Appendix A

Analysis and Representation of Sample-Text

A.1 Text Analysis

Paragraph 1 (idea units 1–3)

1. An organism's habitat is the place where it lives, its address

    (a) a habitat is a place

    (b) organisms live in habitats

    (c) a habitat is like an address

2. Our woodland is the habitat for a whole host of organisms

    (a) a woodland is a habitat

    (b) many organisms live in woodlands

3. Many organisms will only occupy a small part of the total habitat, for example, the snail in our woodland. This small part of the total habitat is called microhabitat

    (a) microhabitat is a small part of a total habitat

    (b) many organisms occupy microhabitats

    (c) snail is an example of an organism which lives in a microhabitat

    (This idea unit appears ambiguous: is woodland a microhabitat or is the snail's habitat a microhabitat?)

Paragraph 2 (idea units 4–6)

4. Each habitat will have certain distinct features which affect the organisms living in it

    (a) habitats have distinct features

    (b) the distinct features of a habitat affect the organisms living in it

5. There are physico-chemical or abiotic factors: climate, soil, type of water (marine, fresh, running, still) and so on

    (a) physico-chemical factors are features of a habitat

    (b) abiotic factor is the same as physico-chemical factor

    (c) climate is a physico-chemical factor

    (d) soil is a physico-chemical factor

(e) type of water is a physico-chemical factor

(f) marine is a type of water

(g) fresh is a type of water

(h) running is a type of water

(i) still is a type of water

(j) there are other abiotic factors

6. There are biotic factors, which are determined by the organisms, which share the habitat. For example, organisms which eat each other, compete with each other for food or provide shelter.

(a) biotic factors are features of a habitat

(b) biotic factors are determined by the organisms which share the habitat

(c) Example of biotic factor (1): organisms which eat each other

(d) Example of biotic factor (2): organisms which compete with each other

(e) Example of biotic factor (3): organisms which provide shelter [to other organisms]

Paragraph 3 (idea units 7–8)

7. Biotic and abiotic factors are not independent of each other. For example, the trees in a woodland affect the humidity, temperature and amount of sunlight there. So, trees, a biotic factor, influence the physico-chemical features of the habitat which, in turn, will affect the other organisms living in the woodland.

(a) biotic factors are not independent of abiotic factors

(b) Example of 7.1: woodland trees affect the humidity of the woodland

(c) Example of 7.1: woodland trees affect the temperature of the woodland

(d) Example of 7.1: woodland trees affect the amount of sunlight of the woodland

(e) trees constitute a biotic factor of a woodland

(f) humidity is a physico-chemical feature of a woodland

(g) temperature is a physico-chemical feature of a woodland

(h) amount of sunlight is a physico-chemical feature of a woodland

(i) woodlands have humidity

(j) woodlands have temperature

(k) woodlands have amount of sunlight

(l) physico-chemical features of a woodland affect other (ambiguity: non-trees?) organisms living in the woodland

8. Understanding the complexity of interaction between organisms and their habitat is one of the challenges faced by ecologists.

    (a) the interaction between organisms and their habitat is complex. (This proposition is not important for the learning objective.)

    (b) ecologists try to understand the interaction between organisms and their habitat. (This proposition is not important for the learning objective.)

After capturing the main ideas, the text was further analysed into propositions. These propositions served as a basis for the representation of relationships presented in **Section A.2**.

A.2 Representation of Relationships

What follows is the representation of relationships used in the sample-text. This representation follows the RELATIONSHIP **Prototype** presented in **Section 3.7.3** (see **Table 3–9 on page 68**), but slot *Where in text* is not included here due to its low conceptual import.

Slot	Value
Link	IS PART OF
Origin concept	MICROHABITAT
Terminal concept	HABITAT
Is explicit	yes
Is ambiguous	yes
Reasoning needed	EASY
Justifications	[RJ1: microhabitat is a small PART OF a total habitat, RJ3: PART OF]
Link	IS PART OF
Origin concept	ORGANISM
Terminal concept	HABITAT
Is explicit	yes
Is ambiguous	no
Reasoning needed	DIFFICULT
Justifications	[RJ2: organisms live in habitats, RJ4: if someone lives in someplace, they are PART OF of it]

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Slot	Value
Link	IS PART OF
Origin concept	ORGANISM
Terminal concept	WOODLAND
Is explicit	no
Is ambiguous	no
Reasoning needed	DIFFICULT
Justifications	[RJ2: many organisms live in woodlands, RJ4: if someone lives in someplace, they are PART OF it]
Link	IS PART OF
Origin concept	SNAIL
Terminal concept	MICROHABITAT
Is explicit	no
Is ambiguous	yes
Reasoning needed	DIFFICULT
Justifications	[RJ2: snails live in microhabitats, RJ4: if someone lives in someplace, they are PART OF it]
Link	IS PART OF
Origin concept	TREE
Terminal concept	WOODLAND
Is explicit	yes
Is ambiguous	no
Reasoning needed	FAIR
Justifications	[RJ2: trees are PART OF woodlands, RJ3: PART OF]
Link	IS PART OF
Origin concept	HUMIDITY
Terminal concept	WOODLAND
Is explicit	yes
Is ambiguous	no
Reasoning needed	FAIR
Justifications	[RJ2: humidity is PART OF woodlands, RJ3: PART OF]

Slot	Value
Link	IS PART OF
Origin concept	TEMPERATURE
Terminal concept	WOODLAND
Is explicit	no
Is ambiguous	no
Reasoning needed	FAIR
Justifications	[RJ2: temperature is PART OF woodlands, RJ3: PART OF]
Link	IS PART OF
Origin concept	AMOUNT OF SUNLIGHT
Terminal concept	WOODLAND
Is explicit	yes
Is ambiguous	no
Reasoning needed	FAIR
Justifications	[RJ2: amount of sunlight is PART OF woodlands, RJ3: PART OF]
Link	IS A TYPE OF
Origin concept	HABITAT
Terminal concept	PLACE
Is explicit	yes
Is ambiguous	yes
Reasoning needed	EASY
Justifications	[RJ2: habitat IS A place, RJ3: IS A]
Link	IS A TYPE OF
Origin concept	HABITAT
Terminal concept	ADDRESS
Is explicit	yes
Is ambiguous	yes
Reasoning needed	FAIR
Justifications	[RJ2: HABITAT IS AN address, RJ3: IS A]

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Slot	Value
Link	IS A TYPE OF
Origin concept	WOODLAND
Terminal concept	HABITAT
Is explicit	yes
Is ambiguous	no
Reasoning needed	EASY
Justifications	[RJ1: WOODLAND IS A habitat, RJ3: IS A]
Link	IS A TYPE OF
Origin concept	SNAIL
Terminal concept	ORGANISM
Is explicit	yes
Is ambiguous	no
Reasoning needed	EASY
Justifications	[RJ1: snail IS AN EXAMPLE OF organism, RJ3: IS AN EXAMPLE OF]
Link	IS A TYPE OF
Origin concept	CLIMATE
Terminal concept	PHYSICO CHEMICAL FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	EASY
Justifications	[RJ1: climate IS A physico-chemical factor, RJ3: IS A]
Link	IS A TYPE OF
Origin concept	SOIL
Terminal concept	PHYSICO CHEMICAL FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	EASY
Justifications	[RJ1: soil IS A physico-chemical factor, RJ3: IS A]

Slot	Value
Link	IS A TYPE OF
Origin concept	TYPE OF WATER
Terminal concept	PHYSICO CHEMICAL FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	EASY
Justifications	[RJ1: type of water IS A physico-chemical factor, RJ3: IS A]
Link	IS A TYPE OF
Origin concept	MARINE
Terminal concept	TYPE OF WATER
Is explicit	yes
Is ambiguous	no
Reasoning needed	EASY
Justifications	[RJ1: marine IS A type of water, RJ3: IS A]
Link	IS A TYPE OF
Origin concept	FRESH
Terminal concept	TYPE OF WATER
Is explicit	yes
Is ambiguous	no
Reasoning needed	EASY
Justifications	[RJ1: fresh IS A type of water, RJ3: IS A]
Link	IS A TYPE OF
Origin concept	RUNNING
Terminal concept	TYPE OF WATER
Is explicit	yes
Is ambiguous	no
Reasoning needed	EASY
Justifications	[RJ1: running IS A type of water, RJ3: IS A]

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Slot	Value
Link	IS A TYPE OF
Origin concept	STILL
Terminal concept	TYPE OF WATER
Is explicit	yes
Is ambiguous	no
Reasoning needed	EASY
Justifications	[RJ1: still IS A type of water, RJ3: IS A]
Link	IS A TYPE OF
Origin concept	TREE
Terminal concept	BIOTIC FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	EASY
Justifications	[RJ2: a tree IS A biotic factor of a woodland, RJ3: IS A]
Link	IS A TYPE OF
Origin concept	HUMIDITY
Terminal concept	PHYSICO CHEMICAL FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	FAIR
Justifications	[RJ1: humidity IS A physico-chemical feature (factor), RJ3: IS A]
Link	IS A TYPE OF
Origin concept	TEMPERATURE
Terminal concept	PHYSICO CHEMICAL FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	FAIR
Justifications	[RJ1: temperature IS A physico-chemical feature (factor), RJ3: IS A]

Slot	Value
Link	IS A TYPE OF
Origin concept	AMOUNT OF SUNLIGHT
Terminal concept	PHYSICO CHEMICAL FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	FAIR
Justifications	[RJ1: amount of sunlight IS A physico-chemical feature (factor), RJ3: IS A]
Link	LEADS TO
Origin concept	PHYSICO CHEMICAL FACTOR
Terminal concept	ORGANISM
Is explicit	yes
Is ambiguous	no
Reasoning needed	FAIR
Justifications	[RJ2: physico-chemical features of a woodland AFFECT organisms living in the woodland, RJ3: AFFECT]
Link	LEADS TO
Origin concept	BIOTIC FACTOR
Terminal concept	ABIOTIC FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	DIFFICULT
Justifications	[RJ2: biotic factors AFFECT abiotic factors, RJ3: AFFECT]

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Slot	Value
Link	LEADS TO
Origin concept	ABIOTIC FACTOR
Terminal concept	BIOTIC FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	DIFFICULT
Justifications	[RJ2: abiotic factors AFFECT biotic factors, RJ3: AFFECT]
Link	LEADS TO
Origin concept	ORGANISM
Terminal concept	BIOTIC FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	EASY
Justifications	[RJ1: biotic factors of a habitat are DETERMINED by the organisms which share the habitat, RJ4: If a concept DETERMINES another one, then the first LEADS TO the second]
Link	LEADS TO
Origin concept	ORGANISMS EATING EACH OTHER
Terminal concept	BIOTIC FACTOR
Is explicit	no
Is ambiguous	yes
Reasoning needed	FAIR
Justifications	[RJ2: organisms eating each other DETERMINE biotic factors, RJ4: If a concept DETERMINES another one, then the first LEADS TO the second]

Slot	Value
Link	LEADS TO
Origin concept	TREE
Terminal concept	HUMIDITY
Is explicit	yes
Is ambiguous	no
Reasoning needed	FAIR
Justifications	[RJ1: (woodlands) trees AFFECT the humidity of the woodland, RJ3: AFFECT]
Link	LEADS TO
Origin concept	TREE
Terminal concept	TEMPERATURE
Is explicit	yes
Is ambiguous	no
Reasoning needed	FAIR
Justifications	[RJ1: (woodlands) trees AFFECT the temperature of the woodland, RJ3: AFFECT]
Link	LEADS TO
Origin concept	TREE
Terminal concept	AMOUNT OF SUNLIGHT
Is explicit	yes
Is ambiguous	no
Reasoning needed	FAIR
Justifications	[RJ1: (woodlands) trees AFFECT the amount of sunlight of the woodland, RJ3: AFFECT]

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Slot	Value
Link	LEADS TO
Origin concept	ORGANISMS PROVIDING SHELTER
Terminal concept	BIOTIC FACTOR
Is explicit	no
Is ambiguous	yes
Reasoning needed	FAIR
Justifications	[RJ2: organisms providing shelter DETERMINE biotic factors, RJ4: If a concept DETERMINES another one, then the first LEADS TO the second]
Link	LEADS TO
Origin concept	ORGANISMS COMPETING FOR FOOD
Terminal concept	BIOTIC FACTOR
Is explicit	no
Is ambiguous	yes
Reasoning needed	FAIR
Justifications	[RJ2: organisms competing with each other DETERMINE biotic factors, RJ4: If a concept DETERMINES another one, then the first LEADS TO the second]
Link	IS EQUIVALENT TO
Origin concept	PHYSICO CHEMICAL FACTOR
Terminal concept	ABIOTIC FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	EASY
Justifications	[RJ2: abiotic factor IS THE SAME AS physico-chemical factor, RJ3: IS THE SAME AS]

Slot	Value
Link	IS EQUIVALENT TO
Origin concept	ABIOTIC FACTOR
Terminal concept	PHYSICO CHEMICAL FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	EASY
Justifications	[RJ2: physico-chemical factor IS THE SAME AS abiotic factor, RJ3: IS THE SAME AS]
Link	HAS PROPERTY
Origin concept	HABITAT
Terminal concept	PHYSICO CHEMICAL FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	FAIR
Justifications	[RJ2: habitats HAVE biotic physico-chemical factors, RJ3: HAVE]
Link	HAS PROPERTY
Origin concept	HABITAT
Terminal concept	BIOTIC FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	FAIR
Justifications	[RJ2: habitats HAVE biotic factors, RJ3: HAVE]
Link	HAS PROPERTY
Origin concept	WOODLAND
Terminal concept	HUMIDITY
Is explicit	yes
Is ambiguous	no
Reasoning needed	EASY
Justifications	[RJ1: woodlands HAVE humidity, RJ3: HAVE]

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Slot	Value
Link	HAS PROPERTY
Origin concept	WOODLAND
Terminal concept	TEMPERATURE
Is explicit	yes
Is ambiguous	no
Reasoning needed	EASY
Justifications	[RJ1: woodlands HAVE temperature, RJ3: HAVE]
Link	HAS PROPERTY
Origin concept	WOODLAND
Terminal concept	AMOUNT OF SUNLIGHT
Is explicit	yes
Is ambiguous	no
Reasoning needed	EASY
Justifications	[RJ1: woodlands HAVE amount of sunlight, RJ3: HAVE]
Link	IS A TYPE OF
Origin concept	CLIMATE
Terminal concept	ABIOTIC FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	EASY
Justifications	[RJ1: climate IS A physico-chemical factor, which is the same as abiotic factor, RJ3: IS A]
Link	IS A TYPE OF
Origin concept	SOIL
Terminal concept	ABIOTIC FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	EASY
Justifications	[RJ1: soil IS A physico-chemical factor, which is the same as abiotic factor, RJ3: IS A]

Slot	Value
Link	LEADS TO
Origin concept	ABIOTIC FACTOR
Terminal concept	ORGGANISM
Is explicit	yes
Is ambiguous	no
Reasoning needed	FAIR
Justifications	[RJ2: physico-chemical factors, which are the same as abiotic factors of a woodland, AFFECT organisms living in the woodland, RJ3: AFFECT]
Link	LEADS TO
Origin concept	BIOTIC FACTOR
Terminal concept	PHYSICO CHEMICAL FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	DIFFICULT
Justifications	[RJ2: biotic factors AFFECT abiotic factors, which are the same as physico-chemical factors, RJ3: AFFECT]
Link	LEADS TO
Origin concept	PHYSICO CHEMICAL FACTOR
Terminal concept	BIOTIC FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	DIFFICULT
Justifications	[RJ1: abiotic factors, which are the same as physico-chemical factors, AFFECT biotic factors, RJ3: AFFECT]

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Slot	Value
Link	IS A TYPE OF
Origin concept	HUMIDITY
Terminal concept	ABIOTIC FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	FAIR
Justifications	[RJ1: humidity IS A physico-chemical factor, which is the same as abiotic factor, RJ3: IS A]
Link	IS A TYPE OF
Origin concept	TEMPERATURE
Terminal concept	ABIOTIC FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	FAIR
Justifications	[RJ1: temperature IS A physico-chemical factor, which is the same as abiotic factor, RJ3: IS A]
Link	IS A TYPE OF
Origin concept	AMOUNT OF SUNLIGHT
Terminal concept	ABIOTIC FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	FAIR
Justifications	[RJ1: amount of sunlight IS A physico-chemical factor, which is the same as abiotic factor, RJ3: IS A]
Link	HAS PROPERTY
Origin concept	HABITAT
Terminal concept	ABIOTIC FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	FAIR
Justifications	[RJ2: habitats HAVE physico-chemical factors, which are the same as abiotic factors, RJ3: HAVE]

Slot	Value
Link	HAS PROPERTY
Origin concept	HABITAT
Terminal concept	ABIOTIC FACTOR
Is explicit	yes
Is ambiguous	no
Reasoning needed	FAIR
Justifications	[RJ2: habitats HAVE physico-chemical factors, which are the same as abiotic factors, RJ3: HAVE]
Link	IS PART OF
Origin concept	ORGANISM
Terminal concept	MICROHABITAT
Is explicit	no
Is ambiguous	no
Reasoning needed	DIFFICULT
Justifications	[RJ2: many organisms occupy microhabitats, RJ4: if someone occupies some place, they are PART OF it]