

LSC-BIOLOGY SOLVED SCENARIO ITEM

School administrators have a challenge of poor garbage disposal and management. As a result of this, houseflies are often seen flying onto students' food during break and lunch, and currently there's a serious outbreak of diarrhea. The specimen Labeled **X** collected by your Teacher and provided to you is associated with this diarrhea outbreak.

TASK:

As a biology student help the school administrators to identify the specimen **X** and understand the relationship of the outbreak with the specimen and how the outbreak can be controlled.

SOLUTION

Specimen Identity: Housefly / Insect: ✓ 1I

Classification (at least up to order level)

1. **Kingdom:** Animalia : ✓ 1C

Reasons:

Possession of Mouth for feeding

Possession of Limbs for locomotion

Possession of sensory organs like compound eyes and pair of antennae

2. **Phylum:** Arthropoda : ✓ 1C

Reasons:

Has jointed limbs/appendages

Has Exo skeleton

Has segmented body

(May ignore the reasons)

3. **Class:** Insecta: ✓ 1C

Reasons:

Possession of three pairs of legs/ six legs

Possession of a pair of antennae

Possession of three main body parts

Possession of three thoracic segments (prothorax, mesothorax and metathorax)

4. **Order:** Diptera: ✓ 1C

Reasons:

Possession of a pair of bristle antennae

Possession of a pair of wings

Possession of compound eyes

Ecology and mode of life

Habitat: Terrestrial mainly in filthy places like toilets, dustbins, heaps of rotting organic matter, pit latrines. ✓ H₁

Adaptations to the habitat

1. Has a segmented body for increased flexibility during locomotion : ✓ A₁

2. Has a pair of hairy antennae for increased sensitivity: ✓ A₁

3. Has a pair of large oval-shaped compound eyes for a wide field of view: ✓ A₁

4. Has a pair of hairy maxillary palps for tasting food.: ✓ A₁

Habits:

1. **Feeding:** Feeds on liquid substances/food by means of sucking proboscis by action of pumping organ in the head.: ✓ Hb₁
2. **Locomotion:** Locomotes by flight/flying using a pair of wings and walks using 3pairs of jointed limbs : ✓ Hb₁
3. **Diet:** Fluids.: ✓ D₁

Reason: Has spongy proboscis expanded at the tip for sucking fluids: ✓ R₁

Is a vector; This is because it transmits/ spreads germs/pathogens: ✓ V₁

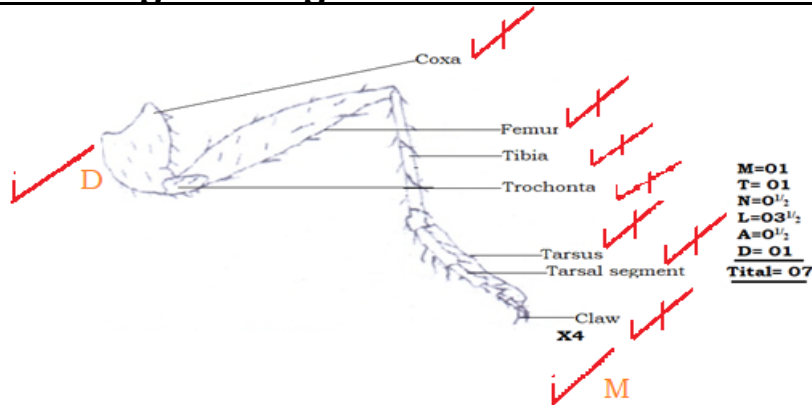
Adaptations/Adaptability as a vector Ad₃

1. Has a hairy body for attachment of germs. : ✓ 1
2. Has a pair of wings for quick locomotion by flight to spread germs: ✓ 1
3. Has expanded proboscis tip to increase surface area for absorption of germs into saliva : ✓ 1.

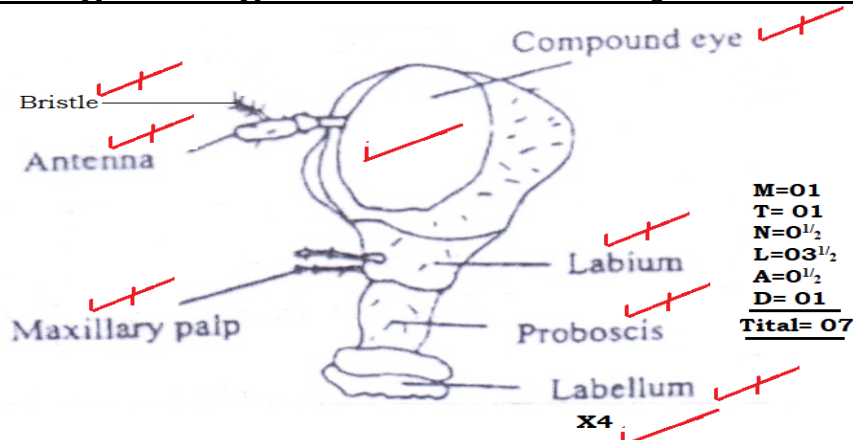
Symptoms and signs of diarrhea S₂

1. Frequent passage of watery stools: abdominal cramps/pain/discomfort, bloating/swelling of abdomen due to gas accumulation: ✓ 1s
2. Nausea and vomiting, thirst, dry mouth, dark yellow urine and reduced urine output; fever; fatigue; loss of appetite; weight loss; flatulence: ✓ 1s

A drawing Showing the Hind limb of a Housefly

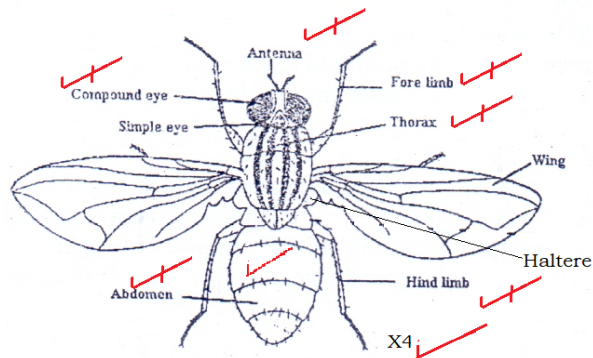


A drawing showing the head of a housefly in lateral view

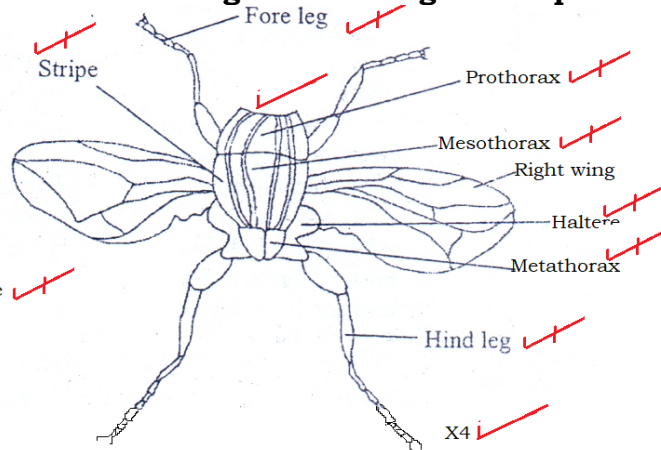


ACCEPT: any hairy body part drawn and labeled like the ones below

A Labeled Drawing of Specimen X



Labeled Drawing of Thora region of Specimen X



Control measures/Recomendations

1. Spraying the houseflies with insecticides; ✓ 1Cm
2. Covering holes of pit latrines/ toilets to prevent houseflies from picking germs from the pit latrines/ toilets. ; ✓ 1Cm
3. Covering all the food to prevent houseflies from walking on it. ; ✓ 1Cm
4. Boiling drinking water and milk to kill the germs. ; ✓ 1Cm
5. Food eaten in raw form like fruits should be washed first to remove the germs. ; ✓ 1Cm
6. Proper disposal of wastes so that houseflies do not reach them by covering them in dust bins. ; ✓ 1Cm
7. Washing hands with clean running water and soap after visiting the latrine and before eating food; ✓ 1Cm

TOTAL SCORES = 30 Scores

END