# Student Performance and Analysis of Student Performance for Question 2

2019 SAT

Food Chain and Food Web

○ Living things are interdependent. In the study of living things, scientists often use food chains and/or food webs to show the feeding relationships among the species in a habitat. A food chain shows a linear feeding relationship of the different species involved, while a food web can be regarded as making up of several food chains.

○ In a paddy habitat, grasshoppers, snakes, mice, sparrows and eagles are found. The following food web shows the feeding relationships of these species.
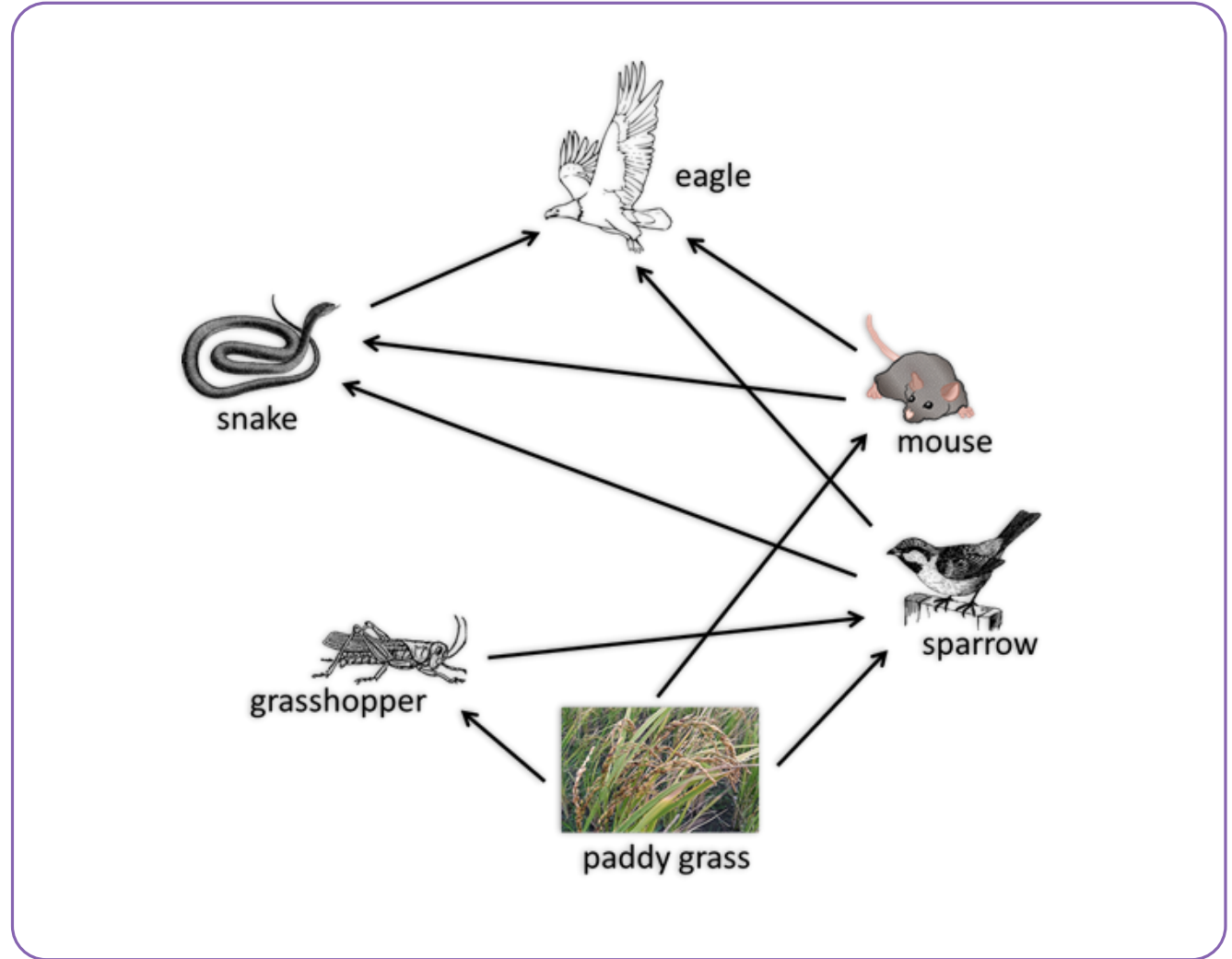
Related Topics in the S1-3 Science Curriculum

- Unit 2: Looking at Living Things / Topic 2.5: Endangered species
  - Key Points : 1. Endangered species; 2. Wild life; 3. Effects of man's activities on the environment; and 4. Conservation
  - Core Content: 1. Awareness of the decreasing number and species of plants and animals on earth and the implication for man; 2. Inter-dependence of life, e.g. predation; 3. Effects of man's activities on wild life; 4. Importance of protecting wild life
- Unit 7: Living Things and Air / Topic 7.4: How do green plants obtain energy
  - Key Points: … 4. Food Chain
  - Extension Content: … 3. Green plants … are producers of food, animals are consumers; 4. Idea of food chain
- Conceptual Framework for S1-3 Science Curriculum: … Diversity of Living Things; Balance of Nature; Conservation …

Competence that Should Have Been Developed Through Relevant Learning Activities

Unit 2

- Making generalisation from observations
- Identifying similarities and differences
- Extracting relevant information …
- Evaluating human activities with respect to environmental cost

Unit 7

- Interpreting and explaining observations
- Identifying cause-effect relations
- Making generalisations
- Distinguishing between valid and invalid conclusions
- Suitably organising relevant information extracted from different sources

Performance of Students

- Overall Performance

Question No.	Mean	S.D.
2	3.8 (48%)	1.57 (19.7%)

- Performance for Sub-questions

	2(a)	2(b)(i)	2b(ii)	2(c)
Mean	1.42 (71%)	1.66 (83%)	0.51 (26%)	0.26 (13%)

Analysis of Student Performance

- 2(a) – Identify the Longest Food Chain Starting with Paddy Grass and Ending with Eagle
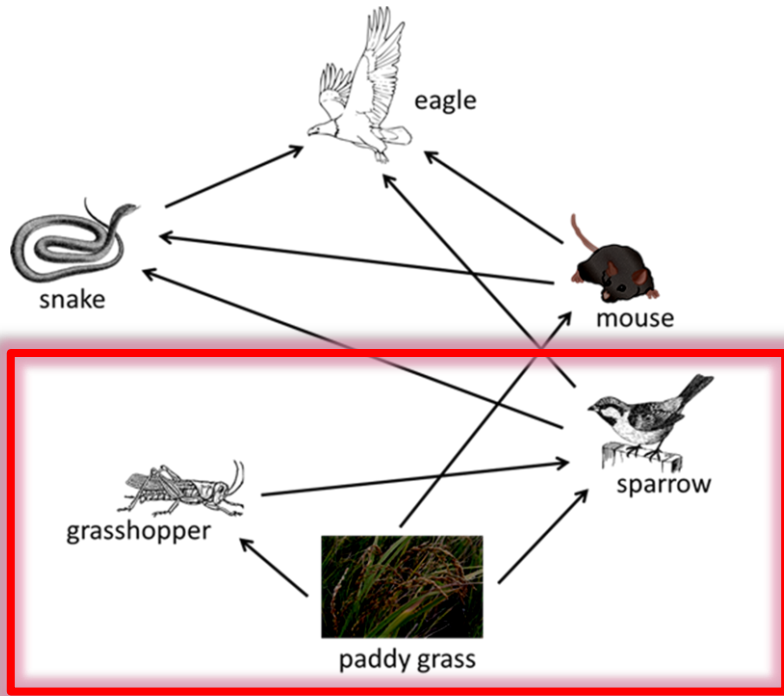
2. (a) 稻草 → 草蜢 → 麻省 → 蛇 → 鷹

2. (a) Paddy grass ← Grasshopper ← Sparrow ← Snake ← Eagle.

2. (a) 稻草 → 草蜢 → 麻雀
　　　 ← 鷹 ← 蛇 ←

Analysis of Student Performance

- 2(a) – Identify the Longest Food Chain Starting with Paddy Grass and Ending with Eagle

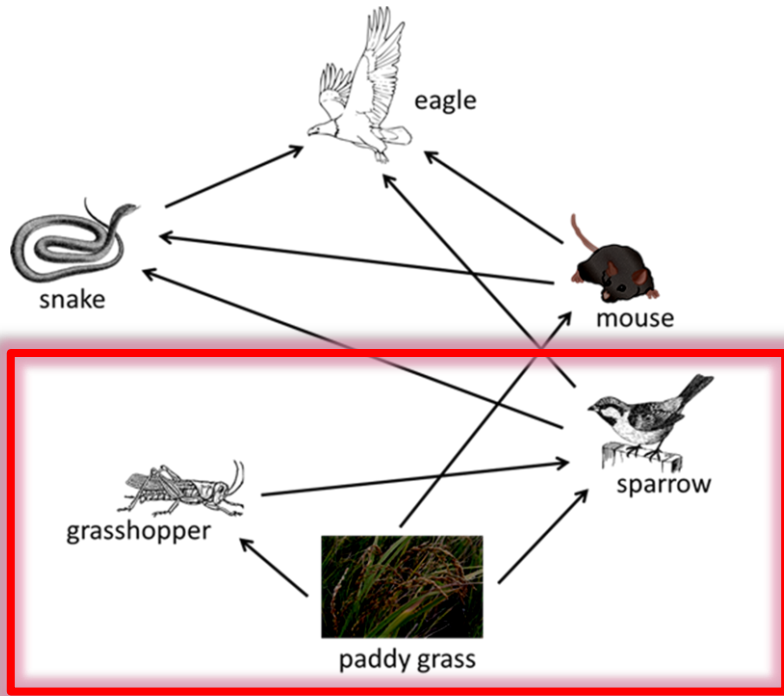| 2 marks	69.0%
1 mark	3.5%
0 mark (Wrong Answer)	20.4%
0 mark (Irrelevant Answer or Not Attempt)	7.1%

Direct Relationship – Less Sparrows > Less Predators

Indirect Relationship – Less Sparrows > More Paddy Grass as Food

Analysis of Student Performance

2(b)(i) – Population of **Grasshoppers** when a large number of **Sparrows** were hunted by Humans

|	
2 marks (Full Understanding)	3.9%
2 marks (Partial Understanding / Correct Prediction based on Any One of the Feeding Relationships)	68.8% (68.4%+ 0.4%)
1 mark (Correct Prediction but No Explanation)	13%
0 mark (Wrong Prediction or Giving Contradictory Explanation)	5.5%
0 mark (Irrelevant Answer or Not Attempt)	8.8%

Analysis of Student Performance

2(b)(i) – Population of **Grasshoppers** when a large number of **Sparrows** were hunted by Humans
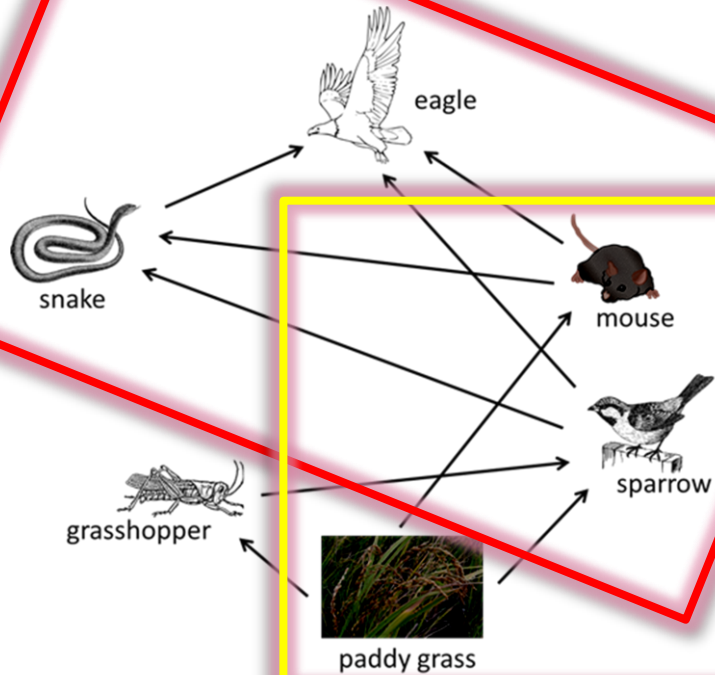
Upward Relationship
with Eagle/Snake
– Both Mouse & Sparrow are Their Preys

Effects Opposing Each Other

Downward Relationship
with Paddy Grass
– Competing Paddy Grass for Food

Analysis of Student Performance

2(b)(ii) – Population of **Mice** when a large number of **Sparrows** were hunted by Humans
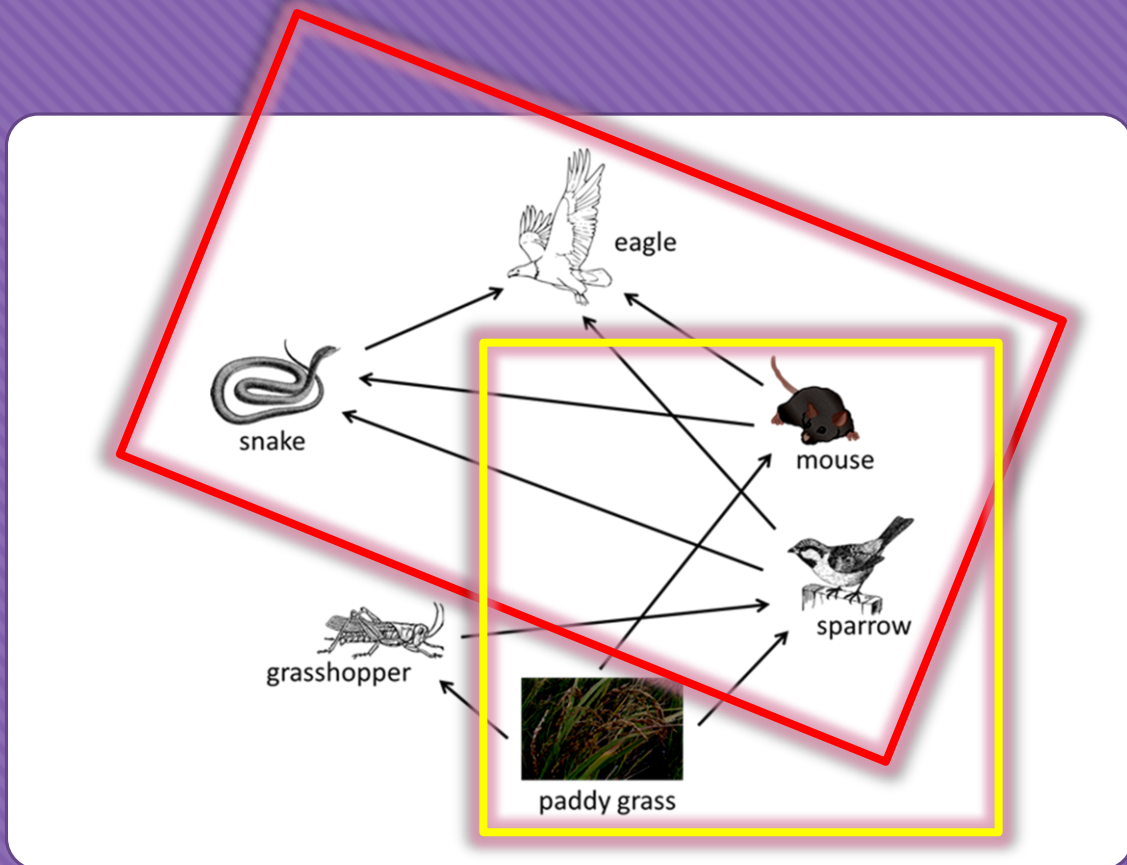
2 marks (Full Understanding, Correct Prediction and Explanation)	1%
1 mark (Partial Understanding / Prediction and Explanation based on One Feeding Relationship / Recognising Both Relationships but No Prediction)	49% (40.5% +7.8% +0.6%)
0 mark (Predicting No Change using the Argument "No Feeding Relationship between Mouse and Sparrow")	9.1%
0 mark (Other Wrong Predictions and/or Giving Incorrect Explanations)	30.1%
0 mark (Irrelevant Answer or Not Attempt)	10.8%

Analysis of Student Performance

2(b)(ii) – Population of **Mice** when a large number of **Sparrows** were hunted by Humans

Issues that Warrant Attention

Issues that Warrant Attention

(ii) The number of mice increases because number of eagle reduces as they lose sparrow to eat. The reducing number of eagle cause the increasing number of mice.

(ii) The number of mice increases because less eagle will eat the mouse. The demand of mice decreases. Therefore, the number of mice will increase.

(ii) 鼠总数 会有所下降 因为缺少了 麻雀 捕食草猛。鼠的食物被草猛吃的一干二净。缺少食物就无法繁殖。这将直接导致蛇和鹰的数量减少。

Issues that Warrant Attention

- Hasty Conclusion / Incorrect Understanding of the Meaning of "Balance" in Nature

- Invalid Conclusion based on Incorrect Assumption / Cause-Effect Relations

Analysis of Student Performance

- 2(c) – Importance of conserving living things and their habitat respectively

  (Requirement: Communicating Viewpoints Freely, without Relying on Information Given)

(c) 保持生態平衡很重要, 如有任何一種生物太多或太少都能間接影響到人類, 如應很大量捕獵, 會使蛇的數量增加, 有機會傷害到人士; 鼠亦有機會增加, 產生鼠患, 所以我們必須保存快要絕種的生物及其生境, 以保持生態平衡。

(c) 能防止動物絕種。

(c) Importance of conserving ~~two~~ living things : to keep the food chains and food webs balanced

(c) 保存生物避免了食物鏈的崩潰, 避免物種滅絕或繁殖過多。而保存生境, 為動物提供棲息地, 令物種熟悉其習性。

Analysis of Student Performance

○ 2(c) – Importance of conserving living things and their habitat respectively

Weaknesses

○ Overlooked the word "Respectively"

○ Weak Communication Skills

   ◦ Unable to use Simple Scientific Terms and/or Appropriate Reasoning Power to Strengthen Arguments / Discussing only like Laymen

   ◦ Weak Sense / Not ready to argue, debate and elaborate

○ Weak understanding of the meaning of Competition, Habitat, Balance and Bio-diversity, as well as the Multifarious Relationships occurring in and the Dynamic Nature of an Ecosystem