Nature and sustainable development-related vocabulary in

Finnish upper secondary school English textbooks

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Second Subject Thesis

October 2014

Kielten opettajana olen kiinnostunut oppimateriaaleista ja niiden tarkoituksenmukaisesta ja tehokkaasta käytöstä kielten opetuksessa. Suomessa vieraiden kielten oppikirjat ovat merkittävässä asemassa ja ne muokkaavat oppitunnin kulkua ja tuntisuunnitelmien tekoa huomattavasti. Tästä syystä valitsin tutkimukseni materiaaliksi kaksi vieraan kielen oppikirjaa. Tutkimukseni tarkoituksena on esitellä ja analysoida kahden suomalaisen lukion englannin oppikirjan *luonto ja kestävä kehitys*- sanastoa ja tarkastella, kuinka kirjoihin valittu sanasto vastaa yleisesti englannin kielessä käytettäviä ilmaisuja. Aineistoni koostuu lukiotason kirjoista *Profiles 7* ja *Open Road 7,* jotka on suunniteltu kurssille seitsemän ja joiden teemana on luonto ja kestävä kehitys. Sanaston esiintymistä englannissa tutkin käyttämällä apunani englanninkielistä korpusta *The Corpus of Contemporary American English* (COCA).

Tutkielmani teoreettisessa osiossa tarkastelen, mitä lukion opetussuunnitelmassa sanotaan kieltenopetuksesta, esittelen näkemyksiä oppikirjan roolista kielten opiskelussa, luon katsauksen erilaisiin teorioihin vieraan kielen sanaston opetuksesta sekä esittelen korpuslingvistiikkaa ja sen merkitystä kielten opetuksessa.

Keräsin materiaalin tähän tutkielmaan oppikirjojen sanastoista, joista valitsin aiheeseen liittyvät sanat ja ilmaisut. Tämän jälkeen tutkin valitsemieni sanojen käyttöä COCA:n avulla. Loin sanoista taulukot, joista ilmenee jokaisen sanan esiintymistiheys, osumien määrät puhutussa kielessä, fiktiossa, aikakauslehdissä, sanomalehdissä sekä akateemisissa teksteissä. Taulukoista selviää myös, minä vuosina kyseisellä sanalla on eniten osumia. Näin voidaan tarkastella sanan ajanmukaisuutta.

Kaiken kaikkiaan tarkastelin yhteensä 92 sanaa/ilmaisua, joista 25 esiintyi molemmissa tutkimissani kirjoissa. COCA:ssa viisi eniten osumia saaneet sanat olivat: *environment, waste, conservation, pollution* sekä *organic.* Kaikki nämä sanat ovat löydettävissä molemmista kirjoista. Lähes kaikille oppikirjojen tutkimilleni sanoille ja ilmaisuille on vastine COCA:ssa. Niistä 25 sanasta/ilmaisusta, jotka esiintyivät molemmissa kirjoissa, 18 ovat COCA:n aineistoista, jotka ovat vuosilta 2010-2012. Voidaan siis sanoa, että kirjoihin on onnistuttu valita englannissa tiheästi esiintyviä ilmaisuja, jotka ovat myös ajanmukaisia.

Kirjojen ympäristö- sanasto on hyvin samankaltaista, mutta pieniä erojakin on. *Profiles 7* näyttäisi keskittyvän enemmän uusiin, hyvinkin nykyaikaisiin ilmaisuihin, kun taas *Open Road 7* sisältää enemmän perinteisiä ilmaisuja sekä uusiin energianlähteisiin liittyvää sanastoa. Tiettyjä ilmaisuja olisi mielestäni ollut hyvä lisätä molempiin kirjoihin. Olen listannut näitä sanoja mm. analyysi osiossa.

Asiasanat: oppikirja, korpuslingvistiikka, luonto ja kestävä kehitys, sanaston opetus

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1. Introduction

Textbooks play a major role in foreign language teaching. In my experience as a language teacher, textbooks quite often structure the language course and they are the most frequently employed item of materials in the classroom. Littlejohn (1998, 190) argues that textbooks are the most powerful devices in spreading new methodological ideas and they define the classroom time more than ever before. Therefore it is important that the textbook succeeds in achieving impact in the learning process. Furthermore, many researchers assert that textbooks should contain authentic texts, that is, materials that appeal to learners and relate to their lives (see chapter 2). According to Tomlinson (1998, 7) a good textbook contains for instance texts from various sources and they should represent a variety of different text types.

The Finnish National Core Curriculum determines what the students should learn in upper secondary school courses and what themes the courses consist of. It is written in the Finnish National Core Curriculum (2003, 105) about course seven that:

> 7. Nature and sustainable development
> The course will provide students with capabilities to understand and use language relating to nature, the natural sciences and the theme of sustainable development.

The purpose of this minor thesis is to study the vocabulary of two Finnish upper secondary school English textbooks aimed for course seven and to compare the lexis with authentic English usage using contemporary corpora as evidence. Accordingly, the research question of this thesis is: "What sort of *nature and sustainable development*- related words and expressions are used in two Finnish upper secondary school English textbooks and how frequently they occur in written and spoken English in general".

As primary data I have two Finnish upper secondary school English textbooks, *Profiles 7* and *Open Road 7*. I have chosen these books because they are widely used in Finnish upper secondary schools and they are also the latest publications. To examine how frequently the

nature and sustainable development-related words and expressions of the textbooks are used in English in general, I will use the *Corpus of Contemporary American English* (hereafter COCA), which contains c. 450 million words from years 1990-2012.

As mentioned above, textbooks have an essential role in the classroom and as a language teacher I make decisions concerning classroom materials. Thus, I consider materials development to be highly significant and interesting field. I also think it is important to provide the learners with tools which enable them to be active participants in conversations and write fluently on environmental issues. A good quality, well-designed textbook can be a useful help for learners to achieve this. I have chosen this subject partly out of personal interest as I am interested in new phrases and expressions relating to environmental themes. However, the topic is also particularly timely because this vocabulary is constantly changing and new expressions appear frequently. Moreover, *nature and sustainable development* is one of the most current themes in political conversations and is a very international theme, too. My experience as textbook author also influenced the choice of the topic. It is interesting to study the books and examine if there are differences in the choices concerning environmental vocabulary. Since the writers are usually teachers or other linguists, my hypothesis is that the vocabulary chosen is rather similar in these two books.

This study comprises seven chapters including the introduction. Chapter two outlines the background of the study by introducing the objectives of the Finnish National Core Curriculum for Upper Secondary Schools for foreign languages, by discussing textbooks and vocabulary teaching and by defining some basic principles of corpus linguistics. Materials, including the textbooks and the vocabulary lists of them in particular and the reference corpus, COCA, will be introduced in chapter three. The procedure of the research is presented in chapter four and the analysis of the data follows in chapter five. I will discuss the findings of my study in chapter six. Finally, a conclusion follows in chapter 7.

2. Background

In this section I will introduce the objectives of the Finnish National Core Curriculum for Upper Secondary Schools for foreign languages, discuss the role and functions of textbooks in language teaching and look into some aspects of vocabulary teaching. I will also introduce the basic principles of corpus linguistics and discuss the role of corpus linguistics in teaching vocabulary in particular.

2.1 Finnish National Core Curriculum for Upper Secondary Schools

In Finland, what the upper secondary school courses should include is determined on the national level by the Finnish National Board of Education and the objectives are defined in the National Core Curriculum for Upper Secondary Education. The education provider is obligated to follow the provisions of this curriculum and its objectives and the core contents set out in the National Core Curriculum should be specified and complemented in teaching as defined on the first page of the Finnish National Core Curriculum for Upper Secondary Schools from year 2003 (hereafter FNCCUSS).

Foreign language teaching develops the intercultural communication skills of the learner, provides them with skills and knowledge related to the foreign language and offers them the opportunity to develop their awareness, understanding and appreciation of the culture where the language is spoken (FNCCUSS, 2003 102). Consequently, foreign languages can be described as practical, theoretical and cultural subjects (FNCCUSS, 2003, 102). According to the FNCCUSS (2003, 102) listening, speaking, reading and writing objectives for A-level English (=first foreign language, starting from grades 1-3) are set at level B2 of the Common European Framework of Reference (hereafter CEFR) scale. CEFR is a system that:

provides a common basis for the elaboration of language syllabuses, curriculum guidelines, examinations, textbooks, etc. across Europe. It describes in a comprehensive way what language learners have to learn to do in order to use a language for communication and what knowledge and skills they have to develop so as to be able to act effectively. The Framework also defines levels of proficiency which allow learners' progress to be measured at each stage of learning and on a life-long basis (CEFR, page 1).

B2 users are called "Independent Users" in CEFR (page 24) and they are described as follows:

B2 Can understand the main ideas of complex text on both concrete and abstract topics, including technical discussions in his/her field of specialisation. Can interact with a degree of fluency and spontaneity that makes regular interaction with native speakers quite possible without strain for either party. Can produce clear, detailed text on a wide range of subjects and explain a viewpoint on a topical issue giving the advantages and disadvantages of various options.

Additional objectives are listed in FNCCUSS (2003) on page 103 as follows:

The objectives are for students to
• know how to communicate in a manner characteristic of the target language and its culture;
• be able to assess their language skills in relation to the objectives;
• be familiar with their own strengths and development needs as communicators and language learners;
• know how to develop their language skills through strategies that are appropriate to their development needs, study assignments and communication tasks.

Each foreign language course in the upper secondary school has a specific theme and, as discussed earlier, the theme of course seven, used as primary data in this thesis, is *Nature and sustainable development.*

The themes of the courses will be dealt with from the perspectives of Finland, the cultural sphere of the language being studied as well as from a broader perspective, in order to give the learner opportunities to make comparisons (FNCCUSS, 2003, 103). In practice, each course may also focus on other themes in accordance with the interests of the learners, on the one hand, and also take account of the requirements of current topics, on the other (FNCCUSS, 2003, 103). Students must have opportunities to listen, read, speak and write for different purposes in every

course, but the priorities emphasized vary from course to course (FNCCUSS, 2003, 103). All

courses will also expand the knowledge of the grammar and vocabulary of the language being

studied (FNCCUSS, 2003, 103). This thesis focuses on the vocabulary learning and on the ways in

which learners can expand their knowledge of English vocabulary in the fields of *nature and*

sustainable development. Furthermore, the use of literary and other authentic sources will help the

student to understand the differences between their mother tongue and the language being studied

and the cultural factors that explain these differences (FNCCUSS, 2003, 103).

2.2 The role of textbooks in language teaching

In the modern system of education, new syllabi are introduced rather often and methodological

innovations frequently give way to new practices in the field of language teaching (Littlejohn, 1998,

190). According to Littlejohn (1998, 190), while new ideas are spread in conferences, journals and

workshops, the most powerful device for disseminating new methodological ideas, Littlejohn

argues, is the published textbook. Materials production has developed in two ways: firstly,

published materials are used now more widely than ever before and secondly the materials have

become more complex; instead of containing mainly readings and sentences to translate like in the

early days, they are now complete "packages" for learners and teachers (Littlejohn, 1998, 190). The

published materials I have used as a language teacher are indeed complete packages as Littlejohn

argues: for example, there are textbooks with a large variety of exercises, audio tapes, games, extra

materials (for example for the fast learners), songs and web materials for the upper secondary

school courses. Consequently, materials structure the classroom time more than ever before

(Littlejohn, 1998, 190).

One major problem in materials development is that all learners, all teachers and all

teaching situations are uniquely different, yet materials have to treat them as if they were the same

(Maley (1998, 279). Maley (1998, 279) uses the following figure to demonstrate that there are three major elements in classrooms using published materials: the materials, the teacher and the learners:
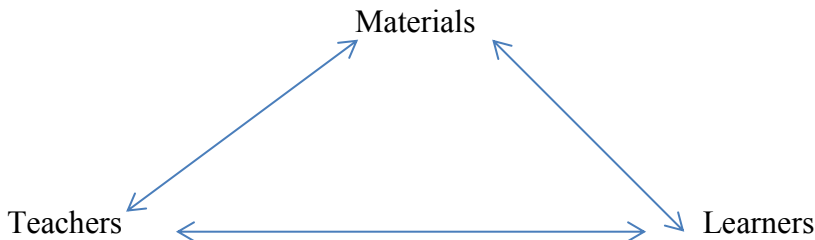

Figure 1 Three major elements in classroom using published materials (Maley, 1998, 279)

When the materials are meant to be used by a relatively specific group of learners, there might be a reasonably close fit between the three elements, but there will never be a perfect fit (Maley, 1998, 279-280). There are various ways in which teachers can cope with this problem. According to Maley (1998, 281) some teachers just "give the book a rest" and use other materials, for instance songs, rhymes, games, cartoons, recordings, video clips, etc. More specifically, teachers who wish to use the materials have several options:

> omission: for example inappropriate, offensive and unproductive things are left out,
>
> addition: teachers add material if they consider the coverage is inadequate,
>
> reduction: the teacher gives some action less emphasis,
>
> extension: an activity is lengthened to introduce an additional dimension,
>
> rewriting/modification: teachers may sometimes want to rewrite material in order to make it more appropriate,
>
> replacement: some texts or exercises are replaced by more suitable material,
>
> re-ordering: the order in which the materials are presented might not be suitable for the learners and the teacher may plot a different course from the one the author has planned,
>
> branching: new options to the existing activity are added (Maley 1998, 281).

What are the characteristics of a good textbook? According to Tomlinson (1998, 7) learning materials should attract the learners´ curiosity, interests and attention and when this is achieved there is a good chance that some of the language in the materials will be taken in for processing. Tomlinson notes (1998, 7) that materials can achieve impact through:

a) novelty (e.g. unusual topics, illustrations and activities);
b) variety (e.g. breaking up the monotony of a unit routine with an unexpected activity; using many different text types taken from many different types of sources; using a number of different instructor voices on a cassette):
c) attractive presentation (e.g. use of attractive colours; lots of white space: use of photographs);
d) appealing content (e.g. topics of interest to the target learners; topics which offer the possibility of learning something new; engaging stories; universal themes: local references).

Tomlinson (1998, 10) also points out that learners should perceive the material they are learning as useful and that material should be relevant to the learners´ interests and to "real-life" tasks that they might need to perform in the target language. It is important to provide the learners with a choice of topics and tasks in order to make them aware of the wider relevance and utility of the material being studied (Tomlinson, 1998, 11). Learners should be interested, pay attention and invest effort in the learning activity and well-prepared materials can help them in this by providing them with choices of focus and activity, by giving them the opportunity to control the topics and by giving them learner-centred tasks (Tomlinson 1998, 11).

In my personal experience all the aspects Tomlinson names are relevant when describing the characteristics of a good foreign language textbook. It is essential that the learning material motivates learners and that they feel it is useful for them. Motivated learners usually give more effort and achieve good results. If we consider upper secondary school course seven, the primary data of this study, it is important that the textbooks succeed in providing multiple text types and every learner finds something that they perceive useful. The theme of the course is determined

by FNCCUSS as mentioned above, but the materials developers need to include texts and tasks that raise interest in the books.

Bell and Gower (1998, 116) argue that the writing of course materials always involves compromise. Instead of writing materials they would use themselves if they were teaching, they need to cater for a wide range of students, teachers and classroom situations, some of which they are not personally acquainted with, even if they are professional educators themselves (Bell and Gower, 1998, 116). Furthermore, authors of textbooks, especially authors who are teachers themselves and have strong experience-based opinions on what works in their classrooms, often feel compromised by publishers (Bell and Gowen, 1998, 120-121). But the publishers, too, compromise; they need to publish materials that sell (Bell and Gower, 1998, 199).

According to Bragger teachers, for various reasons, suffer from time constraints that may keep them from developing many of the ideas they may have (1986, 85). Therefore, teachers should have access to materials that are easily available, that they are familiar with and which are easy to modify without any undue additional effort (Bragger, 1986, 85). An obvious source of teaching content and ideas is the textbook when it is used as a tool to be adapted to the teacher´s own style of teaching rather than as prescriptive set of rules (Bragger, 1986, 85). Bragger argues that such a textbook is a basic step toward a proficiency-oriented classroom (1986, 85). Bell and Gower concur noting that textbooks play an essential role in many classroom activities and that can be a useful resource for teachers and also meet the needs of specific classes (1998, 117). Nevertheless, according to Bell and Gower (1998, 117), there are some questions that are raised when discussing the role of a textbook. As some of the most important ones Bell and Gower (as textbook writers themselves) name the following (1998, 117):

1. If one of your pedagogic principles is that creativity is important in the classroom, then how can you make sure that your coursebook does not take away investment and responsibility from teachers and learners?

2. If coursebooks are sometimes used by schools to maintain consistency of syllabus, how can you at the same time make sure they reflect the dynamic and interactive nature of the learning process?
3. Although it is true no coursebook can cater for all the individual needs of all learners all of the time, can you provide enough material to meet most of the needs most of the time and build in enough flexibility to enable teachers to individualise it?
4. If the language presented in many coursebooks bears little relationship to real language use and more to coursebook convention are you sure your samples of use are as natural as possible?
5. If coursebooks are frequently predictable in format and content how can you bring to your material a feeling that it is not boring and predictable?

All of the questions asked above are important for textbook writers and as mentioned earlier, textbook writing is always about making compromises. Question four in particular is important when thinking about the purpose of this paper: to examine what sort of *nature and sustainable development*-related vocabulary is chosen for upper secondary school textbooks and how frequently these expressions appear in English in general.

A more recent perspective comes from Lähdesmäki (2007, 54) who notes that Finnish authors of English textbooks have maintained some of the goals and ideals throughout the decades although there have been large changes in teaching of foreign languages. Lähdesmäki (2007, 54) gives as examples the variety in text types, the presenting of living and real language and arousing the learner´s interest. Lähdesmäki also notes (2007, 54) that although textbook authors have better material and technological resources today, there are a relatively few authentic texts in the school books of today. The reasons for this are that authentic texts are often too difficult for learners, they are not suitable for teaching core grammatical issues because of the low frequency of the core features that should be taught and there are various copy right and other commercial issues that stand in the way (Lähdesmäki, 2007, 55).

2.3 Vocabulary teaching

Vocabulary teaching can be studied from many perspectives. One of the authorities on this topic is Paul Nation, a linguist researcher, whose special interests are language teaching methodology and vocabulary learning (Asian EFL-Journal: http://www.asian-efl-journal.com/). Nation (1990) discusses vocabulary teaching from the angles of vocabulary and listening, vocabulary and speaking, vocabulary and reading and vocabulary and writing (pp 85-159). Vocabulary teaching can also be approached by discussing learner strategies. Nation (1990, 159), for instance, points to guessing from context, mnemonic techniques and word parts. One of the current strategies is emphasizing the importance of communication that I have often seen in forms of exercises of the textbooks, and the matriculation examination written parts of foreign language often include a communicative written production task instead of an essay composition alone. In this thesis I will discuss vocabulary from the point of view of the key aspects of word meaning and their impact on vocabulary teaching. I will also introduce some perspectives that are important when deciding which words are useful to teach foreign language learners, for example word frequencies.

What is vocabulary and how can it be defined? According to Ur (1996, 60) the term *vocabulary* can be defined in the context of language teaching as the words that are taught in the foreign language. But, as Ur (1996, 60) notes, vocabulary can be constructed of more than just one word. For example, *post office* expresses one idea but is made up of two words (Ur, 1996, 60). Douglas Biber is a well-known researcher, whose studies have focussed on issues in corpus linguistics, English grammar, and register variation (The University of Freiburg: https://www.frias.uni-freiburg.de/). Biber et al (2002, 14-15), too, discuss the complex nature of the concept of "word". Although words are one of the basic elements of language, they show up in writing and they are the items defined in dictionaries, it is actually quite difficult to define what constitutes a "word" (Biber et al, 2002, 14). Biber et al (2002, 15) identify different senses of "word" as follows:

Ortographic words: These are the words that we are familiar with in written language, where they are separated by spaces. For example, *They wrote us a letter* contains five distinct orthographic words.

Grammatical words: A word falls into one grammatical word class (or 'part of speech') or another. Thus the orthographic word *leaves* can be either of two grammatical words: a verb (the present tense -s form of *leave*) or a noun (the plural of *leaf*). This is the basic sense of 'word' for grammatical purposes.

Lexemes: This is a set of grammatical words which share the same basic meaning, similar forms, and the same word class. For example, *leave, leaves, left,* and *leaving* are all members of the verb lexeme *leave*. This is the meaning of 'word' that is employed in dictionaries.

Biber et al also discuss the three major families of words (2002, 15-16). **Lexical words** are the main carriers of information in written or spoken language and they can be subdivided into word classes: nouns, lexical verbs, adjectives and adverbs (Biber et al, 2002, 15). **Function words** can be organised in terms of word classes such as prepositions, coordinators, auxiliary verbs, and pronouns (Biber et al, 2002, 16). **Inserts** are items that are typical for mainly spoken language and they do not form an integral part of syntactic structure (Biber et al. 2002, 16). Instead, they tend to be inserted freely in the text: e.g. *Well,* we made it (Biber et al, 2002, 16). Inserts often carry emotional meanings, such as *oh, ah, wow*, or express a response to what has just been said: *yeah, no, okay* (Biber et al.2002, 16). Vocabulary learning that takes place in the upper secondary school mostly concerns lexical words and in grammar lessons function words, too. In my experience, inserts do appear in the upper secondary school materials, but their meanings and functions are seldom discussed in detail.

There are also different semantic aspects to the meaning of words; the basic referent of a word is in the first place what it refers to in the real world; for example, *dog* refers to a domestic animal (Ur, 1996, 61). This can be considered the *denotative* or basic meaning of the word. According to Ur (1996, 61) a less obvious component of meaning of a word is its connotation. The words *moist* and *dank* both mean slightly wet, but the first word has positive

connotations and the latter negative ones (Ur, 1996, 61). Accordingly, 'pleasantly dank' would definitely sound wrong, even absurd (Ur, 1996, 61). The word *dog* mentioned above has various connotations, too, one of them being a reference to a sexually promiscuous man. A language learner who is not familiar with this connotation may misinterpret a word that appears in a particular sentence. Thus, it is important that learners have opportunities to hear words in different contexts.

Another, related aspect of meaning that also needs to be taught is appropriateness, that is, whether or not a particular word is the appropriate one to use in a certain context (Ur, 1996, 61). According to Ur (1996, 61) it is useful for the learner to know whether a word is frequently used or relatively rare, whether it is considered to be politically incorrect, whether it is used mostly in spoken or in written language, and whether it is more suitable for formal or for informal usage. It is also meaningful to teach whether a word belongs to a certain dialect (Ur, 1996, 61).

When talking about vocabulary, it is also worth remembering the importance of collocations. Collocation is "the way that some words occur regularly whenever another word is used." (Sinclair, 2001, 286). Collocations are seen in the way particular combinations of words sound "right" or "wrong" to a competent speaker of a given language and this is information that needs to be considered when teaching a foreign language (Ur, 1996, 61).

All aspects mentioned above are very important in vocabulary teaching and foreign language teachers should take these various meanings and uses of words into consideration when deciding what vocabulary is useful to teach. This thesis concentrates on textbooks and on the vocabulary these books contain. I think that textbook authors should carefully consider what sort of vocabulary is useful for learners and how to introduce the various uses of words in the books. For example, I believe it is useful to teach high frequency lexical words, because it enables learners to understand foreign language in reading and listening and knowing them also helps in writing tasks.

This is one of the reasons I discuss the frequencies of the words and expressions that are used in the textbooks in this thesis.

When discussing vocabulary and teaching foreign language vocabulary, we need to mention the use of dictionaries, too. In my experience I could argue that the dictionaries do not play a major role in the classroom. Learners do not generally get a copy of a dictionary for the courses and they are not provided with one either. The reason for this might be that the textbooks used in schools contain many vocabulary lists. There are often text-based vocabulary lists, alphabetical word lists and theme vocabulary lists that I will discuss below. I believe that there are usually some dictionaries on the classroom shelf to be used as reference books when learners are for instance producing texts themselves. However, there is a danger in using dictionaries for productive reasons. Nation (1990, 155) notes that even though dictionaries contain a great deal of information including syllabification, meaning, grammar, collocations, register appropriateness, frequency, and advice on common errors, most learners do not make the best use of this information. What I have noticed when working as a teacher is that learners just pick the first word from the list they get when looking for a translation for the mother tongue word in the dictionary. They seldom pay attention to the information mentioned above. One way to prevent this is of course to emphasize the proper use of dictionaries.

One of the aims of this paper is to study how frequently the environmental words that are used in two Finnish textbooks occur in English in general. Nation and Waring (1997, 2) discuss the usefulness of various words for foreign language learners. They note that one useful measure is word frequency, that is, how often the word appears in the foreign language in general (1997, 2). According to Nation and Waring the most frequent English word is *the,* which makes *the* a very useful word to know (1997, 2). The discipline of corpus linguistics, discussed more in detail below, is very much concerned with word frequencies and provides the language teachers and learners with a useful tool for teaching and learning. According to Nation (1990, 18) the frequency counts of

vocabulary items help us decide which words are the most useful for the learners of a foreign language. The frequency counts can help teachers and materials developers in several ways (Nation, 1990, 18). Firstly, they give the teacher a sense of the words which are useful and should be focused on and which words are infrequent (Nation, 1990, 20). Secondly, they can offer a starting point when designing word lists and reading material for the courses (Nation, 1990, 20). Nation and Waring argue that information about frequency gives a good basis for making sure that the learners profit in the best way from what they have been learning (1997, 8-9). They also note that word frequencies play an important role in curriculum design and in setting learning goals (Nation and Waring, 1997, 9). When selecting what vocabulary to teach, frequency is not the only criterion, but it is one important variable (Fox, 1998, 27). According to Fox, frequency information allows teachers to focus on the most common words, ensuring that learners know them and know how to use them actively (1998, 27). By contrast, infrequent words are usually topic-related words and the learner can learn them when needed (Fox, 1998, 27).

Earlier studies of vocabulary learning also emphasize the importance of useful words and the familiarity of the word selection. For example, French points out that the number of words that can be learned in a given time is limited and therefore the words that are chosen to be taught should be: "a) words with a very high measure of usefulness in making sentences; b) additional words connected with the pupils´ own surroundings and interests." (1972, 60-62). Parry (1972, 68) notes that the words to be taught should be influenced by the daily lives of the learners, and that beginners, especially, should learn vocabulary based on situations (1972, 68). Bragger argues that the vocabulary learned in foreign language classes should include possibilities for learners to express their real preferences and the differences of personality and taste should also be taken into account (1986, 88).

Nation (1990, 2) makes a distinction between direct and indirect vocabulary learning. The first refers to situations in which the learners do exercises and activities that focus their

attention on vocabulary (Nation, 1990, 2). In indirect vocabulary learning the learner focuses on some other feature, often on the massage that is conveyed by a writer or a speaker (Nation, 1990, 2). In the latter case the vocabulary might be partly unknown to the learner but nevertheless considerable learning of vocabulary occurs, although the attention is not directed explicitly towards vocabulary learning (Nation, 1990, 2). When the learner is interested in understanding the message this interest creates a need to understand the unknown vocabulary in the message (Nation 1990, 2). These massages should not include items too difficult for the learner, but they should rather be just outside the learner´s present level of knowledge, in other words these items should be understandable from the context in which they occur (Nation, 1990, 2-3). Nation also emphasizes that the learners should not feel threatened or worried by their contact with the foreign language (1990, 3). Although there is place for both direct and indirect vocabulary learning, opportunities for indirect learning should occupy more time in class (Nation 1990, 3). That is, contact with language in use should be given more time than activities out of context (Nation 1990, 3). Sometimes the teacher gives attention to a particular word and this takes the word out of context and focus is put on the word itself (Nation 1990, 5). Nation gives some reasons for this procedure (1990, 5):

1. The word is very frequent and very important for the learners.
2. The word causes particular difficulty.
3. The word is needed for another activity, such as game, a reading or listening exercise, a talk.
4. The word contains features of regular patterns. Knowledge of these patterns will help learners master other words more easily.

2.4 Corpus linguistics and vocabulary learning

In this section I will introduce the basic principles of corpus linguistics and discuss how corpus linguistics can be applied to foreign language teaching.

What is a corpus? The word *corpus* (plural: *corpora*) means "body" and it comes from Latin, and this was also the original meaning of the word in Late Middle English in the 15th century

(Hoffmann et al, 2008, 13). Later, this word was extended to refer to a more abstract type of body, for instance a collection of writings, e.g. the corpus of Shakespeare´s works (Hoffmann et al, 2008, 13). In the latter half of the 20th century, linguists began to use the word *corpus* when referring to more general collections of language data (Hoffman et al, 2008, 13). However, not just any compilation of texts can be called a corpus (Hoffmann et al, 2008, 13). Sinclair, who can be considered as the father of modern corpus linguistics (Scott:http://www.lexically.net/downloads/corpus_linguistics/Sinclair_obituary.), gives a well-known, concise definition of the word:

> A *corpus* is a collection of pieces of language that are selected and ordered according to explicit linguistic criteria in order to be used as a sample of the language.

Hoffmann et al (2008, 13) explain what Sinclair means by *selected*. This word choice suggests that a linguistic corpus is much more than just a large number of compiled texts and instead the individual items of language need to be selected in such a way that they fulfil a certain function, that is, that they can be regarded as a representative of a specific variety of language (Hoffmann et al, 2008 13). In other words:

> although a corpus is only a (potentially quite small) subset of what it is supposed to represent, its function is to mirror the whole in such a way that linguists can use it to say something about the language variety that was sampled: observations on the basis of corpus data are generalized back to the whole from which the corpus was initially selected. (Hoffmann, 2008, 13-14)

According to Sinclair (1996, 4) a corpus should be as large as possible, it should contain samples from a broad range of material to attain representativeness, there should be a classification into genres, the samples should be similar in size and the corpus should have a declared provenance.

Hoffmann et al (2008, 18) answer the question "What is corpus linguistics?" as follows: "Corpus linguistics is the systematic study of linguistic phenomena using (machine-

readable) collections of authentic language use, i.e. corpora". Corpus linguists usually try to find

general patterns of language use rather than establish collections of peculiar features of language

and they focus rather on description than on prescription (Hoffmann et al, 2008, 13). Corpus

linguists tend to count, or have computers count, certain features of language as a part of their

analysis (Hoffmann et al, 2008, 9). This counting of features relates to the concept of frequency that

I discussed in the previous section. In that sense corpus linguistics can be considered a quantitative

approach to language study, but it is important to note that corpus linguists also try to explain the

reasons behind certain linguistic phenomena and that way corpus linguistics can be seen as a

qualitative method, too (Hoffmann et al, 2008, 18). Krieger (http://iteslj.org/Articles/Krieger-

Corpus.html) answers the same question "What is corpus linguistics?" as follows:

> The main focus of corpus linguistics is to discover patterns of authentic language use
> through analysis of actual usage. The aim of a corpus based analysis is not to generate
> theories of what is possible in the language, such as Chomsky's phrase structure
> grammar which can generate an infinite number of sentences but which does not
> account for the probable choices that speakers actually make. Corpus linguistics' only
> concern is the usage patterns of the empirical data and what that reveals to us about
> language behavior.

Krieger also notes that one of the advantages that corpus-based analysis offers is that corpora

provide an objective view of language and it can investigate almost any language pattern

(http://iteslj.org/Articles/Krieger-Corpus.html).

Above I discussed the vocabulary counts and how teachers can use them when

choosing what vocabulary they should teach. The availability of computers and the very large

corpora that are available today, make it easy to develop such vocabulary frequency lists. According

to Nation and Waring (1997, 9), well-established criteria need to be made when creating a

frequency list and several factors need to be considered in the development of such lists that can be

used as resource lists of high frequency words. Like Sinclair, Nation and Waring emphasize the

importance of representativeness; the corpora that the frequency list is based on should present a wide range of uses of linguistic items (1997, 9). In addition to written material there should be spoken material as well and both should cover a wide range of representative text types (Nation and Waring, 1997, 9). A word to be included in a frequency list should occur frequently across a wide range of texts and it should occur in some form or another in most of the text groups (Nation and Waring, 1997, 9). The forms and uses of the word also need to be taken into consideration. Nation and Waring argue that the level of the learners´ knowledge determines whether they are able to see the difference between the members of a certain word family, for example *govern* and *governor* (1997, 9). Idioms, phrases and other expressions that are formed of two or more words behave like high frequency words, that is to say, they occur as a unit, e.g. *Good morning* or *Never mind* (Nation and Waring, 1997, 9). According to Nation and Waring it should be taken into consideration whether word frequency lists should include high frequency idioms besides single words (1997, 9). In Nation´s and Waring´s (1997, 9) opinion high frequency list words should also include information about following factors: "The forms and parts of speech included in a word family, frequency, the underlying meaning of the word, variations of meaning and collocations and the relative frequency of these meanings and uses, and restrictions on the use of the word with regard to politeness, geographical distribution etc.". In my opinion this information is useful for learners and when space allows, word lists should contain as much information as possible. The texts that are to be studied have an important role as well; the surroundings of a certain word give information about the language patterns.

Reppen (2010, 4), whose special areas are: corpus linguistics, sociolinguistics, child language, vocabulary and teacher training (Northern Arizona University: http://nau.edu/CAL/English/Directory/Randi-Reppen/) notes that corpus linguistics can provide examples of actual language use and therefore the information it provides can be used in developing language materials and language tests. Language professionals, for instance language teachers,

make decisions about language, including which words and linguistic phenomena to teach (Reppen, 2010, 4). As mentioned above, authentic texts are preferred in language teaching and by their very design corpora provide authentic, natural texts for language learning (Reppen, 2010, 4). According to Reppen, corpora can be used in several ways in the classroom (2010, 5). Similarly, exercises involving corpora (e.g. hands-on activities) can be used to introduce learners to meaningful tasks in which they are able to be involved in manipulating the language, and this way they can learn more and retain what they have learned longer (Reppen, 2010, 5). Teachers and learners can focus on specific linguistic features or concentrate on varieties of language such as business memos, campaign speeches, biology lab reports, and the like (Reppen, 2010, 5).

Reppen also notes that programs called concordance programs is a useful tool when learning vocabulary and creating word lists (2010, 5). Concordance programs can generate lists that can be arranged in either alphabetical order or in order of word frequency (Reppen, 2010, 5). The information of the word lists can be used in several ways. Reppen (2010, 8) shows as follows:

- Discuss how the two lists are arranged (frequency vs. alphabetic). What are some of the differences in the types of words in the two lists?
- Find content words (i.e. nouns, adjectives, verbs, and adverbs) vs. content words (e.g. articles, pronouns, prepositions). Then answer the following questions: How many content words do I find in each list? How many function words? Why do you think there is a difference between the two lists?
- Find related word forms (*abandoned, abandonment, achieve, achievement*) and examine the role of prefixes or suffixes. How do prefixes or suffixes change the core meaning of a word? How do prefixes or suffixes change a word from a noun to a verb and vice versa?
- Explore which words in the alphabetical can go with words in the frequency list (e.g. *ability to*), or use the words in the two lists as the basis for a sentence scramble activity.
- Ask students to scan the lists and mark unfamiliar words. Then use those words as a basis for vocabulary lesson.

Sometimes knowing which words go together and how some words occur together is a puzzle for learners (Reppen 2010, 8). This is where corpora can be used to provide valuable insights into

patterns of language use, because corpora can give information about the context of use for particular phrases and words (Reppen 2010, 8). This is an aspect in language teaching where even native speakers, including native speaker teachers, do not always intuitively know how language patterns work.

3. Materials

In this section I will introduce the textbooks that I will use as primary data in this study. They are both Finnish upper secondary school English textbooks designed for course seven which is an obligatory course in the upper secondary school. According to the FNCCUSS: "The courses consist of compulsory, specialisation and applied studies. Specialisation courses are elective courses relating to compulsory courses in the same subject (2003, 15). Course seven is one of the specialization courses mentioned in the FNCCUSS. These books are the latest English upper secondary course book publications of both publishing houses.

I will discuss the main topics of the texts in these books and aspects that concern the vocabulary. I will not describe the exercises of each individual unit in detail, since the focus of this paper is mainly on the vocabulary. The contents of the books correspond to what is written about course seven in the National Core Curriculum of the Upper Secondary School. Therefore the themes touch a wide range of phenomena concerning nature and sustainable development. I will also briefly describe the several word lists of these textbooks and explain which lists are used when examining the word frequencies. Finally, I will describe the corpus I am using in this project, the *Corpus of Contemporary American English*.

3.1 *Profiles 7*

The publisher, Sanoma Pro Oy, describes their textbook series *Profiles* as follows: *Profiles* is a

Finnish upper secondary school text book series that presents a wide variety of present day´s

English in natural contexts. Each course has a profile of a certain person. The texts vary from e-

mails and blogs to newspaper articles and film manuscripts. New words are taught as meaningful

units and the core vocabulary is practiced again in exercises. Course seven contains four units and

the themes in this book are: the world around us, nature, sustainable development and indigenous

peoples. The environmental problems of today are discussed and the significance of individuals

solving them, too (Sanoma Pro Oy´s web site: http://sanomapro.fi). *Profiles 7* was published in

2013 in Helsinki and the authors are Jaana Ikonen, Anna-Mari Mäkelä, Lynn Nikkanen, Olli-Pekka

Salo and Tuula Sutela.

Each unit of the book has two or three set texts which are followed by exercises.

There are vocabulary exercises, listening and reading comprehension exercises, oral exercises,

writing exercises and tasks to train for the Matriculation Examination. In addition, there are learning

tips for special purposes, for instance about political correctness on page 39:

> If someone is **politically correct** or **PC**, it means that they choose their words
> carefully to avoid upsetting or insulting different nationalities, races, age groups,
> religions and so on by using neutral expressions. Conversely, if a person is politically
> **in**correct, their language, opinions or behavior may offend certain people.

Furthermore, there are boxes entitled *How come?,* which include information of the origin of a

word or expression that appear in the texts, for example: *frankenfood, Trojan horse* or *mesmerizing.*

A short vocabulary list of certain phenomena, for example *Nature- related vocabulary* (p. 61),

appear in each unit. The grammar section is entitled *KnowHow* in this book. There is information on

nouns, pronouns, syntax and verbs in this section and there are exercises to all themes. There are

also tips for exam preparation and English-Finnish text-based vocabulary lists as well as English-

Finnish alphabetical wordlists that contain the words that appear in the book (these lists are discussed more in detail below). A list of irregular verbs is also included (172-173). The inside cover pages are titled "Going green" and they include wordlists. It says in the front inside cover: "Going green involves thinking about the impact that daily decisions and lifestyle choices can have on the environment. Here are some of the words and expressions that characterize this concept." Examples for these words and expressions are: *alternative energy* and *biodegradable*.

Unit one has two texts: *Environmental Q & A (11-13)* which is an excerpt from a science magazine´s Q & A section and *Anita Roddick: Radical by Nature* (24-25), which is a text about the founder of the famous cosmetics company The Body Shop. The latter text is a profile of a famous person that each textbook of this series has in it. The first text contains questions concerning the weather, bee population and carbon footprint and "down-to-earth" answers to them. Among the exercises there is a box with the title "Green-thinking vocabulary" (p. 31) which lists expression in English without translation. For example words *fair trade* and *recycling* appear in this list.

Unit two contains three texts: *I´ve got the solution for the rainforest: napalm the lot* (36-37)*, Doomsday tourism* (44-45) and *Noise pollution- an underrated environmental problem* (54-56). The first text is a column by Jeremy Clarkson, an English journalist and broadcaster and it was first published in The Times in 1.11. 2009. The column is written in a provocative way as the title of the text suggests and Clarkson describes the circumstances in the rainforests in it. The second text in this unit is an article from an online travel magazine and it is written by Amanda Kendle. It discusses responsible tourism and the environmental consequences of travelling. The last text in this unit is Michael Bloch´s article in which he discusses noise being an environmental problem. The article is followed by blog entries with commentary on the theme noise pollution. Unit two also includes a box with nature- related vocabulary (p. 61). For example, the words *landscape* and *scenery* are defined and example sentences are given.

Unit three contains two texts, *Out of the blue* (66-67) and *The mystery of crop circles* (78-79). The first text is a report on whales and it describes the physics of whales and discusses the hunt for whales with its consequences. The second text is an online magazine article by Pakistan Herald Publications and it looks at an odd phenomenon, the appearance of strange, often highly complex patterns in fields containing standing crops. This unit also introduces wildlife- related vocabulary, for example *mammal, prey* and *habitat* (72).

The last unit has three texts, the last of them being a short "PostScript" (102) with quotes and slogans. The first text of unit four, *Taking a rain check*, is divided into two separate extracts, because the text is designed to be worked on in pairs (88, 90). It is a literary extract by Nick Middleton who is a lecturer and researcher in physical geography at Oxford University in England and is also known for his travelogues and accompanying TV series. Middleton writes about Calcutta and Mawsynram, both located in India, and the monsoon time in these places. This section of the unit has also a weather-related vocabulary box with expressions such as *monsoon, moisture* and *rain gauge* (93). The second text is called *Living with the tribe* (96-97). It is a literary extract by Bruce Parry who is known for the BBC documentary television series *Tribe.* In this text Parry describes his experiences with a people called the Suri, who live in Ethiopia.

3.2 *Open Road 7*

The other upper secondary school text book I use in this project is called *Open Road 7* and the publisher is Kustannusosakeyhtiö Otava. The authors are Elina Karapalo, Jim McWhirr, Jaakko Mäki, Teijo Päkkilä, Marjut Sadeharju and Riitta Silk. It was published in 2011. *Open Road 7* discusses current global phenomena and sustainable development from various points of views (Kustannusosakeyhtiö Otava´s web site: http://www.otava.fi/).

Open Road 7 consists of four sections each of which has a certain theme. The themes are: "Environment", "Society", "Economy" and "Culture". Each section has two texts and there is one chapter called *Guardian Angels* (56-61) designed to practise oral skills. Each chapter is followed by a text-based English-Finnish wordlist (these lists are discussed more in detail below) and exercises. There are also "FYI" info boxes with information on the English speaking world and different cultures. One example of a FYI box is on page 16 and it describes the differences between the words *Nature, the environment, the wild, a wilderness* and *a desert. Travel Guide* (112-139) refers to the section in which the authors give hints and exercises for the Matriculation Examination, for writing speeches, topics for written tasks and language portfolio assignments. The grammar section is called *Highway Code* (132-162) and it has information and exercises on auxiliary verbs, prepositions, verbs with a certain preposition, verbs with no preposition, prepositions following nouns and prepositions following adjectives. *Service Station* (164- 196) is a section which has A/B partner exercises (a type of a task, usually an oral exercise, in which a student has his/her partner´s answers and vice versa), vocabulary revision and grammar revision. There is also a section with keys (197-212) to some, mainly oral, exercises of the chapters and keys to *Highway Code* and *Service Station* exercises. *Open Road 7* has an alphabetical English- Finnish wordlist, too (213-243). *Open Road 7* has also four special vocabulary glossaries (30, 54, 62, 87) which are lists of words and expressions of a certain theme. Each glossary is followed by vocabulary exercises. Here is one example of a glossary (p.62):

Glossary: Energy

aaltovoima	**wave energy**
akku	**battery**
aurinkoenergia	**solar energy**
aurinkopaneeli	**solar panel**
energiantuotanto	**energy supply**
fossiilinen polttoaine	**fossil fuel**
happosade	**acid rain**

hiilidioksidi	**carbon dioxide**
hiilidioksidipäästö	**carbon emission**
hiilijalanjälki	**carbon footprint**
hiilikompensaatio (kauppa)	**carbon offsetting**
hiilivoimala	**coal-fired power plant/ station**
maakaasu	**natural gas**
maalämpö	**geothermal energy**
merienergia	**marine energy, ocean energy**
metaani	**methane**
päästökauppa	**emissions trading**
turve	**peat**
tuulivoima	**wind power**
tuulivoimapuisto	**windfarm**
uusiutuvat	**renewable energy sources,**
energialähteet	**renewables**
vähentää	**cut down, reduce, decrease**
valjastaa energia	**harness energy**
käyttöön	
vesivoimala	**hydroelectric power plant**
voimala	**power plant**
vuorovesivoima	**tidal power, tidal energy**
ydinlaskeuma	**nuclear fallout**
ydinvoima	**nuclear energy**
öljyvuoto	**oil spill**

Figure 2 An Example of a Glossary from *Open Road 7*

The inside covers have lists of vocabulary concerning Finnish nature. The lists are divided into eight categories: Mammals e.g. *wolverine*, plants e.g. *lichen*, birds e.g. *pheasant,* trees e.g. *aspen*, fish e.g. *perch* reptiles e.g. *adder*, berries e.g. *cranberry* and other e.g. *mussel.* The words are given first in Finnish and the translation into English follows.

The first section of the book (Theme: "Environment") consists of two chapters: *A Knight in the Woods* (8-10) and *Inside the Minds of Animals* (19-20). *A Knight in the Woods* is a

literary extract from "A Walk in the Woods" by Bill Bryson. It is about two friends hiking and sleeping in a tent in the woods. The second is abbreviated from an article by Jeffrey Kluger in TIME 2011. This text describes the relationship between humans and animals and ponders on whether animals are social and whether they are able to distinguish between self and other.

The second section titled "Society" includes texts *Final Call* (33-34) and *Recipes for Disaster* (43 and 46). The first is an extract from "Confessions of an Eco Sinner" by Fred Pearce. It tells about a father who tries to get rid of his son´s old phone in an environmentally friendly way and is surprised how difficult it is. *Recipes for Disaster* is divided into two parts like *Taking a rain check* in *Profiles 7* discussed above. Similarly, this chapter can be worked on in pairs. There are facts and figures of ten horrific natural disasters in these texts.

Next section with theme "Economy" has two chapters *Ultimatum* (65-67) and *Going Nuclear?* (78-80). The first text is an excerpt from the novel "Ultimatum" by Matthew Glass and it takes the reader to the year 2033, when an agreement on climate change is about to be signed. Glass describes the negotiations between the Chinese and the Americans in this text. *Going Nuclear?* is a modified online article by Richard T. Stuebi on scitizen.com. As the title of the article suggests, it discusses nuclear energy and whether it is a threat or an opportunity.

The fourth and last section titled "Culture" include chapter *Meanwhile Back at the Ranch* (90-91), which is a book extract of Sean Aiken´s "The One-Week Job Project". In this book Aiken travelled around North America and tried fifty-two different jobs, one week at a time. This chapter in *Open Road 7* describes his work on a ranch in Wyoming. The second text is called *Rare, Medium or Well Done?* (100-101). It, too, is a book extract from "Before the Dawn" by Nicholas Wade. The theme of this text is cannibalism. Wade makes interesting notes on this theme and writes for instance how widespread a phenomenon it was and how some people are partly protected by their ancient cannibal heritage.

3.3 The vocabulary lists

I will use the vocabulary lists of the two textbooks as primary data in my study. In this section I will describe the lists in more detail.

As mentioned above, *Profiles 7* has a list of text-based vocabulary in the back of the book (174-187). There are words and expressions from the chapters translated from English into Finnish on these pages. The words are listed under a title that is the same as the title of the chapter from which these words come and they are listed in the same order as they appear in the study text itself. Not every single word of the chapter is translated, only those that are new and challenging. The English word is given the Finnish translation that is correct in that specific context, for example *organic* is translated *luomu-* (174). Some of the words are printed in bold. These are words that according to *Longman Dictionary of Contemporary English 2009* fall under the group of 3000 most common words of English (174). Irregular verbs, plurals, American English words and British English words and colloquial expressions are marked with: *, pl, AmE, BrE and puhek.[=colloquial] respectively (174).This section is followed by an alphabetical vocabulary list (188-201) which lists the words and expressions that appear in the book again in their alphabetical order. The English word is given first and the Finnish translation follows. The place where to find that particular word in the book is marked, for instance *account* U3T1 meaning unit three, text one (188). In this section, in contrast to the text-based vocabulary lists, a wider definition for the word is given, for example *organic* is now translated *luomu-; orgaaninen* (196).

In *Open Road 7* the text-based vocabulary lists are placed immediately after the chapter in question. They are translated from English into Finnish. As in *Profiles 7,* the words and expressions appear in the same order as they do in the text. Again, not every word is translated, only the new and difficult ones. Some of the words are printed in bold, but it is not explained why. I assume these are the words that are core vocabulary in English in general, similar to the words

printed in bold in *Profiles 7.* Again, the Finnish translation is not a broad definition of the word, but a definition that is a suitable translation in this particular context, for example *spring* is translated *lähde* (11). *Open Road 7* contains an alphabetical wordlist in which English words that appear in the book are translated into Finnish (213-243). No wider definition of the word is given in this list either. It is not mentioned on which page or section or chapter to find the word.

I will use the text-based vocabulary lists of these two books as primary material of this study. I have chosen to use these lists instead of the alphabetical lists, because it is not mentioned in the alphabetical wordlist of *Open Road 7* in which text the word in question occurs. I think it is important for the reader to be able to have a closer look into the word and its surroundings in the text. There are also words that do not appear in the texts, but somewhere in the book (for instance in an exercise); these words are included in the alphabetical lists, but not in the text-based vocabulary lists.

Besides the text-based vocabulary lists I will use other lists, too. *Open Road 7* contains four glossaries (see above). All glossaries have nature-related words in them. There are similar lists in the inside covers of *Profiles 7* which are titled "Going green" (also above). I will select words and expressions from both of these lists.

3.4 The *Corpus of Contemporary American English* (COCA)

COCA is one of the largest freely-available corpora of English. This corpus contains more than 450 million words in 189,431 texts from the years 1990-2012. There are spoken, fiction, popular magazines, newspapers, and academic texts in this corpus. COCA is a monitor corpus, which means that it is updated regularly: the most recent addition of texts was completed in June 2012 (The web

site of COCA: http://corpus.byu.edu/coca/). The proportions and sources of the text categories are described on the web site of COCA as follows:

> Spoken: (95 million words [95,385,672]) Transcripts of unscripted conversation from more than 150 different TV and radio programs (examples: *All Things Considered* (NPR), *Newshour* (PBS), *Good Morning America* (ABC), *Today Show* (NBC), *60 Minutes* (CBS), *Hannity and Colmes* (Fox), *Jerry Springer*, etc).

> Fiction: (90 million words [90,344,134]) Short stories and plays from literary magazines, children's magazines, popular magazines, first chapters of first edition books 1990-present, and movie scripts.

> Popular Magazines: (95 million words [95,564,706]) Nearly 100 different magazines, with a good mix (overall, and by year) between specific domains (news, health, home and gardening, women, financial, religion, sports, etc). A few examples are *Time, Men's Health, Good Housekeeping, Cosmopolitan, Fortune, Christian Century, Sports Illustrated*, etc.

> Newspapers: (92 million words [91,680,966]) Ten newspapers from across the US, including: *USA Today, New York Times, Atlanta Journal Constitution, San Francisco Chronicle*, etc. In most cases, there is a good mix between different sections of the newspaper, such as local news, opinion, sports, financial, etc.

> Academic Journals: (91 million words [91,044,778]) Nearly 100 different peer-reviewed journals. These were selected to cover the entire range of the Library of Congress classification system (e.g. a certain percentage from B (philosophy, psychology, religion), D (world history), K (education), T (technology), etc.), both overall and by number of words per year

In my opinion COCA is a suitable tool for examining *nature and sustainable development-* related vocabulary. Of course, not all sections in COCA include vocabulary that I am focusing on in this thesis. I believe that e.g. talk shows that are used as material in the spoken language section do not usually touch environmental themes. Similarly, it is likely that the fiction section does not cover various environmental phenomena the material coming from sources like children´s magazines and movie scripts. Nevertheless, there are magazines that focus on nature, for instance *The Environmental Magazine* and newspapers include a wide range of different sections, in which also environmental issues are discussed. Also academic journals have texts that are concerned with environmental themes for example in articles that discuss new technology. *Nature and sustainable*

development is after all a domain in which new technological innovations are developed. Another widely used corpus that would have been an option is the British National Corpus (BNC), but it was created in the beginning of 1990 and the vocabulary of environmental words has most likely changed and increased in the last twenty years. This is why I decided to use COCA in this project. Although COCA is an American corpus, I do not think that it matters in this research because *nature and sustainable development* is a theme in which there is not much difference between American and British English.

COCA provides an online search engine, which gives information on word frequencies. The user types the word or words, they wish to examine, clicks "search" and within seconds COCA provides frequency information about the word. It is possible to have this information divided into charts, which are separated into categories (all, spoken, fiction, magazine, newspaper, academic). The search engine displays all hits ("raw frequencies") and the frequency per a million words ("standardised frequencies"), which makes it possible to compare the frequencies between various words. It is also possible to see the word in its real context and the source of the text in which the word occurs is provided as well as the year of publication.

4. Methods

In this section I will describe the procedure of this research. First I wrote out the vocabulary lists of the books and then I separated the nature-related words from these lists. As mentioned in the materials section, I used the text-based vocabulary lists of the books, the glossaries of *Open Road 7* and the "Going green"- lists of *Profiles 7* (see appendix 1).

Nature and sustainable development is a phrase that covers many perspectives. This made my work a little challenging; what should I include and what not? In order to ensure that the

lists that I use in this project are of manageable length, I had to exclude some phrases that do of course belong to the wide field of *nature and sustainable development.* The following figure illustrates the groups of words and expressions that I excluded from the vocabulary lists that I examined in this paper. Examples are given under the title.

Verbs
- conserve
- preserve
- dispose of

Natural disaster words
- cyclone
- tornado
- volcano

Food and agriculture words
- additive
- soil
- crop rotation

People, society, human rights
- indigenous people
- urbanisation
- tribe

Finnish nature words
- weasel
- willowherb
- cloudberry

Figure 3 The excluded words

Most of the words and expressions in the lists are nouns. There are also some adjectives. I left out verbs because they often carry other meanings besides this theme and therefore they would probably give hits in COCA that are not related to *nature and sustainable development.* For example, *reduce* and *separate* are such verbs. Words denoting "natural disaster" were also excluded, because they refer rather to weather conditions than environmental expressions. Most "food and agriculture"- words are left out, because they most often denote words that relate to farming, such as *livestock.* However, I have used some words that relate to agriculture. These words can be seen as a part of larger context, because they are phenomena that cause (or prevent) environmental problems, for example vocabulary similar to *pesticide* and *herbicide.* People, society and human rights are other major themes in these textbooks, but expressions like *tribe* and

indigenous people are in the list neither, since they refer more likely to social as to environmental issues. Because the books are meant to provide learners with words that they need when communicating from the Finnish perspective, there are some words that concern Finnish nature such as *lichen* and *seal*. Although important for learners, I had to leave these words out, too, because some of them occur very unfrequently in my reference corpus, COCA. For example, *bank vole* has only 5 (0.01 per mil.) hits, *hare bell* 6 (0.01 per mil.) hits and *ringed seal* 14 (0.03 per mil.) hits in COCA. The vocabulary I focus on in this project contains on the one hand "classic" environmental words and on the other hand new, coined expressions. When it comes to the latter, I will focus on words and phrases concerning new energy forms, causes for environmental problems and new phenomena in nature conservation.

After I compiled the vocabulary lists of environmental words, I used COCA to find out how frequently these words occur in English in general. I worked with the words from *Profiles* 7 and from *Open Road* 7 separately and compiled tables of the word frequencies both in written and spoken English. The frequencies in written language are separated into four categories: fiction, magazine, newspaper and academic as they are given in my reference corpus COCA

The words in *Profiles 7* and *Open Road 7*- tables are numbered according to their frequency in COCA. The figures under "hits all/per mil" show how many raw frequencies there are in COCA and what their standardised frequency is. The hits are also divided in hits in spoken language and in written language and these words are categorised as described above. Numbers 1 and 2 under the five-year sections indicate in what time period the word or words occur most frequently (1) and the second frequently (2). These tables are rather long and to save some space, they do not appear in this text, but in appendices (see appendices 2 and 3)

To put the word frequencies into context, it is useful first to take a look at the frequencies of some the most frequent nouns of English (see table 1). The hits are from COCA.

Because most words in my data are nouns, table 1 contains nouns. As mentioned in the background

section, the most frequent word in English is *the.* In COCA, *the* has 25063951 hits (53,977.95 per

mil.)

Word	Hits all	Hits per mil.
people	785844	1,578.56
time	785844	1,692.40
way	473745	1,020.26
work	360459	776.29
day	345732	744.57
man	304277	655.29
woman	162676	350.34
job	128443	276.62
house	255224	549.65
water	182906	393.91

Table 1 A selection of frequently used nouns of English

Besides the two tables described above, I compiled a table to represent the word/s that appear in

only one of the books and another for word/s that appear in both books. A table, which shows the

hits in different written language genres is attached and a table of the most current expressions as

well.

5. Analysis

In this chapter I will discuss the findings from my data. First I will comment on the word

frequencies of *Profiles 7* and *Open Road 7-* tables and demonstrate the differences in the word

choices in these books. Next I will discuss whether the words and expressions appear in spoken or written language and finally an analysis on the most current word/s follows.

The first five words in are identical in both, *Profiles 7* and in *Open Road 7-* tables: *environment, waste, conservation, pollution, organic* (see table 2 and appendices 2 and 3). These words are "core" environment-related expressions in a way that they are used in environmental discourse when themes such as growing environmental problems and individuals´ actions are discussed. As the frequency hits indicate, they are also widely used in English in general. Number six is different in the tables. *Open Road 7* has *climate change* on the sixth place, and that is an expression that does not occur in the wordlists of *Profiles 7* at all. That is surprising to me, given that with 6,316 hits in COCA, *climate change* appears to be a rather frequent expression in English. Most hits are from the time period of 2010-2012 and 2005-2009, which indicates that it is also a current expression. Number six in the *Profiles 7-* table is *ecological.* This word does occur in some context in *Open Road (*possibly in an exercise)*, because it is mentioned in the alphabetical wordlist, but is not included in the text-based vocabulary that I used in this study. *Ecosystem* in *Profiles 7-* table (number 9) is a similar case. *Natural gas,* the ninth expression in the *Open Road 7-* table, does not appear in any text of *Profiles 7*, but it is used in an exercise on page 19. This is the reason it is not in the text-based vocabulary list, but does occur in the alphabetical wordlist. Otherwise the top ten words and expressions are similar.

Profiles 7- table

	Word/s	hits all/ per mil	Spoken hits all/ per mil	Fiction hits all/ per mil	Magazine hits all/ per mil	Newspaper hits all/ per mil	Academic hits all/ per mil	1994-1994	1995-1999	2000-2004	2005-2009	2010-2012
1.	environment	48977 105.48	5908 61.81	1333 14.74	9558 100.02	6976 76.06	25202 276.74	1				2
2.	waste	24580 52.94	2629 27.51	5436 38.00	53 47 55.96	4,018 43.81	9,150 100.48	2	1			
3.	conservation	14528 31.29	798 8.35	134 1.48	3770 39.45	22445 24.47	7582 83.26	2				1
4.	pollution	12793 27.55	919 9.62	229 2.53	3148 32.94	2554 27.85	5943 65.26	1	2			
5.	organic	12763 24.49	621 6.50	628 6.94	6006 62.85	2024 22.107	3484 38.26				2	1
6.	ecological	7712 16.61	175 1.83	136 1.50	1289 13.49	500 5.49	5612 61.63				2	1
7.	recycling	6126 13.19	254 2.66	286 3.16	1490 15.59	1181 12.88	2915 32.01	2	1			
8.	global warming	5145 11.08	1063 11.12	118 1.30	1801 18.85	1147 12.51	1016 11.16				1	2
9.	ecosystem	5102 10.99	195 2.06	116 1.28	1122 11.74	415 4.52	3252 35.71				2	1
10.	biodiversity	3928 8.46	118 1.23	15 0.17	481 5.03	183 2.00	3131 34.38			2		1

Open Road 7- table

	Words/s	hits all/ per mil	Spoken hits all/ per mil	Fiction hits all/ per mil	Magazine hits all/ per mil	Newspaper hits all/ per mil	Academic hit all/ per mil	1990-1994	1995-1999	2000-2004	2005-2009	2010-2012
1.	environment	48977 105.48	5908 61.81	1333 14.74	9558 100.02	6976 76.06	25202 276.74	1				2
2.	waste	24580 52.94	2629 27.51	5436 38.00	5347 55.96	4018 43.81	9150 100.48	2	1			
3.	conservation	14528 31.29	798 8.35	134 1.48	3770 39.45	22445 24.47	7582 83.26	2				1
4.	pollution	12793 27.55	919 9.62	229 2.53	3148 32.94	2554 27.85	5943 65.26	1	2			
5.	organic	12763 24.49	621 6.50	628 6.94	6006 62.85	2024 22.107	3484 38.26				2	1
6.	climate change	6316 13.60	806 8.43	45 0.50	1510 15.80	820 8.94	3135 34.43				2	1
7.	recycling	6126 13.19	254 2.66	286 3.16	1490 15.59	1181 12.88	2915 32.01	2	1			
8.	global warming	5145 11.08	1063 11.08	118 1.30	1801 18.85	1147 12.51	1016 11.16				1	2
9.	natural gas	4622 9.95	542 5.67	33 0.36	1040 10.88	1708 18.62	1299 14.26				2	1
10.	biodiversity	3928 8.46	118 1.23	15 0.17	481 5.03	183 2.00	3131 34.38			2		1

Table 2 Ten most frequent environmental words in *Profiles 7* and *Open Road 7*

Word/s that occur in *Open Road 7* but not in *Profiles 7* (others than mentioned above) and vice

versa are:

Word/s that occur only in Open Road 7	hits all/ per mil	Word/s that occur only in Profiles 7	hits all/ per mil
carbon dioxide	3744 8.06	life cycle	928 2.00
contamination	3668 7.90	alternative energy	622 1.35
emission	2788 6.00	ecotourism	411 0.89
disposable	1744 3.76	acidification	219 0.47
acid rain	896 1.93	green design	42 0.09
environmentalist	896 1.93	eco-label	13 0.03
environmentally friendly	648 1.40	low-emission vehicles	2 0.00
fossil fuel	681 1.47	guerrilla gardening	1 0.00
overcrowding	620 1.34	earth hour	-
overpopulation	403 0.87	passive house	-
greenhouse effect	419 0.90		
ozone depletion	348 0.75		
exhaust fumes	121 0.26		
wave energy	57 0.12		
polar ice cap	40 0.09		
nuclear fallout	34 0.07		
ocean energy	27 0.06		
tidal power	22 0.05		
hydroelectric power plant	18 0.04		
marine energy	7 0.02		
petroleum extraction	5 0.01		
carbon- constrained	6 0.01		

Table 3 Words that do not occur in both books

Some of the expression of *Open Road 7* have a synonym or another similar word or expression in *Profiles 7.* For example, *Profiles 7* contains the words *emit, disposal, fossil* (it is in the alphabetical wordlist with a notion that *fossil* is to be found in the inside cover, but actually the word does not occur there), *ozone layer, ice cap* and *hydroelectric power plant. Carbon dioxide, contamination, oil spill* are words that occur relatively frequently in COCA with 3,744, 3,668 and 1,329 hits and they do not have any equivalence in *Profiles 7*. In my opinion they are useful environment-related words and it might have been a good idea to include them in *Profiles 7*, too. Nevertheless, they are not the "newest of the new" expressions and that might have been the reason for excluding them. The rest of the words that appear in *Open Road 7* but not in *Profiles 7* are mostly words that are related to energy production, e.g. *ocean energy* and *tidal power,* or are a little "old- fashioned", e.g. *greenhouse effect* (most hits in COCA from 1990-1994) and *environmentalist* (most hits in COCA from 1990-1994). *Open Road 7* has the theme-related glossaries that might explain the reason for the many energy production-words. They are also relevant expressions in today´s communication. *Exhaust fumes* does not occur very frequently in COCA (121 hits), but most of the hits are from the time period of 2010- 2012. It might have been a good idea to include this expression in *Profiles 7,* too.

Words and expressions that occur in *Profiles 7,* but not in *Open Road 7* have less than 1000 hits in COCA, so they are not among the most frequently used *nature and sustainable*-related words in English. Even though, they seem to be quite up-to-date expressions. For example, *alternative energy* is a very useful expression for learners and most hits it has in COCA are from 2010-2012 and 2005-2009. It also has 622 hits, so it is not a rare expression either. *Profiles 7* is a new upper secondary school text book, it was published in 2013. Therefore there are some modern, very up-to-date expressions. *Earth hour* and *passive house* are expressions that do not occur in COCA at all. *Guerrilla gardening* has one hit. Maybe these expressions will find their way to COCA in the future years. They are described in *Profiles* (2013, inside cover) as follows:

Earth hour- a global event organized by WWF every March to raise people´s awareness of the need to cut down on energy consumption as a means of combating climate change.

Guerrilla gardening- a form of direct action by environmentalists in which an abandoned piece of land is taken over to grow plants and to make people reconsider land ownership.

Passive house- an ultra-low-energy house that uses a lot less energy than a traditional house.

Next I will discuss the expressions that appear in both, *Profiles 7* and *Open Road 7.*

Table 4 Words that appear in both books

	Word/s	hits all/per mil.
1.	environment	48977 105.48
2.	waste	24580 52.94
3.	conservation	14528 31.29
4.	pollution	12793 27.55
5.	organic	12763 24.49
6.	recycling	6126 13.19
7.	global warming	5145 13.19
8.	biodiversity	3928 11.08
9.	composting	3311 7.13
10.	renewable (in *Open Road 7)* renewable energy (in *Profiles 7)*	3476 7.49 1979 4.26
11.	irrigation	3132 6.75
12.	fertilizer	2758

		5.94
13.	litter	2549 5.49
14.	pesticide	2054 4.42
15.	sustainable development	1248 2.69
16.	solar energy	825 1.78
17.	rubbish	810 1.74
18.	wind power	782 1.68
19.	biodegradable	472 1.02
20.	fair trade	462 0.99
21.	eco-friendly	398 0.86
22.	conservationist	385 0.83
23.	carbon footprint	177 0.38
24.	geothermal energy	124 0.27
25.	hydroelectric power plant (in *Open Road 7)* hydroelectric energy (in *Profiles7)*	18 0.08 9 0.02

As illustrated in table 4, the first fifteen words in this list occur rather frequently in COCA. There

are words that concern other phenomena besides *nature and sustainable development*, e.g.

environment, waste, litter, rubbish, conservation. The next extract is from *Journal of American*

Culture and the word "environment" does not refer to nature or sustainable development: "The

majority of new tattooees received tattoos in places that could never be seen while wearing shorts

and a t-shirt, let alone while dressed appropriately for a professional work **environment**. Many

females were tattooed on their hip bone, beneath the waistline, or on the top of their foot." (COCA: 304) These ambiguous words have naturally high frequencies in COCA.

The tables contain the hits in spoken and written language, too. As mentioned above the hits in written language are divided into four categories: fiction, magazine, newspaper and academic. The twenty most frequent words in *Profiles 7* and *Open Road* 7 lists occur most frequently in written language. They are divided in the genres as follows:

	Fiction	Magazine	Newspaper	Academic
Profiles 7	5%	20%	-	75%
Open Road 7	5%	20%	5%	70%

Table 5 Percentages in different genres

It seems that *nature* and *sustainable* development is a theme that is rather written than spoken about. As discussed in the Materials section the reference corpus, COCA, contains spoken language texts from sources that include mainly discussion panels and talk shows, such as *Good Morning America, Today show* and *Jerry Springer.* The topics of the shows vary, and I believe that *nature and environment* is not one of the most discussed topics in these programmes, because many of them can be considered as entertainment programmes. As table 5 indicates, most hits occur in academic writing. Environmental issues are discussed in many academic disciplines and it is area that is, I believe, quite current in today´s research. The second highest rate in magazines might be explained by the fact that there are nearly 100 magazines represented in the COCA, so the range of topics is wide in these magazines. The following extract is for example from *The Environmental Magazine:* "Brookings' Jonathan Rothwell says that more than half of all jobs in **organic** food and tanning, and virtually all the new ones, are located in large metropolitan areas - close to where most food is consumed." (COCA: 110).

I believe that besides the word frequencies it is useful to look at the years, in which the words most often occur. This gives information about the currency of the word. This is in my opinion important, because learners need up-to-date expressions when discussing or writing about current phenomena. Useful vocabulary should also be connected with learners´ surroundings and interests, as mentioned in section 2.3. The interests of young people are often current issues and therefore it is useful to learn foreign language expressions that are current, too. Table six contains words from both books that occur most often in 2010-2012 in COCA. The period of time for the second most frequent occurrence is given in the table.

	WORD/S	2. FREQUENT OCCURRENCE IN
1.	conservation	1990-1994
2.	organic	2005-2009
3.	climate change	2005-2009
4.	natural gas	2005-2009
5.	biodiversity	2000-2004
6.	oil spill	1990-1994
7.	solar energy	2005-2009
8.	herbicide	2000-2004
9.	fair trade	2000-2004
10.	eco-friendly	2005-2009
11.	carbon footprint	2005-2009
12.	exhaust fumes	1990-1994, 2000-2004, 2005-2009
13.	ocean energy	2005-2009
14.	tidal power	2005-2009

15.	carbon constrained	2000-2004
16.	ecological	2005-2009
17.	ecosystem	2005-2009
18.	geothermal energy	2000-2004

Table 6 The most current words

As mentioned above, *conservation* is a word that is used in other contexts besides *nature and sustainable development.* This might be the reason for *conservation* to occur frequently both relatively early in 1990-1994 and late in 2010-2012. Similarly, *oil spill* occurs most often in 2010-2012 and second often in 1990-1994. Since the corpus contains texts from newspapers, this might indicate that there have been major oil spills during the years mentioned and there are newspaper articles written about them.

The most current words are (that is, words that have the most frequent occurrence in 2010-2012 and the second frequent occurrence in 2005-2009) : *organic, climate change, natural gas, solar energy, eco-friendly, carbon footprint, exhaust fumes* (although this expression seems to occur quite similarly throughout the time periods), *ocean energy, tidal power, ecological* and *ecosystem.* In my opinion the authors of the textbooks have succeeded very well in using the most up-to-date words and expressions. *Climate change, natural gas, oil spill, herbicide, exhaust fumes, ocean energy* and *tidal power* occur only in the wordlists of *Open Road 7. Ecological* and *ecosystem occur* on the other hand only in the *Profiles 7*- wordlists. But as I discussed above, some of these absent expressions appear somewhere in the book, they are just not included in the text-based wordlists.

6. Discussion

I have examined the *nature and sustainable development*-related words and expressions of two upper secondary school textbooks and compared them to English in general in this thesis. The findings from my data illustrate that there are not major differences between the word choices in these two books. Nevertheless, *Profiles 7* seems to contain more words that are more current and up-to-date, whereas *Open Road 7* provides learners with more classic environmental expressions and also with a wide range of vocabulary concerning for instance alternative energy sources. It might have been useful to include more *nature and sustainable development*-related vocabulary in the actual chapters of these two textbooks. When the word appears within the text, the reader sees how the word is used and what other words, for instance prepositions or nouns, are used with a certain expression. Most of the environmental words, especially in O*pen Road 7* are listed in theme vocabulary lists, in other words in the glossaries discussed in the Materials section. Fortunately, the lists are followed by exercises and learners are able to practice the environmental words of the lists.

Teachers may want to add extra vocabulary to those provided in a textbook, if they think the coverage is inadequate, as Maley (1998, 281) suggests. I think that both of the textbooks, *Profiles 7* and *Open Road 7*, include relevant environmental vocabulary, which enables learners to discuss basic environmental phenomena in English. Of course, if the students are given a special task, for example a speech or they work on a project concerning a specific environmental topic, they may need other words besides the vocabulary provided in these two textbooks.

Tomlinson (1998, 7), who discusses the characteristics of a good textbook, emphasizes among other aspects variety: good quality learning materials should use many different text types and the texts should be taken from different types of sources. Both of the textbooks I studied in this thesis succeed in my opinion in introducing different text types. Especially *Profiles 7* uses various text types. It includes chapters, which are taken from a science magazine, a column, from various articles, blog entries, a report and literary extracts. *Open Road 7* has chapters, whose

sources are: literary extracts and articles. It includes songs, too. Tomlinson (1998, 11) also notes that a large variety of different texts allows learners to study many topics, which makes them aware of the utility of the material. The textbooks, I studied, provide learners with environmental vocabulary used in different topics and text types, which shows learners that this sort of words and phrases can be used in many contexts, not only in "pure" environmental discussions. The importance of using authentic texts in foreign language teaching is mentioned in the Finnish National Curriculum for Upper Secondary Schools (FNCCUSS), too (2003, 103). Furthermore, according to FNCCUSS (2003, 103) all courses expand the knowledge of vocabulary of learners and in my opinion the textbooks I studied manage to introduce vocabulary that enables learners to "know how to communicate in a manner characteristic of the target language and its culture" as it is written in the FNCCUSS (2003, 103)

The five *nature and sustainable development*-words that got most hits in COCA are: *environment, waste, conservation, pollution* and *organic.* They appear in both books. Nation and Waring (1997, 2) among other scholars argue that one measure to consider the usefulness of the vocabulary in foreign language lesson is the word frequency. The top ten most frequent words of the textbooks have all over c. 4,000 hits in COCA, which indicates that they are rather frequently used in English in general. Therefore, I believe that the authors of these textbooks have paid attention to the authenticity of the vocabulary. The list of word/s that occur most frequently in 2010-2012 contains 18 word/s. Here are some examples: *organic, climate change, solar energy, eco-friendly. Climate change* is an expression that is not included either in the text-based wordlist of *Profiles 7* or in the alphabetical wordlist. Because it is such a contemporary and frequent expression, I would have included it in the wordlists. Other words that might be useful in the wordlists of *Profiles 7* would be: *carbon dioxide, contamination, oil spill* and *exhaust fumes. Alternative energy* is an expression I would have included in the wordlists of *Open Road 7.* Some other very contemporary expressions that are not included in *Open Road 7* are: *earth hour, passive*

house, green design, guerrilla gardening. The latter expression is so new and rare that I am not sure whether even a native speaker of English would recognize it. It is open to discussion whether it is an important word for foreign English learners. I believe that published materials are designed for average students and the words used in the textbooks contain the core vocabulary of a certain theme. Nevertheless, I think it is important to provide the fast learners with more complex vocabulary. The teachers have plenty of extra materials for advanced learners for example in teacher´s guides and in web materials, too.

One of problems in collecting the data for my thesis was the choice of words, that is, making the choice of which words to examine. I had to decide which words and expressions to include and what to exclude. The best solution would of course have been to include every word that relates to environmental topics, but space did not allow that. As I describe in the Methods section, I excluded certain groups of words. Consequently, important and relevant expressions might have been excluded from the wordlists that form my primary data.

Although I consider COCA to be the best corpus for this study, there are some challenges to using it. I wrote above that I do not think that COCA being an American corpus does not matter when examining English expressions in general, because the theme of the vocabulary in this thesis is *nature and sustainable development*, and there should not be major differences in British and American Englishes in this area. Nevertheless, for example *rubbish* is used mainly in British English and there are fewer hits for this word in COCA than for instance in a British corpus British National Corpus (BNC). *Rubbish* has 1.74 hits per million in COCA and 22.33 in BNC. This word is also used to describe something that is of poor quality, especially in British English as the following extract illustrates: " 'Well, it´s absolute rubbish', I said." (BNC: AOF 38). As I mentioned in the Analysis section, some of the words and expressions have many meanings and not all of them concern *nature and sustainable development.* Therefore some words appear to be rather frequently used in English in general, although they do not refer to environmental issues. The word

environment, which has the most hits of all the words I studied (48,977 hits = 105.48 per mil), is a good example. Although COCA is a large corpus with its 450 million words, it does not cover everything. For example, the expression *Earth hour,* which appears in *Profiles 7,* does not occur in COCA at all. On the other hand, the fact that an expression does not get one single hit in such a large corpus, suggests that this particular phrase is not one of the core expressions in English.

Finnish language teachers and textbook authors are usually professional linguists and they have a certain "feeling" of what is important to teach and what not. They also know their audience, that is, the learners, and their specific needs. The findings from my data show that in case of these two textbooks, the authors have managed to find relevant environment vocabulary for the textbooks. Although the vocabulary is rather similar in the books, differences appear and as discussed above, there are words that might have been useful to add in the books. For me as a teacher and a textbook author frequency lists created with help of corpora provide a useful tool to support that "feeling" I described earlier. In other words, people who are involved in language teaching do not need to rely only on their intuition, but can use quantitative frequencies as well. Corpora also serve language teachers, who are not native speakers of the language they teach, in a way that they can rely on corpora-based frequency information if they are uncertain of the use of a certain expression. Corpora can provide other activities for the classroom, such as creating different word lists and examine them from different angles, learners can focus for example on prefixes and suffixes, as Reppen suggests (see chapter 2.4).

7. Conclusion

The purpose of this paper was to examine what *nature and sustainable development*-related words and expressions are used in two Finnish upper secondary textbooks and how frequently they occur in English in general. I examined *nature and sustainable development*- related words and expressions of two textbooks, *Profiles 7* and *Open Road 7* and searched each 92 words/expression in COCA and looked into the frequencies of the words. I also paid attention to whether the words occurred in spoken or written English. I marked the period of time in which the words occurred most frequently, too. All in all, the textbooks I examined in this project succeed in my opinion very well in using words and expressions that occur frequently in English. There is older, "classic" environment- vocabulary like *pollution* and also very present-day English words, for example *organic.*

As I discuss in the Background section, many scholars, whose special field in linguistics is materials development and vocabulary teaching, claim that words and expressions should be authentic and textbooks should contain high frequency vocabulary. Therefore, I think that textbook authors should carefully evaluate the vocabulary they decide to include in textbooks. It might be a good idea to check the important and key words and phrases of the books by using corpora to examine the word frequencies.

Finally, an interesting topic for future research would be to include students´ angle to this theme. What do they perceive as useful *nature and sustainable development*-related vocabulary and what is the most useful strategy to learn these words. As a language teacher I would also be very interested to work with corpora in classroom as Reppen (2010, 5) suggests: compile wordlists with students and look at word frequencies and for example compare content words and function words.

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Appendices:

Appendix 1. The word lists of *Profiles 7* and *Open Road 7*

Profiles 7:

Going green (the covers)

Alternative energy

Biodegradable

Biodiversity

Carbon footprint

Composing

Conservation

Earth hour

Eco-friendly

Eco-label

Ecosystem

Ecotourism

Energy efficiency

Fair trade

Free range

Geothermal energy

Green design

Guerrilla gardening

Hydroelectric energy

Life cycle

Local food

Low-emission vehicles

Organic

Passive house

Rainforests

Recycling

Renewable energy

Solar energy

Sustainable development

Wind power

Text-based vocabulary

Course intro (p. 174)

environment

flora

fauna

sustainable development

indigenous people

current

ecological

quest

vacant

caretaker

package

application

virtual

villa

the Great Barrier Reef

environmentally-conscious

initiative

volcanic eruption

at intervals

at regular intervals

Text 1 Environmental Q & A (pp. 174-176)

environmental

Q (=questions)

A(=answers)

gesture

eco-friendly

public transport

sort

rubbish

bin

be second nature to sb

drop in the ocean

effort

impact

thumb

appliance

waste

tap

consider

load

subscribe to sth

print edition

litter

organic

ethical

labour

manufacture

down-to-earth

earthly

mood

gloomy

conclusion

jump to conclusion

be related to sth

recharge

battery

sap	bee	organism
research	population	resistant to sth
conduct	prophetic	specific
conduct research into sth	pronouncement	pesticide
condition	decrease	the latter
seasonal	none other than	argue
affective	paramount	provide
disorder	be of paramount importance	nutrition
SAD	on account of sth	reduce
depression	pollinate	lifespan
trigger	vast	die out
serotonin	quantity	estimate
sufferer	crop	rely on sth
fatigue	plant	extent
excessive	food chain	to a large extent
disinterest in sth	flourish	sting
craving for sth	pollination	tail
carbohydrate	kiss goodbye to sth	sting in the tail
be deprived of sth	species (pl) species	carbon
symptom	hypothesis, (pl) hypotheses	greenhouse
melt away	insect	emit
tenuous	buzz	life cycle
heat wave	be on the decrease	eventual
humidity	diminish	disposal
cite	consequence	ordinary
hostile	as a consequence of sth	plentiful
mercury	cellular phone (AmE)	conversely
soar	speculate	supply
extreme	frequency	be in short supply
attributable to sth	disrupt	irrigation
underlying	migrate	account
jury	hive	take into account
the jury is still out	modify	fertilizer
superficial	genetically modified	cultivation
average	foods	consume
disposition	frankenfoods	harvest

mill

spin, spun, spun

in a(n environmentaly-friendly) fashion

fuel

outlet

last but not least

full load

temperature

biodegradable

washing powder

make (uncomfortable) reading

pay lip service to sth

sustainable

sustainable development

weigh up

humble

Text 2 Anita Roddick: Radical by nature
(pp. 176-178)

founder

pioneer

revolutionize

view

cosmetics

body care product

shade

in the process

a bar of soap

raise awareness

sweatshop

perfume

parental

fiery

spirit

request

ash

firework

routinely

charity

honours

award

lifetime

including

knighthood

title

Dame

mascara

have an impact (on sth)

radical

by nature

outlet

brand

introduction

driving force

guiding light

environmentally- friendly

cosmetics

empire

bomb shelter

seaside

Naples

make a living

adopt

would work

cultivate

work ethic

novel

attribute sth to sb

emergence

social conscience

the Holocaust

kick-start

sense

outrage

empathy

the human condition

recall

take off for sth

take up a post

labour

be employed

department

stint

whet

whet sb´s appetite

kibbutz

trail

hit the hippie trail

make a mental note of sth

ethnic

ritual

ingredient

hit it of

kindred spirit

horseback ride

keep body and soul together

prolonged

absence

hit on the idea

set up a business

secure

loan

reluctant

reluctance

remark

stem from sth

suspect

judging by sth

bohemian

be situated

funeral parlour

stock

modest

range

cleancing

concoct

package

recyclable

urine sample

label

premises

trademark

camouflage

patch

damp

mould

gain ground

tap into sth

with gusto

spur on

franchise network

overseas

Brussels

environmental consciousness

stamp

copycat

innovative

found

hell-bent on doing something

paradigm shift

means

first off

make a point of doing sth

source

raw material

developing country

fair trade

buzzword

indigenous tribe

impoverish

derive

dilute

recycling

the done thing

peppermint

feet lotion

bubble bath

empties

superfluous

packaging

pamper

do one´s bit for sth

justify

The end justifies the means

extend

play an integral part in sth

campaign

petition

industrial

twiddle one´s thumbs

tear-gas

WTO World Trade Organisation

demonstration

sleep rough

opponent

be quick to do sth

dismiss

worthy

cause

socially-minded

window display

mere

marketing gimmick

undeniably

rake in (money)

rank as sth

reconcile

injustice

fortune

amass

silence

via

foundation

tycoon

reputation

bruise

clinch a deal

record

buy into sth

ethos

enthusiasm

purchase

principle

Trojan horse

practice

take alook on sth

procedure

diagnose

hepatitis

condition

contract sth

blood transfusion

go out of one´s way to do sth

inform sb about sth

be cut short

fatal

haemorrhage

shortly before

long live

legacy

Text 3 I´ve got a solution for the rainforest: napalm the lot (pp. 178-179)

equivalent

capture

buzz

growl

hiss

hoot

howl

moo

purr

quack

fierce

jump out of one´s skin

napalm

the lot

the Albert Hall

cut down

portray

mystical

majesty

chop down

specifically

brush

weep, wept, wept

sore

recluse

spider

chomp

anaconda

bloody

tarantula

deadly

wildlife

annoyance

buzz

nest

beetle

sheer

fly

recognisable

character trait

harelip

snip

hind leg

grasshopper

inch

bash

JCB

set alight

ignite

stubborn

cockroach

net

intact

catch fire

literally

put up with sth

array

flora

fauna

dreary

catch sb´s eye

veneer

moss

trip over sth

pointless

wood

be out of the woods

frankly

occasionally

clearing

sniffy

tumbledown

filthy

gap-year

gradually

trust fund

tribe

elder

chap

saucer

sew, sewed, sewn/sewed

agitated

diamond

formation

diamond formation

Stamford Bridge

charity

sole

Text 4 Doomsday tourism: Seeing it Before You Can´t (pp. 179-180)

sales pitch

the Maldives

the Galápagos Islands

Greenland

doomsday

explore

natural wonder

no matter what

position

global warming

environmental

stress

phenomenon, (pl) phenomena

take in

crumble

fade away

drift

scientist

degrade

pollution

traipse

virtually

isolation

the Galápagos Islands

off

surge

indicator

target

sheer

boost

port

float

inject

kayaking

fragile

ecosystem

boom

ice fjord

the Antarctic

the Arctic

destruction

expand

route

cruise

pole

iceberg

the Great Barrier Reef

under threat

average

temperature

sensitive

coral

unleash

unbecoming

bleach

devastate

reef

prone to sth

at risk

the Maldives

snow cap

peak

vanish

heck

sugar maple tree

in one´s prime

phrase

a positive spin

prospective

at a micro level

resort

tour operator

genuine

environment

practice

miss out (on sth)

off the record

nudge

high-end

bombard

lump on the bandwagon

dilemma

motivation

degradation

environmental degradation

site

Text 5 Noise pollution – an underrated environmental problem (pp. 180-181)

pollution

underrated

immediate

vicinity

take off

flock

squawk

seagull

renovation

drill

hammer

bark

wail

turbine

chainsaw

whisper

threshold

be long gone

pump

skull

mechanical

electrical

generate

absence

anthropogenic

cacophony

cherish

miss out on sth

due to sth

tinnitus

constant

industrial	in blind panic	ozone layer
pre-	aside from	ice cap
be in sight	exposure to sth	earplug
drift	moderately	flight path
line	cardiac	more´s the pity
flat	cardiac issues	reduce
calm	consciously	dull
crew	be disturbed	hum
lap	gastric	roast
hull	relief	invade
insect	excessively	invade one´s space
deafening	partial	runway
overkill	deafness	scrap
level	industrialized	on average
annoyance	substantial	peace and quiet
combustion engine	loss	ground
simultaneously	impaired	on account of sth
disappear	rate	volcano
dissipate	assault	pure
given	be attributed to sth	bliss
in the middle of nowhere	spiral out of control	let´s hear it for sth
sum	initiative	ash
sum total	appreciate	it´s about time
to a small degree	concept	speak out
shine	yell	subtle
torch	block out sth	detrimental
detectable	grip	ornithologist
din	get a grip	counterpart
layer	deserve	desperate
block of land	tag	attempt
outback	intermittent	in a desperate attempt
accessible	immaterial	get away from it all
increasingly	escape sth	ear-splitting
fling, flung, flung oneself	as far as sth goes	get on sb´s nerves
cliff	compare with sth	mildly
blind	diminishing	put sth mildly

For crying out loud!

Text 6 Out of the blue (pp. 181-183)

the blue

out of the blue

surface

jellyfish

respiratory

shark

deplete

commercial

pollution

entanglement

migrate

emperor

humpback whale

leatherback turtle

delicacy

aphrodisiac

prey

paddle

transparent

nostril

endangered

seal

whopper

scant

illumination

still

stale

enclosure

predominantly

location

converse

digestive

tract

bean

be stranded in sth

submarine

be extricated

belly

blue whale

creature

whopping

proportions

of whopping proportions

inhabit sth

brontosaurus

T-Rex= tyrannosaurus rex

put together

tongue

weight

full-grown

roomy

with aplomb

trivia

put to the test

beetle

Volkswagen Beetle

throughout

give sth a run for sb´s money

in terms of sth

offspring

calf

be reckoned with sth

tip the scales at sth (BrE)

at birth

mammal

guzzle

put on

give or take

odd

gargantuan

dimensions

dine on sth

exclusively

prey

marine

krill

endow with sth

humongous

extend

navel

scientific

scoop sth up

galore

krill galore

leisurely

cruise

put away

delicacy

weightlessness

habitat

expand

rely on sth

skeleton

bulk

buoyancy

tonnage

become beached

become stranded

collapse

breathtaking

gill

opening

nasal

passage

nasal passage

blow-hole

be positioned

dive

capacity

fill to capacity

well-adapted

respiratory

submerged

surface

exhale

moist

column

column of steam

spout

wow

whale-watcher

vicinity

be in the vicinity

boast sth

emit

low-frequency

grunt

groan

moan

jet engine

detect

enigma

ascertain

conclusively

mating

sonar

navigate

abyss

migration

equally

pod

mate

population

migrate

pole

the equator

breed

chilly

insulate

layer

blubber

envelop

lifespan

longevity

comparable to sth

predator

Antarctic waters

advent

factory ship

harpoon

with human reach

yield

at its peak

slaughter

species, (pl) species

brink

extinction

on the brink of sth

sense

come to one´s senses

endangered

plight

hit the headlines

dice

dinghy

intervene in sth

pro-whaling

cull

minke whale

humpback whale

in defiance of sth

moratorium of sth

commercial

pollution

acidification

accelerate

global warming

take a toll on sth

make up

staple diet

collision

entanglement

pose

hazard

conservationist

claim

exhaust

compromise

reproduce

individual

require

ensure

engage with sb

deplete

path

cross

Text 7 The mystery of crop circles (pp. 183-184)

crop circle

elaborate

wheat

crop

flatten	curious	permit
pattern	across	commercialization
triangle	intricate	hoax
intricate	plait	complexity
geometric	stalk	spontaneous
alien	weave, wove, woven	in broad daylight
spontaneous	plaits of wheat stalks woven together	account
electrically charged currents of air	site	sway
of air	minute	lay oneself flat
hoax	iron filing	clockwise
perpetrate	detect	spiral
under the cloak of darkness	expansion	fan
cereologist	claim	complete
die-hard	prankster	accompany
sceptic	oddity	high-pitched
elusive	elaborate	hum
mystery	spot	circular
crop circle	torch	rope
crop	passer-by	plank
circle	cottage industry	intricacy
dependable	emerge	viewer
feature	enthusiast	generate
appearance	make one´s way	purport (to do sth)
scores of sth	furious at sth	globe
phenomenon, (pl) phenomena	put up with sth	genuine
record	inevitably	not surprisingly
overnight	ascribe to sth	buff
emergence	proximity	nutter
highly	ancient	file
complex	burial site	give one´s take on sth
pattern	alien	researcher
wheat	UFO	research
corn	unidentified	surf the net
Georgia	object	intriguing
brush off sth	charge	
hoaxer	entrance fee	

	choke	point
tune into sth	bulge	assure
traffic jam	seam	in that respect
snatch	auto-rickshaw	on foot
census	wiry	lethargy
tutor	for the most part	palatable
e-tutoring	vehicle	solid
IT (Information Technology)	lean, leant/leaned, leant/leaned	panelling
industry	horn	shutter
adopt	no…whatsoever	horizontal
subcontinent	gridlocked	bright
official	judging by sth	teak
profound	patience	floorboard
suspicious	all concerned	grab
moisture	by no means	fuel
terminal	visa	ingenious
greenhouse	application form	stream
ooze	overland	corrugated iron
pore	virtually	bamboo pole
swerve	define	split, split, split
herd	annual	gutter
pedestrian	flood	channel
dual carriageway	north of sth	bucket
damp	state	snug
state	reception	thanks to
monsoon	directions	charcoal
jam-packed	set off	brazier
in the wee small hours of the morning	at a stately pace	be alight
misleading	engine	dash
by the time	gun	condensation
emerge	yard	apart from sth
survey	rear window	hence
seething	gridlock	continually
humanity	seek, sought, sought	bump
in force	reappear	beam
go about sth	melee	drawback

as far as sth is concerned

crash against sth

rocky

shore

howl

tidal wave

smash against sth

survey

equally

wide awake

racket

bladder

outcome

the loo

internal

plumbing

toilet facilities

relieve oneself

torrential (rain)

Biblical

proportions

of Biblical proportions

prospect

saturated (with water)

stone to death

lie, lay, lain

vain

let-up

drift off

volume

astonishing

public works

compound

edge

gauge

reading

average

rainfall

average

Text 9 Living with the tribe (pp. 186-187)

tribe

indigenous

conditions

surroundings

isolated

practise

feature

impact

evoke (thoughts)

lead

presenter

adventurer

particularly

remote

region

aim

rule

mod cons

people

fierce

self-defence

on-going

dense

settled

agrarian

landscape

highland

dirt road

rough

vegetation

tattered

unkempt

random

wave

frequent

broad

ground

view

bumb

acacia

acacia-dotted

savannah

distant

escarpment

on-road

dominate

compound

brick

tin

barbed wire

argue

negotiate

authority

spiritual

dignity

man of great dignity

robe

baboon

measured

fix

gaze

fix sb with a gaze

sincere

pause

crew

forcefully

trace

halting

garbled

dialect

match sth with sth

expression

previous

turn ut

vehicle

depart

look down on sb/sth

superior to sb/sth

stipulation

homestead

thorn

validation

humanize

equal

compensate sb for sth

access

concrete

terms

heartened

genuinely

delighted

nose around

clear off

be in luck

ease

carriage

brow

sprawling

climax

mesmerizing

etiquette

upset

super-fit

mill around

be primed

to the max(imum)

AK-47

testosterone

observe

reassure

take care

charge

hardwood

frenzy

strike

parry

fencing

moan

clutch

headdress

cloth

padding

knee-protector

woven

reed

all but

string

decorative

bead

genitals

barefoot

hardcore

get stuck into sth

incredibly

victor

declare

hoist

supporter

parade

nail

hard as nails

cheer

devoid of sth

prior to sth

Text 10 Hear the eco (p. 187)

quote

slogan

blow, blew, blown

owe sb

apology

inherit

ancestor

erupt

weed

Eeyore

bumber

be contained in sth

mighty

oak

hold one´s ground

caving society

lawn mower

despair for sth

charge

pave

Open Road 7:

Text 1 A Knight in the Woods (p. 11)

tranquil

spring

clearing

flush

perishable

go off

gorge yourself

idly

persistent

midgelike

no-see-ums: not see them

snooze

indeterminate

pee

weighty

foliage

vaguely

irritable

snuffling

bolt upright

dash

frantically

nocturnal

cease

successive

repose

weary

skunk

plod

rustle

lapping

shuffle

mesh

peer

appalled

wimpy

appliance

patently

inadequate

ravenous

distressingly

feeble

beam

vicious

bolt

buck

timid

Scat!

singularly

brute

merciless

withdraw, withdrew, withdrawn

horrid

lug

toss

scare the bejesus

whimper

emit a noise

growl

provoke

a trifle

pedicure

I´ll cross that bridge when I come to it

implacably

moron

flicker

scamper

stab

thigh

lunge

rapidly

resume

fling, flung, flung

miner´s lamp

conserve

club

by degrees

Text 2 Inside the Minds of Animals (p. 21)

fraught

beast

pest

dodge

mortality

pair-bond

charity

mourn

exhibit

retreat

warily

Kanzi

convids

crow

jay

solitary

negotiate

power struggle

collaborate

stalk

prey

ambush

unglamorous

wildebeest

party

in effect

bypass

cause-and-effect relationship

boost

innate

stable

herd

primate

carnivore

subtle

cognitive

theory of mind

toddler

rare

factory-loaded

cling, clung, clung

abdomen

knuckle-walk

 indicator

grasp

blue jay

cache

retrieval

mindful

stash

self and other distinction

adorable

apply

crude

compassion

grieve

Text 3 Final Call (p. 34)

discard

landfill

tantalum

antimony

lead

toxin

leach

ponder

obvious bet

waste

WEEE: the Waste Electric and Electronic
Equipment Directive

carry out

prolong

scheme

process

untraceable

refurbish

keen

run, ran, ran

nephew

work like clockwork

vague

import duty

a bit of an issue

gather

litter-strewn

reacquaint

eventually

equivalent

going rate

mark the price down

bashed

reconditioned

counterfeit

quibble

preacher

head (off) for

mosque

Text 4 Recipes for disaster/ Part 1 (p. 44)

recipes for disaster

unpredictable

magnitude

typhoon

Tip

air pressure

sustain

fatality

the Pacific

freighter

cyclone

limnic eruption

remote

Cameroonian

bed of the lake

magma

chamber

leak

carbon dioxide

dense

erupt

release

displace

suffocate

gas expulsion

tsunami

earthquake

strike, struck, struck

preparedness

quake´s epicenter

antire

seize

sling, slung, slung

volcano

measure

mile

heat wave

be equipped

nursing home

severe

most notably

cyclonic storm

off the east coast

vast

unique

hodgepodge	wrap	reservation
blizzard	telephone pole	Premier
accompany	issue a warning	senior government official
gust	resident	preliminary
tornado	securely	simultaneously
Text 4 Recipes for disaster/ Part 2 (p. 47)	precaution	summit
recipes for disaster	mattress	Mandarin
unpredictable	ditch	flawless
magnitude	overpass	interpreter
flood	insufficient	immaculately
occur	Mt.: mountain	crumpled
drain	erupt	on behalf of
river basin	volcanic eruption	People´s Republic (of China)
melt	Hiroshima Bomb	murmur
flow	surface	pull a fast one
freak	decrease	recognition
estimate	crop	emphatically
starve	starve	Secretary (of State)
plummet	bay	initials
detonate	megatsunami	draft
altitude	earthquake	emission
mile	glacial ice	memo(randum)
airburst	head of the bay	negotiate
topple	vertically	done deal
ground zero	plunge	craft
epicentre	monolith	repugnant
shockwave	bay´s headwaters	outrageous
scorch	generate	troop
shatter	on board	flanked by
creek	slosh	impassively
F5		forward-looking
tornado	Text 6 Ultimatum (p. 67)	dwell on
outbreak	ultimatum	preamble
windstorm	excerpt	compromise
sweep away	landmark	emitter
shred	climate change	quote

retort

manufacture

hiss

contain

injustice

hostage

hold hostage

Text 7 Going Nuclear? (p. 81)

substantial

status quo

inherently

cite

plant

Chernobyl

aberration

intentionally

disable

Three Mile Island

plausible

worst-case scenario

relative to

petroleum extraction

refining

The BP Gulf oil spill

BP

disposal

hazardous

contamination

crucial

address

subsidize

renewable

discredit

subsidy

hypocritical

current

drawing board

implement

installation

cost-effective

storage

power grid

emission

volatile

conventional

in the order of carbon policy

deteriorate

carbon- constrained

project

dominant

amplify

imperative

reliance

electrification

plug- in

retire

legislation

be torn

perceived

proponent

tradeoff

Text 8 Meanwhile Back at the Ranch (p. 92)

meanwhile back at the ranch

tend

dawn

chaps

lodge

chewing tobacco

reckon

uh-huh

duties

open range

roping

immerse

dirt area

assign

calving season

priority

smoothly

complication

tag

heifer

graze

undeveloped

Hiccup

stubborn

comply

giddy-up

poser

solid

earshot

gallop

get by

maxim

Text 9 Rare. Medium or Well Done? (p. 102)

constant

warfare

geneticist

imply

anthropologist

myth

attest

establish

superiority

defleshed

occupy

remains

attribute

scavenging

funerary practice

account

fictive

AD: Anno Domini

state practice

captive

furnish

stew

accompany

notion

slain

absorb

conclude

corpse

by no means

prestate

embed

genome

gruesome

emerge

assess

extent

outbreak

mad cow disease (BSE)

tainted

brain-eroding

pathology

misshapen

prion

species

rot

neural tissue

exposure

Fore

novel

brain- washing

at low incidence

presumably

deceased

relentlessly

devoid

subside

mortuary feast

distinctive

genetic signature

be infected

arise, arose, arisen

natural selection

disperse

scenario

genetic drift

initially

heritage

ancestral

descendant

prevalence

Glossary: The Environment (p. 30)

habitat

fauna

atmosphere

global warming

greenhouse effect

vegetation, flora

flora and fauna

urbanisation

sustainable development

indigenous

become extinct, die out

biodiversity

environmentalist, conservationist, nature activist

conservation

biodegradable

eco-friendly, environmentally friendly

deforestation

polar ice cap

ozone depletion

emissions trading

precipitation

poacher

extinction

conserve

preserve

invasive species

endangered species

wildlife

overcrowding, overpopulation

environmental mitigation

Glossary: Reduce, Reuse, Recycle

disposal

dispose of, discard

waste management/disposal

dumpster, skip

sewage

refuse, waste

incineration

landfill (site), dump

kerbside collection

disposable

recycling

drop-off site

flea market, charity shop (Br)

composing

second-hand, used

sort out, separate

toxic waste

hazardous waste

exhaust fumes

styrofoam

bottle bank

scrap, junk

(rubbish) bin (Br), trash can (Am), container

trash (Am), garbage, rubbish

litter

pollution

polluted, contaminated

pollutant

domestic waste

industrial waste

sewage (treatment) plant/works

Glossary: Energy (p.62)

wave energy

battery

solar energy

solar panel

energy supply

fossil fuel

acid rain

carbon dioxide

carbon emission

carbon footprint

carbon offsetting

coal-fired power plant/station

natural gas

geothermal energy

marine energy, ocean energy

methane

emissions trading

peat

wind power

wind farm

renewable energy sources, renewables

cut down, reduce, decrease

harness energy

hydroelectric power plant

power plant

tidal power, tidal energy

nuclear fallout

nuclear energy

oil spill

Glossary: Food and Agriculture (p. 87)

genetically modified (GM)

fertility

livestock, cattle

ranch

irrigation

herbicide

farmer´s market

quota

domestic animal

subsistence farming

local food, locally grown food

graze

fertilizer

fertilize

manure, dung

additive

organic

soil, ground, land

agriculture

dairy farm

forestry

food chain

eutrophication

fodder

fair trade

preservative

harvest, yield, crop

factory farming

pest

pesticide

crop rotation

Appendix 2. *Profiles 7*- table

	Word/s	hits all/ per mil	Spoken hits all/ per mil	Fiction hits all/ per mil	Magazine hits all/ per mil	Newspaper hits all/ per mil	Academic hits all/ per mil	1994-1994	1995-1999	2000-2004	2005-2009	2010-2012
1.	environment	48977 105.48	5908 61.81	1333 14.74	9558 100.02	6976 76.06	25202 276.74	1				2
2.	waste	24580 52.94	2629 27.51	5436 38.00	5347 55.96	4018 43.81	9150 100.48	2	1			
3.	conservation	14528 31.29	798 8.35	134 1.48	3770 39.45	22445 24.47	7582 83.26	2				1
4.	pollution	12793 27.55	919 9.62	229 2.53	3148 32.94	2554 27.85	5943 65.26	1	2			
5.	organic	12763 24.49	621 6.50	628 6.94	6006 62.85	2024 22.107	3484 38.26				2	1
6.	ecological	7712 16.61	175 1.83	136 1.50	1289 13.49	500 5.49	5612 61.63				2	1
7.	recycling	6126 13.19	254 2.66	286 3.16	1490 15.59	1181 12.88	2915 32.01	2	1			
8.	global warming	5145 11.08	1063 11.12	118 1.30	1801 18.85	1147 12.51	1016 11.16				1	2
9.	ecosystem	5102 10.99	195 2.06	116 1.28	1122 11.74	415 4.52	3252 35.71				2	1
10.	biodiversity	3928 8.46	118 1.23	15 0.17	481 5.03	183 2.00	3131 34.38			2		1
11.	composting	3311 7.13	9 0.09	18 0.20	293 3.07	95 1.04	2896 31.80		1	2		
12.	irrigation	3132 6.75	121 1.27	181 2.03	774 8.10	502 5.47	1553 17.05			2	1	
13.	fertilizer	2758 5.94	201 2.10	213 2.36	986 10.32	524 5.71	834 9.16		1	2		
14.	litter	2549 5.49	163 1.71	795 8.79	725 7.59	447 4.87	419 4.60	2		1		
15.	pesticide	2054 4.42	184 1.93	27 0.30	792 8.29	268 2.92	783 8.60	1	2			
16.	renewable energy	1979 4.26	142 1.49	2 0.02	694 7.26	426 4.64	715 7.85				2	1
17.	sustainable development	1248 2.69	46 0.48	1 0.01	141 1.48	102 1.11	958 10.52	2	1			
18.	energy efficiency	1195 2.57	73 0.76	2 0.02	356 3.73	202 2.20	562 6.17	1			2	
19.	life cycle	928 2.00	47 0.49	33 0.36	258 2.70	97 1.06	493 5.41	1		2		
20.	solar energy	825 1.78	78 0.82	37 0.41	344 3.60	112 1.33	244 2.68				2	1
21.	rubbish	810 1.74	101 1.06	366 4.05	101 1.06	106 1.16	136 1.49	1				2
22	wind power	782 1.68	81 0.85	2 0.02	351 3.67	120 1.31	228 2,50				1	2
23.	ozone layer	692 1.49	90 0.94	55 0.61	221 2.31	95 1.04	231 2.54	1	2			
24.	alternative energy	622 1.35	116 1.21	4 0.04	191 2.00	172 1.88	143 1.57				2	1
25.	bio-degradable	472 1.02	36 0.38	13 0.14	207 2.17	69 0.75	147 1.61		1			2
26.	fair trade	462 0.99	72 0.75	27 0.30	244 2.55	80 0.87	39 0.43				2	1
27.	ecotourism	411 0.89	13 0.14	8 0.09	218 2.28	43 0.47	129 1.42			1	2	
28.	eco-friendly	398 0.86	38 0.40	6 0.07	257 2.69	84 0.92	13 0.14				2	1
29.	conservationist	385 0.83	54 0.56	11 0.12	178 1.86	78 0.85	64 0.70	1			2	
30.	acidification	219 0.47	6 0.06	1 0.01	61 0.64	17 0.19	134 1,47		2			1
31.	carbon footprint	177 0.38	13 0.14	14 0.15	91 0.95	39 0.43	20 0.22				2	1

	Words/s	hits all/ per mil	Spoken hits all/ per mil	Fiction hits all/ per mil	Magazine hits all/ per mil	Newspaper hits all/ per mil	Academic hit all/ per mil	1990-1994	1995-1999	2000-2004	2005-2009	2010-2012
32.	ice cap	155 0.33	13 0.14	19 0.21	89 0.93	17 0.19	17 0.19			1	2	
33.	geothermal energy	124 0.27	15 0.16	1 0.01	45 0.47	21 0.23	42 0.46			2		1
34.	green design	42 0.09	1 0.01	1 0.01	19 0.20	6 0.05	15 0.16				1	2
35.	eco-label	13 0.03	1 0.01	0 0.00	2 0.02	1 0.01	9 0.10	1				2
36.	hydroelectric energy	9 0.02	0 0.00	0 0.00	3 0.03	1 0.01	5 0.05	2			1	
37.	low-emission vehicles	2 0.00	0 0.00	0 0.00	0 0.00	1 0.01	1 0.01	1			1	
38.	guerrilla gardening	1 0.00	0 0.00	0 0.00	0 0.00	1 0.01	0 0.00					
39.	earth hour	-											
40.	passive house	-											

Appendix 3. *Open Road 7*- table

	Words/s	hits all/ per mil	Spoken hits all/ per mil	Fiction hits all/ per mil	Magazine hits all/ per mil	Newspaper hits all/ per mil	Academic hit all/ per mil	1990-1994	1995-1999	2000-2004	2005-2009	2010-2012
1.	environment	48977 105.48	5908 61.81	1333 14.74	9558 100.02	6976 76.06	25202 276.74	1				2
2.	waste	24580 52.94	2629 27.51	5436 38.00	5347 55.96	4018 43.81	9150 100.48	2	1			
3.	conservation	14528 31.29	798 8.35	134 1.48	3770 39.45	22445 24.47	7582 83.26	2				1
4.	pollution	12793 27.55	919 9.62	229 2.53	3148 32.94	2554 27.85	5943 65.26	1	2			
5.	organic	12763 24.49	621 6.50	628 6.94	6006 62.85	2024 22.107	3484 38.26				2	1
6.	climate change	6316 13.60	806 8.43	45 0.50	1510 15.80	820 8.94	3135 34.43				2	1
7.	recycling	6126 13.19	254 2.66	286 3.16	1490 15.59	1181 12.88	2915 32.01	2	1			
8.	global warming	5145 11.08	1063 11.08	118 1.30	1801 18.85	1147 12.51	1016 11.16				1	2
9.	natural gas	4622 9.95	542 5.67	33 0.36	1040 10.88	1708 18.62	1299 14.26				2	1
10.	biodiversity	3928 8.46	118 1.23	15 0.17	481 5.03	183 2.00	3131 34.38			2		1
11.	carbon dioxide	3744 8.06	331 3.46	182 2.01	1453 15.21	533 5.81	1245 13.67				1	2
12.	contamination	3668 7.90	314 3.29	177 1.96	703 7.36	598 6.52	1876 20.60		2	1		
13.	renewable	3476 7.49	275 2.88	24 0.27	1126 11.78	787 8.58	1264 13.88				1	2
14.	irrigation	3132 6.75	121 1.27	181 2.03	774 8.10	502 5.47	1553 17.05			2	1	
15.	composting	3311 7.13	9 0.09	18 0.20	293 3.07	95 1.04	2896 31.80		1	2		
16.	emission	2788 6.00	82 0.86	32 0.35	735 7.69	189 2.06	1750 19.22	1	2			
17.	fertilizer	2758 5.94	201 2.10	213 2.36	986 10.32	524 5.71	834 9.16		1	2		
18.	litter	2549 5.49	163 1.71	795 8.79	725 7.59	447 4.87	419 4.60	2		1		
19.	pesticide	2054 4.42	184 1.93	27 0.30	792 8.29	268 2.92	783 8.60	1	2			
20.	disposable	1744 3.76	203 2.12	212 2.34	665 6.96	411 4.48	253 2.78	2			1	
21.	oil spill	1329 2.86	501 5.24	18 0.20	190 1.99	358 3.90	262 2.88	2				1
22.	sustainable development	1248 2.69	46 0.48	1 0.01	141 1.48	102 1.11	958 10.52	2	1			
23.	acid rain	896	48	36	301	141	370	1	2			

No.	Word	C1	C2	C3	C4	C5	C6	R1	R2	R3	R4	R5
		1.93	0.50	0.40	3.15	1.54	4.06					
24.	environmentalist	896 / 1.93	208 / 2.18	41 / 0.45	298 / 3.12	211 / 2.30	138 / 1.52	1	2			
25.	solar energy	825 / 1.78	78 / 0.82	37 / 0.41	344 / 3.60	112 / 1.33	244 / 2.68				2	1
26.	rubbish	810 / 1.74	101 / 1.06	366 / 4.05	101 / 1.06	106 / 1.16	136 / 1.49	1				2
27.	wind power	782 / 1.68	81 / 0.85	2 / 0.02	351 / 3.67	120 / 1.31	228 / 2,50			2	1	
28.	environmentally friendly	648 / 1.40	57 / 0.60	5 / 0.06	250 / 2.62	152 / 1.66	184 / 2.02				1	2
29.	fossil fuel	681 / 1.47	54 / 0.56	25 / 0.28	243 / 2.54	72 / 0.79	287 / 3.15				1	2
30.	overcrowding	620 / 1.34	116 / 1.21	23 / 0.25	96 / 1.00	244 / 2.66	141 / 1.55	1	2			
31.	herbicide	476 / 103	34 / 0.36	9 / 0.10	169 / 1.77	55 / 0.60	209 / 2.30			2		1
32.	biodegradable	472 / 1.02	36 / 0.38	13 / 0.14	207 / 2.17	69 / 0.75	147 / 1.61		1			2
33.	fair trade	462 / 0.99	72 / 0.75	27 / 0.30	244 / 2.55	80 / 0.87	39 / 0.43				2	1
34.	overpopulation	403 / 0.87	36 / 0.38	28 / 0.31	117 / 1.22	118 / 1.29	104 / 1.14	1	2			
35.	greenhouse effect	419 / 0.90	37 / 0.39	33 / 0.36	144 / 1.51	59 / 0.64	146 / 1.60	1	2			
36.	eco-friendly	398 / 0.86	38 / 0.40	6 / 0.07	257 / 2.69	84 / 0.92	13 / 0.14				2	1
37.	conservationist	385 / 0.83	54 / 0.56	11 / 0.12	178 / 1.86	78 / 0.85	64 / 0.70	1			2	
38.	emissions trading	359 / 0.77	2 / 0.02	0 / 0.00	22 / 0.23	12 / 0.13	323 / 3.55		1	2		
39.	ozone depletion	348 / 0.75	25 / 0.26	0 / 0.00	100 / 1.05	24 / 0.26	199 / 2.19	1	2			
40.	carbon footprint	177 / 0.38	13 / 0.14	14 / 0.15	91 / 0.95	39 / 0.43	20 / 0.22				2	1
41.	geothermal energy	124 / 0.27	15 / 0.16	1 / 0.01	45 / 0.47	21 / 0.23	42 / 0.46				2	1
42.	emitter	132 / 0.28	6 / 0.06	29 / 0.32	44 / 0.46	11 / 0.12	42 / 0.46				1	2
43.	exhaust fumes	121 / 0.26	8 / 0.08	57 / 0.58	26 / 0.27	27 / 0.29	8 / 0.09	2		2	2	1
44.	wave energy	57 / 0.12	0 / 0.00	1 / 0.01	8 / 0.08	7 / 0.08	41 / 0.45				1	2
45.	polar ice cap	40 / 0.09	6 / 0.06	5 / 0.05	21 / 0.22	6 / 0.07	2 / 0.02			1	2	
46.	nuclear fallout	34 / 0.07	8 / 0.08	2 / 0.02	8 / 0.08	11 / 0.12	5 / 0.05			1	2	2
47.	ocean energy	27 / 0.06	1 / 0.01	0 / 0.00	3 / 0.03	9 / 0.10	14 / 0.15				2	1
48.	tidal power	22 / 0.05	1 / 0.01	3 / 0.03	7 / 0.07	3 / 0.03	8 / 0.09				2	1
49.	hydroelectric power plant	18 / 0.04	4 / 0.04	1 / 0.01	4 / 0.04	4 / 0.04	5 / 0.05			1	2	
50.	marine energy	7 / 0.02	1 / 0.01	0 / 0.00	0 / 0.00	0 / 0.00	6 / 0.07				1	
51.	petroleum extraction	5 / 0.01	0 / 0.00	0 / 0.00	0 / 0.00	1 / 0.01	4 / 0.04		1			2
52.	carbon-constrained	6 / 0.01	0 / 0.00	0 / 0.00	3 / 0.03	1 / 0.01	2 / 0.02			2		1