Answer the study guide questions
6. Quiz yourself to identify the species of Neuroptera and if they are a pest/beneficial/ inconsequential and where they are found in nature and/or their host.

Key Words to Know for Neuroptera:
Aquatic
Holometabolous
Mandibulate

Neuroptera Facts:
Neuropteran have lacey, membranous looking wings, with many veins.

All Neuroptera listed for the contest are beneficial.

All Neuropterans have mandibulate, or chewing, mouthparts. They are holometabolous.

Study Guide Questions:
Which species of Neuropteran has a larva called a hellgrammite?
Which Neuropterans are aquatic in at least one part of their lifecycle?
Which Neuropteran has a larva called a doodle bug?
Why are Neuropterans beneficial?

Study Guide – Texas 4-H Entomology ID Contest
Coleoptera

1. Review the Coleoptera YouTube video(s) for your age level at the Bexar Entomology page.
2. Follow along with your 4-H Entomology Study Guide (https://entomology.tamu.edu/extension/youth/4-h/4h-contest/)
3. Review the definitions for the key words for Coleoptera.
4. Read the Coleoptera Facts
5. Answer the study guide questions
6. Quiz yourself to identify the species of Coleoptera and if they are a pest/beneficial/ inconsequential and where they are found in nature and/or their host.

Key Words to Know for Coleoptera:
Elytra
Holometabolous
Mandibulate

Coleoptera Facts:
Notice that the forewings on beetles, called elytra, meet in a straight line down the middle. This is a good and easy tip to identify beetles from other orders of insects.

There are many species of beetles, they can beneficial or harmful and found in many habitats throughout Texas. They are a very diverse order of insects.

All beetles have mandibulate, or chewing, mouthparts. All beetles are holometabolous. Beetle larvae are often called grubs.

Study Guide Questions:
Name the aquatic beetles.
Are all the aquatic beetles beneficial?
Name the beneficial beetles.
Name the beetles that are agricultural pests.
Name the hosts of the agricultural pests.
What does holometabolous mean?

Study Guide – Texas 4-H Entomology ID Contest
Siphonaptera

1. Review the Siphonaptera YouTube video(s) for your age level at the Bexar Entomology page.
2. Follow along with your 4-H Entomology Study Guide (https://entomology.tamu.edu/extension/youth/4-h/4h-contest/)
3. Review the definitions for the key words for Siphonaptera.
4. Read the Coleoptera Facts
5. Answer the study guide questions
6. Quiz yourself to identify the species of Siphonaptera and if they are a pest/beneficial/ inconsequential and where they are found in nature and/or their host.

Key Words to Know for Siphonaptera:
Holometabolous
Parasite
Haustellate

Siphonaptera Facts:
Fleas are parasites, feeding on the blood of animals with their piercing/sucking mouthparts. There are many different species of fleas and they can feed on mammals, birds, and even reptiles.

Fleas are laterally flattened, which means they are flat from side to side (like a knife). They also have hairs and barbs on their body that allow them to get stuck in hair when they are being chased.

All fleas have haustellate, or piercing/sucking, mouthparts. All fleas are holometabolous, their larva live around the bedding and resting places of their host and feed on dried blood (fecal material from the adults).

Study Guide Questions:
What is a parasite?
Why are fleas considered a parasite? Is this good or bad?
What type of mouthparts do fleas have?
Where do the larvae of fleas live? What do they feed on?
What adaptations do fleas have to allow them to live on animals and feed on blood?

Study Guide – Texas 4-H Entomology ID Contest
Diptera

1. Review the Diptera YouTube video(s) for your age level at the Bexar Entomology page.
2. Follow along with your 4-H Entomology Study Guide (https://entomology.tamu.edu/extension/youth/4-h/4h-contest/)
3. Review the definitions for the key words for Diptera.
4. Read the Diptera Facts
5. Answer the study guide questions
6. Quiz yourself to identify the species of Diptera and if they are a pest/beneficial/ inconsequential and where they are found in nature and/or their host.

Key Words to Know for Diptera:

Maggot
Holometabolous
Parasite
Vector
Carrion
Halteres

Diptera Facts:

- Flies usually have very large eyes, shaped almost like a triangle and nearly touching at the top of the head.
- Diptera means two wings – flies only have two wings (one pair). The second pair are modified into knobs called halters, which help with balance.
- Flies can be beneficial, harmful, or variable. Variable means that in some situations they are good and others they are bad. For instance, blow flies are variable because in nature they help decompose carrion but would be a nuisance around homes or businesses.
- Mosquitoes are the deadliest animals to humans. They vector (carry or transmit) diseases to humans that can be deadly.
- All flies lay their eggs in aquatic or semiaquatic environments. The larvae require a very moist environment to develop. Fly larva are called maggots.
- Flies have various types of mouthparts: from chewing, to piercing/sucking, to sponging. They are the only order in which the adults do not all have the same type of mouthpart.

Study Guide Questions:

Name the beneficial flies.
Name the flies that are considered pests.
Name the flies that are considered variable.
What do halters do for flies?
Which flies feed on carrion?
What type of lifecycle do flies have?