Promoting Environmental Attitudes

A case study of the human-nature relationship promoted in Chinese middle school textbooks

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Abstract

This thesis investigates what sort of environmental attitudes are being promoted in contemporary China. The outset of the thesis is the growing awareness of environmental problems and the need to educate the Chinese population about environmental behaviours and attitudes by Chinese authorities. Based on prior research showing the importance of values in constructing attitudes, the main target of the analysis will be to distinguish these values and the way they shape environmental attitudes.

With a background discussion of environmental awareness and environmental education in China, the investigation is carried out as a qualitative content analysis with compulsory middle school textbooks as a case study. The choice of school textbooks is based on their importance as mediums of officially sanctioned knowledge and attitudes. The qualitative content analysis uses ideal types belonging to the conceptions of human-nature relationship and environmental responsibility; anthropocentric vs. naturocentric views on human-nature relationship and individual vs. social (state) responsibility respectively. These ideal types of environmental values are applied to a selection of value-laden environmental content: the environmental themes of pollution, sustainable development and use of resources.

The results of the analysis show that with environmental content follows expressions of environmental values that can be said to be characterised by anthropocentrism and social (state) responsibility. The overall focus on anthropocentric values indicates that a utilitarian and rational attitude towards the natural environment is promoted in the textbooks, where predominantly humans are seen as morally significant and nature is a resource to be used by and for people. The conception of responsibility shows a greater emphasis on social (state) responsibility toward nature than individual, mainly exhibited by the focus on national policies and governmental projects in environmental prevention and management. This focus is interpreted as promoting an environmental attitude that stresses external locus of control, which leaves environmental problems to experts and science/technology.

Together, the pattern of highlighting anthropocentric values and social (state) responsibility in relation to environmental themes is interpreted as constructing an official environmental attitude which guides its readership, the future generation of Chinese adults, how to view the natural environment and how to behave toward it.

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Abbreviations

CCP   Chinese Communist Party

EE   Environmental Education

IUCN   The International Union for Conservation of Nature

DESD   United Nations Decade of Education for Sustainable Development

NGO   Non-Governmental Organisation

OCR   Optical Character Recognition

SD   Sustainable Development

UN   United Nations

UNESCO United Nations Educational, Scientific and Cultural Organisation

WWF   World Wildlife Fund

1 Introduction and purpose of study

That China faces a number of environmental problems such as deforestation, air-, water- and ocean pollution and biodiversity loss has been known to many observers for some time.[1] Lately, even the public in the rest of the world is informed about the air pollution increasingly affecting urban areas in China. The environmental situation in China has caught the attention of Chinese and global governmental and non-governmental organisations, especially since the turn of the century. As it becomes apparent that China as a society needs to change in order to turn around the environmental situation, it has become vital to socialize the current and future generation of Chinese into environmental knowledge, conciousness and behaviour.

Thus, education has been viewed as one of the most important tools to combat environmental related problems, both internationally, as seen for example in the Brundtland report, and in China, as evident by various governmental reports.[2]

The international recognition of human activities threatening the ecosystems of the world, and the growing awareness that environmental problems and socio-economic issues are connected, brought about the concept of sustainable development (SD) in the 1980s.[3] The interrelatedness of these issues has made researchers observant to a change in the way humans relate to nature and the environment on a more fundamental level.[4] In 1984, Lester W. Milbrath and Barbara V. Fisher found that a reevaluation of the underlying worldview that guides people's relationship to the physical environment was underway.[5] Since then, there

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[1] See for example Vaclav Smil, *China's Environmental Crisis: An Inquiry into the Limits of National Development* (Armonk: ME Sharpe, 1993); Elizabeth C. Economy, *The River Runs Black: The Environmental Challenge to China's Future* (Ithaca: Cornell University Press, 2011); Judith Shapiro, *China's Environmental Challenges* (New York: John Wiley & Sons, 2012).

[2] National Environmental Protection Bureau, CCP Central Committee Propaganda Department, and National Education Committee, "Quánguó huánjìng xuānchuán jiàoyù xíngdòng gāngyào" [National environmental publicity and education platform for action] (1996), accessed May 20, 2016, http://www.chinalawedu.com/news/1200/22598/22603/22683/2006/3/sh248128012136002546-0.htm; CCP Ministry of Education, "Zhōng xiǎoxué huánjìng jiàoyù shíshī zhǐnán (shìxíng)" [Guidelines for the implementation of environmental education in primary and secondary schools (for Trial Implementation)] (2003), accessed May 20, 2016, http://www.moe.gov.cn/srcsite/A06/s7053/200310/t20031013_181773.html; Gro Brundtland et al., "Report of the World Commission on Environment and Development: Our Common Future," (1987), accessed May 22, 2016, http://www.un-documents.net/wced-ocf.htm.

[3] Daniel Olsson et al., "Young People's 'Sustainability Consciousness': Effects of Esd Implementation in Swedish Schools" (Licentiate thesis, Karlstads universitet, 2014), 15.

[4] Riley Dunlap et al., "Measuring Endorsement of the New Ecological Paradigm: A Revised Nep Scale," *Journal of social issues* 56, no. 3 (2000).

[5] Lester W. Milbrath and Barbara V. Fisher, *Environmentalists: Vanguard for a New Society* (SUNY Press, 1984), 88.

have been further scholarly efforts to try to measure "ecological consciousness",[6] "anthropocentrism",[7] and "anthropocentrism versus ecocentrism".[8] The underlying motivation for this field of research has been to try to find the factors that influence people's views, attitudes and concern for the environment.

Based on this field of research, it is worthwile asking what constitutes environmental attitudes or an environmental consciousness in a particular context. China as a state is attempting to instill environmental attitudes and enhance environmental awareness in its population.[9] One evidence of this is the inclusion of the promotion of "ecological civilization" (生态文明 shēngtài wénmíng) into the CCP Constitution in 2012 and the prominence given to "ecological civilization" and environmental quality in national speeches by former President Hu Jintao and Premier Li Keqiang.[10] Also, the concept of "environmental awareness" (环保意识 huánbǎo yìshí) has been used by authorities for some time as a national aim.[11]

In this study, I attempt to trace which values that influence environmental attitudes as promoted by Chinese authorities. The main target of the analysis will be to define the conception around humans' relationship to nature along the distinction between anthropocentric (human-centred) and naturocentric (nature-centred) concerns. Furthermore, the question of responsibility for the environment, broadly separated into individual and society-based responsibility, will be analysed and discussed. Investigating whether individual behaviour change or social policies are highlighted in efforts directed towards environmental problems can indicate if the attitudes that are promoted are centred in the citizenship (individual and communal agency) or in a support of larger state initiatives. These two angles,

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[6] Richard J. Ellis and Fred Thompson, "Culture and the Environment in the Pacific Northwest,"*American political science review* 91, no. 04 (1997).

[7] Edward W. Chandler and Ralph M. Dreger, "Anthropocentrism: Construct Validity and Measurement,"*Journal of Social Behavior and Personality* 8, no. 2 (1993).

[8] Suzanne C. Gagnon Thompson and Michelle A. Barton, "Ecocentric and Anthropocentric Attitudes toward the Environment,"*Journal of environmental Psychology* 14, no. 2 (1994).

[9] Youyi Tian and Chenyu Wang, "Environmental Education in China: Development, Difficulties and Recommendations,"*Journal of Social Science Studies* 3, no. 1 (2015): 37; Gerald A. McBeath et al., *Environmental Education in China*, (Cheltenham, UK: Edward Elgar Publishing, 2014) E-book

[10] Congressional-Executive Commission on China, *Congressional-executive commission on China 2013 Annual Report*, 124-125 (Washington: U.S. Government Printing Office, 2013), accessed May 22, 2016, http://www.cecc.gov/publications/annual-reports/2013-annual-report.

[11] Mette Halskov Hansen and Anna Ahlers, "Air Pollution: How Will China Win Its Self-Declared War against It?," in *Routledge Handbook: China's Environmental Policy*, ed. Eva Sternfeld (Routledge, forthcoming), 15. See for example National Environmental Protection Bureau (1996); CCP General Office of the State Council, "Guówùyuàn guānyú luòshí kēxué fāzhǎn guān jiāqiáng huánjìng bǎohù de juédìng" [The State Council on the implementation of Scientific Outlook on Development - The decision to strengthen environmental protection] (2005), accessed May 22, 2016, http://www.gov.cn/zwgk/2005-12/13/content_125680.htm.

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or *conceptions,* related to how humans' relationship with the environment is portrayed will help to delineate the type of environmental attitude that is promoted in the concrete case of school textbooks. Compulsory school textbooks are chosen as a case study because of their representative value as a reflection of official, legitimate doctrine.

The analysis will be carried out as a qualitative content analysis. It concentrates on three environmental topics that particularly involve values and beliefs; pollution, sustainable development and use of resources. The way in which the texts chosen highlight these topics can indicate how the relationship between man and nature is portrayed, and what types of environmental behaviors are promoted by governmental authorities. This forms a picture of how pupils in China are expected by the authorities to relate to the environment.

1.1 Structure of the thesis

This thesis is separated into six chapters. Chapter 1 features the background of the thesis, its aim and research questions, along with sections on the situation in the part of the world to be studied; environmental awareness and environmental education in China. In chapter 2, under the heading "Theoretical focus and related literature", the central concepts of environmental attitudes and values will be defined and their relation to eachother will be outlined. The core of the theoretical focus is a presentation of the different philosophies of environmental ethics which form the basis of the ideal types which the textbooks will be analysed after. The chapter also features a description of textbooks studies as a field of research and a review of earlier research on environmental values and attitudes in textbooks. In chapter 3, "Research methodology", the choices of method and selection is presented. This features a presentation of case study research, qualitative content analysis and ideal type analysis, as well as the analysis tool that has been formulated to carry out the analysis. This analysis tool separates ideal types of environmental values belonging to the conceptions 'human-nature relationship' and 'environmental responsibility'; (anthropocentric vs. naturocentric views on human-nature relationship and individual vs. social (state) management and responsibility respectively). Furthermore, the execution and delimitation of the analysis is described. Chapter 4 presents the results of the analysis, separated into the three environmental themes chosen; the ideal types of environmental values are applied to a selection of value-laden environmental content: the environmental themes of pollution, sustainable development and use of resources, with the help of the analysis tool. Chapter 5 discusses the analysis results with the help of the

theoretical focus of the study. In the analysis, I show that with content about the environmental themes chosen follows explicit and implicit expressions of values, and discuss the extent to which expressions of certain environmental values take precedence over others in the textbooks. Chapter 6 includes a conclusion of the findings and suggestions for further research.

1.2 Research questions

I want to look at specific examples of environmental attitudes that are being promoted in China by the authorities. Fundamental to this is a search for the values connected to the environment and its protection, values implicit within official discourse. For this official promotion of environmental attitude, compulsory school textbooks for the middle school years seven to nine for the school year of 2015–2016 have been chosen as a case study. The choice of textbooks as a case study is based on how they can be interpreted as reflecting officially accepted knowledge and moral. This makes the analysis of the values expressed in textbooks a case study of values expressed by official authorities. Another reason for choosing educational text material as a case study is the emphasis on education for achieving environmental awareness and values given by scholars and organisations in China and internationally.

My research questions are as follows:

- How are topics of environmental concern discussed in Chinese middle grade compulsory school books?
- What are the values represented in these discussions?
- How do they present the relation between humans and the environment?
- How do they promote environmental management and responsibility?

1.3 Environmental awareness and education in China

In this sub-chapter, the increased attention to environmental awareness in China, especially during the latest decade (2006—2016) will described and discussed. It will also highlight the importance given to education in fostering environmental attitudes. This has the purpose of

adding the geographical and historical context to this thesis' analysis of environmental values and attitudes.

1.3.1 Environmental awareness in China

With the environmental changes that are under way in China, studying the levels and composition of environmental awareness among the Chinese becomes important. In 2006, Paul G. Harris did a summarizing study of 34 environmental surveys carried out in China between 1998 and 2004 which reported on Chinese environmental awareness, attitudes and behaviours. The general conclusion from these surveys was that the overall sense of environmental awareness and responsibility was generally low outside major urban areas and universities.[12] Harris concluded that "people often admit that they are not concerned or bothered enough about the environment to accept personal responsibility for preventing harm to it or protecting it. People generally expect others, particularly the government, to take care of environmental protection".[13] As a collection, these surveys give a macroscopic status of Chinese environmental attitudes of 10 years ago, they probably do not reflect the complete picture of environmental attitudes in China in 2016. As Lynne Kailan notes in her 2010 master's thesis, we cannot predict the attitudes of the next generation based solely on what has gone before: The social landscape of the Chinese born after the implementation of the one-child policy in 1979 is different, especially in terms of lifestyle and increased individualism.[14] The survey results may, however, indicate the relative unsuccessfulness in promoting environmental responsibility to the population up to that point, making apparent a need to further promote the issue. They also point towards the resilience of the environment-related attitudes and environmental perspectives that have been prevalent in China for a long time. Kailan does however state that China's current environmental situation is the result not only of policy choices made today, but of attitudes and approaches that have evolved over centuries.[15] Harris' synthesis of surveys confirms an instrumental view of the natural world, where nature is seen as existing for the benefit of people, a view he concludes mirrors traditional Chinese thought, notably Confucianism,[16] a view that was later reinforced by

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[12] Paul G Harris, "Environmental Perspectives and Behavior in China: Synopsis and Bibliography,"*Environment and Behavior* 38, no. 1 (2006): 9.

[13] Ibid.

[14] Lynne Kailan, "Red and Green: Chinese University Student's Views on the Environment" (Master's thesis, Royal Roads University, Canada, 2010), 12.

[15] Ibid., 10.

[16] Harris, "Environmental Perspectives and Behavior in China: Synopsis and Bibliography," 8.

Maoism.[17] The impact of Maoist politics on China's environment has been thoroughly described by Judith Shapiro.[18] Her view is that "Mao-era efforts to control humans in nature, and nature in humans, have set the scene for the current precarious environmental situation, which has deteriorated with China's post-Mao push to development".[19]

Earlier environmental perspectives do not necessarily only contribute to a lack of environmental responsibility and instrumental nature views. Several researchers point toward traditional Chinese philosophy as providing a possible foundation for a better human-nature relationship and increased citizen support for environmental policy measures in contemporary China.[20] Gerald A. McBeath et al. point out how many concepts in traditional Chinese philosophy emphasized sustainability and the need to preserve species and ecosystems, something which could possibly resonate well with the modern concept of sustainability.[21] Shapiro asserts that Chinese confronting environmental problems might find their Confucian, Buddhist, and Daoist traditions helpful for the crystallisation of a modern environmental consciousness and environmental ethic.[22]

Many environmental initiatives have been carried out the past decade, and people's awareness of the graveness in the destruction of the environment has increased, as shown by several studies.[23] This is particularly evident in the increased amount of local protest against environmental pollution, as studied by for example Yanhua Deng and Guobin Yang, and Anna Lora-Wainwright et al.[24] The increased environmental protests were partly enabled by new political opportunities such as the passage of the Environmental Impact Assessment Law in 2002 and its subsequent publicity campaign.[25] In general, a more elaborated environmental

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[17] Kailan, "Red and Green," 11.

[18] Judith Shapiro, *Mao's War against Nature: Politics and the Environment in Revolutionary China* (Cambridge University Press, 2001).

[19] Ibid., 203.

[20] Ibid., 212-215; McBeath et al., *Environmental Education in China*, chap. 2; Xiumei Guo and Dora Marinova, "Environmental Awareness in China: Facilitating the Greening of the Economy" (paper presented at the 19th International Congress on Modelling and Simulation, Perth, Australia, 2011), 1678.

[21] McBeath et al., *Environmental Education in China*, chap. 4.2.

[22] Shapiro, *Mao's War against Nature*, 212.

[23] See for example Halskov Hansen and Ahlers, "Air Pollution."; Bryan Tilt, *The Struggle for Sustainability in Rural China: Environmental Values and Civil Society* (New York: Columbia University Press, 2010); Robert P. Weller, *Discovering Nature: Globalization and Environmental Culture in China and Taiwan* (New York: Cambridge University Press, 2006).

[24] Yanhua Deng and Guobin Yang, "Pollution and Protest in China: Environmental Mobilization in Context,"*The China Quarterly* 214 (2013); Anna Lora-Wainwright et al., "Learning to Live with Pollution: The Making of Environmental Subjects in a Chinese Industrialized Village,"*China Journal*, no. 68 (2012).

[25] Deng and Yang, "Pollution and Protest in China," 328.

bureacracy has been established, which has also opened up channels for legal protest.[26] This indicates that also the authorities have increased their efforts to raise the environmental awareness among the population. This has been confirmed by Xibing Huang et al., who in their content analysis of government documents conclude that "environmental issues are becoming increasingly important in China, attracting heightened attention from policy stakeholders."[27] According to Xiumei Guo and Dora Marinova, considerable progress has been made in turning this heigthened attention from policy stakeholders into enhanced environmental education and awareness, through environmental petitions and proposals, media and environmental public participation and governmental organisations and institutions.[28] They conclude that "environmental awareness and environmental concern have become more and more visible within the Chinese society."[29] One example of the increased effort to heighten environmental awareness is the so called Platform for Action, the National Environmental Publicity and Education program, a joint initiative from the Ministry of Environmental Protection, the Publicity Department of the CCP Central Committee and the central civilization office, the Ministry of Education, the Communist Youth League and the Central Committee of the all China Women's Federation. Starting already in 1996, this program, which has been renewed every five years, has been undertaken to strengthen China's environmental awareness. Until now, three Platform for Action programs have been implemented.[30] This program also exemplifies the emphasis on education as an important tool for achieving heightened environmental awareness in China.

1.3.2 Environmental education in China

Since the 1970s, the importance of education in spreading awareness and knowledge about the environment has been highlighted by many major international organisations such as UN and its educational organ UNESCO, as well as NGOs such as WWF and WCS (World Conservation Society). Subsequently, Environmental Education (EE) has been increasingly incorporated into the school curricula worldwide. In China, the government has been

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[26] Weller, *Discovering Nature*, 116.
[27] Xibing Huang et al., "Environmental Issues and Policy Priorities in China: A Content Analysis of Government Documents,"*China: An International Journal* 8, no. 02 (2010): 244.
[28] Guo and Marinova, "Environmental Awareness in China," 1678.
[29] Ibid., 1673.
[30] National Environmental Protection Bureau (1996); Ministry of Environmental Protection, et al., "Quánguó huánjìng xuānchuán jiàoyù xíngdòng gāngyào" [National environmental awareness education platform for action (2011 - 2015)] (2011), accessed May 22, 2016, http://www.jyhb.gov.cn/0/600/119437/44953/WebSite/0/354648/0/ShowTxtContent.shtml.

formulating policy on environmental education since the Law of Environmental Protection was written in 1979.[31] However, in China, the acknowledgement and development of EE has moved slower than in the West: Not until 2001 did the Ministry of Education establish a nation-wide model for EE, and the unified curriculum with guidelines for content and activities of EE was activated in 2003.[32] This may indicate that China, in comparison to many countries, is still in the development stage of some of the formal aspects of environmental education. Meanwhile, more informal channels such as NGOs and local voluntary efforts by for example school teachers have played an important role in the development of environmental education and awareness in China.[33]

Nonetheless, the ambition to further prioritise environmental education within the formal education system has been expressed by Chinese authorities. One example of this ambition was the initiation of the Green School Project, a concept introduced in Europe in the 1990s and adopted in China as early as 1996.[34] The basic curriculum reform of 2001 also enabled elements of environmental education to be further incorporated into various school subjects. Furthermore, in 2003, the Ministry of Education launched the National Environmental Education Guidelines (trial) document which promoted further integrated and practice-oriented environmental education in schools.[35] The Platform for Action – the National Environmental Publicity and Education program (as referred to above), has a clear focus on formal education in promoting environmental awareness. The 2011-2015 version of this platform states that it is important to:

> *Strengthen basic education, higher education and industry environmental vocational*
> *education, promoting quality environmental education into the national education process.*
> *Strengthen environmental education in the basic stage, making the content of*

[31] John C.K. Lee and Danielia Tilbury, "Changing Environments: The Challenge for Environmental Education in China,"*Geography* (1998): 228.

[32] G. McBeath and J. McBeath, "Environmental Education in China: A Preliminary Comparative Assessment," (paper presented at The American Association for Chinese studies 1st annual conference), accessed May 22, 2016, http://www.ccny.cuny.edu/aacs/2009conference/Jerry_and_Jenifer_McBeath.doc.

[33] Ibid.; Tian Qing, "Historical Review of Environmental Education in China,"*Chinese Education & Society* 37, no. 3 (2004): 35.

[34] John Chi-Kin Lee and Michael Williams, *Schooling for Sustainable Development in Chinese Communities: Experience with Younger Children* (Dordrecht: Springer, 2009), 14.

[35] John Chi-Kin Lee and Michael Williams, "Environmental Education for Sustainability in Primary Schools in Chinese Communities," in *Schooling for Sustainable Development in Chinese Communities: Experience with Younger Children*, ed. John Chi-Kin Lee and Michael Williams (Dordrecht: Springer, 2009), 15.

environmental education penetrate into the relevant courses, to encourage primary and secondary schools to offer various forms of environmental education in the classroom.[36]

It is evident that the awareness of environmental issues has increased among authorities and population alike. It also seems that on the governmental level, the aspirations for education as an instrument for increased environmental awareness and attitudes are quite high. However, as this study tries to investigate, exactly how the authorities' aspirations to popularise environmental protection knowledge and consciousness are promoted is of interest. In particular, this study will look at what values and attitudes are shaping the way the Chinese school students are expected by the authorities to relate to the environment. Given the high priority given to education, this thesis will focus on how this promotion is carried out in compulsory school textbooks.

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[36] Ministry of Environmental Protection (2011), article 3.2. Translation by candidate.

2 Theoretical focus and related literature

This chapter features definitions of concepts central to the thesis and their theoretical basis. Furthermore, a short description of textbook studies as a field of research and earlier research conducted on environmental attitudes and values will be described – together with the significance of this study within the field of research. The presentation does not propose to be comprehensive for this field of research, but is intended to highlight the connection between environmental ethics and attitudes, and similar research of textbooks with relation to this.

2.1 Defining 'environmental attitude'

Martin Fishbein and Icek Ajzen define attitude as "a learned predisposition to respond in a consistently favourable or unfavourable manner with respect to a given object."[37]

Expanding from this, the concept 'environmental attitude' is a phenomenon that is as difficult to define as it is to measure. In this study, the term 'environmental attitude' is meant to encapsule not only an awareness about the environment, but also the 'perspectives' towards it. Environmental attitude has been conceptualised in different ways by different scholars, mainly defined as either unidimensional; referring to specific psychological factors related to peoples' pro-environmental behaviours (such as the first version of the New Environmental Paradigm developed by Riley E. Dunlap and Kent D. Van Liere,)[38] or as multidimensional; which in addition incorporates other associated factors such as knowledge, beliefs, values and attitudes.[39] In this thesis I employ the latter, multi-dimensional definition of environmental attitude. Such a definition has been used by Florian G. Kaiser, Sybille Wulfing and Urs Fuhrer, who viewed environmental attitude to be composed of environmental knowledge, values and behaviour intention.[40] They present these three components as being at the core of

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[37] Martin Fishbein and Icek Ajzen, *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research*, Addison-Wesley Series in Social Psychology (Reading, Mass: Addison-Wesley, 1975).

[38] Riley E. Dunlap and Kent D. Van Liere, "The "New Environmental Paradigm","*The journal of environmental education* 9, no. 4 (1978).

[39] Regina Lafuente, "Defining and Measuring Environmental Consciousness,"*Revista Internacional de Sociología (RIS)* Vol.68, no 3 (2010): 732.

[40] Florian G. Kaiser, Sybille Wolfing, and Urs Fuhrer, "Environmental Attitude and Ecological Behavior,"*Journal of Environmental Psychology* 19 (1999): 7.

most of the commonly used attitude approaches toward the environment used to predict ecological behaviour.[41]

This thesis bases its analysis on textual content as opposed to survey data on individuals' personal environmental attitudes (which formed the basis of the two studies mentioned above). The two components that will be analysed as main contributors of environmental attitudes are values and responsibility. Kaiser, Wulfing and Fuhrer propose that responsibility be included as an alternative predictor of ecological behaviour intention, while also confirming that "responsibility towards the environment not only appears to affect different ecological behaviour intentions considerably, but it also predicts general ecological behaviour itself mediated by one's responsibility judgement towards the environment".[42]

2.2 Values as indicators of environmental attitudes

To understand what constitutes environmental attitudes it is necessary to go beyond expressions of environmental concern and look at the underlying basis for them. In this study, values are seen as a main indicator of environmental attitudes. Two sociological definitions of values illustrate the understanding of values in this context;

Huron's definition: "...systems of collective preferences that orient and justify the social actions of humans..."[43]

Miceli and Calstelfranchi's definition: "Value may be called an element of a shared symbolic system, which serves as a criterion or standard for selection among the alternatives of orientation that are intrinsically open in a situation."[44]

Values are, in other words, identified as broad, fundamental norms shared by members of a society.[45] Within environmental ethics, perhaps the most fundamental values concern how people relate to the environment – the human-nature relationship.[46] The human-nature relationship has been singled out as one of the main indicators defining people's

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[41] Ibid., 12.

[42] Ibid., 13.

[43] Cited in Silvia Caravita et al., "Construction and Validation of Textbook Analysis Grids for Ecology and Environmental Education,"*Science Education International* 19, no. 2 (2008): 102.

[44] Maria Miceli and Cristiano Castelfranchi, "A Cognitive Approach to Values,"*Journal for the Theory of Social Behaviour* 19, no. 2 (1989): 171.

[45] Ibid.

[46] Christoph Rehmann-Sutter, "Biological Organicism and the Ethics of the Human-Nature Relationship,"*Theory in Biosciences* 119, no. 3-4 (2000).

environmental attitudes and a fundamental component of people's environmental belief system in a variety of studies.[47] The understanding of the human-nature relationship is believed to affect people's worldview, which in turn determines the way people address solutions of existing environmental problems.[48]

In their 1994 book *The Value Basis of Environmental Concern* , Paul C. Stern and Thomas Dietz proposed a value-basis theory for environmental concern wherein a 'biospheric' view is one of three dimensions of values from which environmental attitudes form. The other two are 'egoistic' and 'social-altruistic'; and together they represent the values and beliefs that influence the views on the relationship between humans and the environment.[49] This three-factor structure of environmental attitudes, where the distinction between egoistic, biospheric and altruistic concerns underlie environmental attitudes and worldview has been supported by several studies.[50] This theoretical distinction used in the studies is oriented around three sets of valued objects: self, other people, and the biosphere.[51] The cross-cultural research done using this distinction further found that culture plays an important role in determing environmental attitudes.[52] Barbara Deutsch Lynch found several differences between Latino and Anglo views of the environment in her studies, suggesting that the very content of environmental consciousness varies with cultural backgrounds. These differences were manifested along mainly two conceptions concerning environmentalism: the relationship of humans in respect to nature and social responsibility. First, Anglo environmentalism tends to view humans as protectors or consumers of nature, while Latino environmentalism is characterized by a more biospheric view. Secondly, the Anglo environmentalism promotes

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[47] See for example Dunlap and Van Liere, "The "New Environmental Paradigm"."; Dunlap et al., "Measuring Endorsement of the New Ecological Paradigm."; Caravita et al., "Construction and Validation of Textbook Analysis Grids."

[48] Rehmann-Sutter, "Biological Organicism," 334-335; Rosa Branca Tracana and Graça S. Carvalho, "Ecosystems, Pollution, and Use of Resources in Textbooks of 14 Countries: An Ecocentric Emphasis,"*ISRN Education* 2012 (2012): 1.

[49] Cited in P. Wesley Schultz and Lynnette Zelezny, "Values as Predictors of Environmental Attitudes: Evidence for Consistency across 14 Countries,"*Journal of environmental psychology* 19, no. 3 (1999): 255-256.

[50] Ibid.; P. Wesley Schultz, John B. Unipan, and Raymond J. Gamba, "Acculturation and Ecological Worldview among Latino Americans,"*The Journal of Environmental Education* 31, no. 2 (2000); P. Wesley Schultz, "The Structure of Environmental Concern: Concern for Self, Other People, and the Biosphere,"*Journal of environmental psychology* 21, no. 4 (2001); P. Wesley Schultz and Lynnette Zelezny, "Reframing Environmental Messages to Be Congruent with American Values,"*Human ecology review* 10, no. 2 (2003); P. Wesley Schultz et al., "Values and Their Relationship to Environmental Concern and Conservation Behavior,"*Journal of cross-cultural psychology* 36, no. 4 (2005).

[51] Schultz, "The Structure of Environmental Concern," 327.

[52] Schultz, Unipan, and Gamba, "Acculturation and Ecological Worldview."; P. Schultz, "Environmental Attitudes and Behaviors across Cultures,"*Online readings in psychology and culture* 8, no. 1 (2002).

technical solutions to environmental problems whereas Latino environmentalism focuses on communal solutions.[53]

As this is a text-study, it does not make sense to try to find egoistic environmental concerns, therefore the concepts of anthropocentric (human-centred) and naturocentric (nature-centred) values towards the environment as defined by Leena Vilkka will be used.[54]

2.3 Environmental ethics and the human-nature relationship

In order to determine which human-nature relationship is promoted in the text, I turn to the field of environmental ethics. Mikael Stenmark defines environmental ethics as: "...the systematic and critical study of the value-based positions (consciously or unconsciously) which control the way people relate to nature."[55] This is a broader definition of environmental ethics than used in some other circumstances, where it is defined as the position that humans have moral obligations towards nature. The latter, narrower definition does not allow for other type of value-based positions, and will therefore not be used in this study.

A key subject of environmental ethics is the tension between human-centred and nature-centred concern.[56] This relates to the different moral values people ascribe to humans, non-humans and nature respectively. These moral values can be divided into instrumental value and intrinsic value.[57] Objects with intrinsic value can be seen as the ends to our actions, meaning that they have higher value than the objects with instrumental value which can be seen as means to an end. Intrinsic value limits the way we can use the object for its instrumental value. The human-centred view, called anthropocentrism, ascribes intrinsic value only to humans, whereas nature and its resources only have instrumental value. In other words, humans are the only ones that can be regarded as ends-in-themselves, and they are considered the only morally significant for our actions. Nature-centred views, on the other

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[53] Barbara Deutsch Lynch, "The Garden and the Sea: U.S. Latino Environmental Discourses and Mainstream Environmentalism,"*Social Problems* 40, no. 1 (1993): 116-117.

[54] Leena Vilkka, *The Intrinsic Value of Nature*, vol. 59, Value Inquiry Book Series (Rodopi, 1997), 4, 8, 33, 107, 119.

[55] Mikael Stenmark, *Miljöetik Och Miljövård: Miljöfrågornas Värderingsmässiga Dimension* (Studentlitteratur, 2000), 21. Translation by the candidate.

[56] Leena Vilkka, "The Varieties of Intrinsic Value in Nature: A Naturistic Approach to Environmental Philosophy" (PhD dissertation, University of Helsinki, 1995), 10.

[57] Stenmark, *Miljöetik Och Miljövård*, 40-41.

hand, ascribe moral significance also to non-humans, and in some cases greater part of nature. These views ascribe intrinsic value also to nature.[58]

The importance of this division between human-centred and nature-centred views for people's environmental attitude becomes apparent when confronted with environmental challenges. As mentioned, the understanding of the human-nature relationship (what is morally taken into account when interacting with nature) determines how we address solutions of environmental challenges.

The following review describes human-centred views and nature-centred views, how they view the human-nature relationship and what is considered morally significant.

Anthropocentrism can be further subdivided. Vilkka distinguishes between strong and weak anthropocentrism, where the weak form can ascribe intrinsic value to nature, but human welfare goes before the welfare of other beings, and the highest ethical goal is to defend the welfare of human beings.[59]

Klas Sandell, Johan Öman and Leif Östman make a historic division between two different forms of anthropocentrism called "modern anthropocentrism" and "late-modern anthropocentrism."[60] The premise of both types of anthropocentrism is the needs and interests of humans, where nature is valued according to the economic or experience value it has for mankind. Another shared outset is a strong belief in the ability of science and technology to solve environmental problems. The main differences between these two types is how far the moral obligations towards humans stretches – late-modern anthropocentrism stresses our moral obligations also to future generations, while modern anthropocentrism limits obligations to the current population that should not be negatively affected by our interactions with nature. Late-modern anthropocentrism also often stresses quality of life as the goal of development, while modern anthropocentrism stresses heightened material standards.[61] Mikael Stenmark further draws attention to the eco-holistic view that characterises the late-modern anthropocentrism.[62] The eco-holistic view furthers that there is an interaction and interdependence between humans and all other organisms. Yet another feature of late-modern

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[58] Klas Sandell, Johan Öhman, and Leif Östman, *Miljödidaktik: Naturen, Skolan Och Demokratin* [Environmental Education: Nature, school and democracy] (Lund: Studentlitteratur, 2003), 91.

[59] Vilkka, "The Varieties of Intrinsic Value in Nature," 149.

[60] Sandell, Öhman, and Östman, *Miljödidaktik*, 92-95.

[61] Ibid.

[62] Stenmark, *Miljöetik Och Miljövård*, 46-47, 49-52. Stenmark calls late-modern anthropocentrism "the ethic of sustainable development". Translation by candidate.

anthropocentrism is the focus on the limitation of natural resources.[63] Following from this, conservation of resources should be attempted so that they can be shared with future generations of humans.[64]

For the view that not only humans possess intrinsic value and moral significance stand the different non-human philosophies called "naturocentric".[65] Naturocentrism can be further subdivided, according to what is considered to be included in the scope of our morality, these are: zoo-centrism (animals have intrinsic value), biocentrism (all living organisms have intrinsic value) and ecocentrism (also whole ecosystems, species and landscapes have intrinsic value).[66] This study will however use the collected term of naturocentrism.

As shown above, the concepts of anthropocentrism and naturocentrism can be said to be multidimensional. The content analysis of this study distinguishes initially only between anthropocentric and naturocentric values, therefore any statements that stress human needs and values over non-human, even though the value of nature is mentioned (weak anthropocentrism) will be labeled under the broader term of anthropocentrism. Neither will a division be made between modern and late-modern anthropocentrism in the initial analysis. Additionally, the collected term of naturocentrism will be used to refer to the focus on all types of non-human concerns when confronted with environmental situations and problems. The chosen texts are usually too brief in their reasonings to always be able to determine what type of subcategory of either anthropocentric or naturocentric view is being promoted. Other times it is difficult to determine how different objects' moral significance should be valued against eachother. However, the multidimensionality of the two concepts will be taken into consideration during the analysis. Where these narrower divisions of environmental ethical viewpoints can be made, they will be evaluated in the analysis and subsequent discussion.

2.3.1 Environmental ethics in a Chinese context

Although the compositions of different environmental ethics were historically elaborated and developed in the Euro-American context, these alternate views on the environment have had an impact also in China. Paul Weller has described how three major Western ways of relating to the environment entered China during the twentieth century: the first view to influence

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[63] Ibid., 45-47.
[64] Ibid., 51.
[65] Vilkka, "The Varieties of Intrinsic Value in Nature," 10.
[66] Ibid.; Sandell, Öhman, and Östman, *Miljödidaktik*, 97, 100.

China had clear anthropocentric characteristics and came to dominate from the May Fourth era until the 1980s. This view, which fit the national aim of progress and development, relied on a scientific and instrumental relation to the environment. The other two directions have naturocentric characteristics; one gives intrinsic value to nature and the other focus on nature as a remedy to the ills of modern urban life. These arrived in China around the same time in the early 1900s but only grew important with the interest in nature tourism and environmental protection toward the end of the century.[67] Weller notes that aspects of both anthropocentric and naturo (bio-) centric views on nature exist in contemporary China. However these views and the following attitudes toward nature can be traced to a global context of human-nature relationship. China's chosen solutions to environmental problems were also directly influenced by the outside world through models of conservation, the structure of environmental protection bureaucracies and nature reserve laws, as well as the development of Environmental NGOs.[68] Based on Wellers claim that international environmental ethics and global environmentalist discourses have had formative effects on the Chinese development of views on nature and environmentalism, the characteristics connected to anthropocentric and naturocentric views on human-nature relationship as used in the western context will be applied in this study of Chinese environmental attitudes.

2.4 Environmental responsibility

Apart from environmental worldview (environmental ethics) as distinguished through the concepts of anthropocentrism and naturocentrism, another aspect important to environmental attitudes is environmental responsibility. By also investigating expressions of environmental management and responsibility, the description of "environmental attitude" can also encompass the way solutions to existing environmental problems are addressed. Furthermore, environmental responsibility has been highlighted as a promising predictor of ecological behaviour.[69]

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[67] Weller, *Discovering Nature*, 61, 166.

[68] Ibid., 165.

[69] See for example Florian G. Kaiser and Todd A. Shimoda, "Responsibility as a Predictor of Ecological Behaviour,"*Journal of Environmental Psychology* 19, no. 3 (1999): 20-21; E. Kals and R.P. Becker, "Zusammenschau Von Drei Umweltpsychologischen Untersuchungen Zur Erklärung Verkehrsbezogener Verbotsforderungen, Engagementsbereitschaften Und Handlungsentscheidungen,"[A showcase of three environmental psychological studies to the explanation of transportational prohibitions, readiness to act and decisions to act.] *Berichte aus der Arbeitsgruppe "Verantwortung, Gerechtigkeit, Moral"* 73 (1994): 20-21.

This thesis adopts the dichotomisation of environmental responsibility, where responsibility for the environment is divided between the focus on individual and social responsibility in school textbooks, as defined and used by Silvia Caravita et al..[70] The distinguishing characteristics of this divide in textbook content are presented as:

• Emphasis on change in individual behaviours vs. emphasis on change in life styles at society level

• Adhesion to moral norms descending from community involvement vs. sources of authority

• Moral responsibility and "literacy" vs. political responsibility and literacy.[71]

A similar division of environmental responsibility has been made between internal and external locus of control.[72] Locus of control is viewed as a personality factor of environmental responsibility: it represents an individual's perception of whether or not he or she has the ability to bring about change through his or her own behaviour. External locus of control exists with the individuals who do not try to bring about change because they attribute change to chance or to powerful others (e.g. government) rather than to their own behaviors. Internal locus of control exists with those who believe that their activity has an impact.[73] Jody M. Hines, Harold R. Hungerford and Audrey N. Tomera's 1987 meta analysis showed that in fifteen different studies, individuals with an internal locus of control were more likely to have behaved in an environmentally responsible manner than individuals with an external locus of control.[74] Such results suggest that in order to promote environmentally responsible behaviour to the citizenry, a message promoting individual responsibility and sense of making a difference should be in the forefront of educational text material.

A Finnish study by Uitto et al. in 2004 incorporated both environmental values and locus of control in a survey of attitudes to environmental challenges among 9th grade school

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[70] Caravita et al., "Construction and Validation of Textbook Analysis Grids," 109-110.

[71] Ibid., 110.

[72] E.g. Jody M. Hines, Harold R. Hungerford, and Audrey N. Tomera, "Analysis and Synthesis of Research on Responsible Environmental Behavior: A Meta-Analysis,"*The Journal of environmental education* 18, no. 2 (1987); Harold R. Hungerford and Trudi L. Volk, "Changing Learner Behavior through Environmental Education,"*The journal of environmental education* 21, no. 3 (1990); Niklas Fransson and Tommy Gärling, "Environmental Concern: Conceptual Definitions, Measurement Methods, and Research Findings,"*Journal of environmental psychology* 19, no. 4 (1999).

[73] Hines, Hungerford, and Tomera, "Analysis and Synthesis of Research," 4.

[74] Ibid., 5; Fransson and Gärling, "Environmental Concern," 375.

students.[75] The results indicated that naturocentric values and positive attitudes towards (individual) environmental responsibility were linked with each other. The naturocentric factor was also linked to scepticism about the ability of science and technology to solve environmental problems. The anthropocentric factor, on the other hand, revealed attitudes expressing that environmental problems do not belong to oneself, showing external locus of control.[76]

Following Uitto et al., both expressions of values indicative of how the relationship with the environment is promoted, and whether the environmental content of the textbooks is seen as promoting either individual responsibility (internal locus of control) or social responsibility (external locus of control) will be used in this study as indicators of certain environmental attitudes.

2.5 Textbook research

In a study of Chinese environmental attitudes school text books are important because they reflect the official attitude of the political authorities – textbooks influence the content, approach and teaching in schools. They determine the selection of topics to be taught by teachers and often represent the actual curriculum.[77] James M. Blaut labels the school textbook a key social document, through careful reviews by several involved institutions, the school textbook becomes "a vetted social statement of what is considered valid and acceptable for entry into the mind of the child. For this reason, research on textbooks is, in fact, ethnographic research."[78]

Important to the study of environmental awareness and attitudes, textbooks also convey values – whether explicitly or implicitly, with obvious or hidden messages incorporated.[79]

Rosa Branca Tracana and Graça S. Carvalho present textbook analysis as a major element in the evaluation of how educational goals are implemented, as they are used by teachers both as syllabus guidelines and didactical resources. They conclude that textbook analysis is "a

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[75] Anna Uitto et al., "Who Is Responsible for Sustainable Development? Attitudes to Environmental Challenges: A Survey of Finnish 9th Grade Comprehensive School Students" (2004).
[76] Ibid., 94-97.
[77] Caravita et al., "Construction and Validation of Textbook Analysis Grids," 99.
[78] James Morris Blaut, *The Colonizer's Model of the World* (New York: Guilford Press, 1998), 46.
[79] C. Jacob, The textbook and the social construction of reality. Technologies, Idéologies Et Pratiques, 81(1-4), 333-341 (1988). Cited in Caravita et al., "Construction and Validation of Textbook Analysis Grids," 99.

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relevant tool for studying socio-cultural determinants of environmental problems, in particular the school related ones."[80]

The ways in which environmental issues are presented and adressed in Chinese school textbooks can indicate which issues and values about the environment that are shaping the environmental awareness and consciousness that authorities promote to the Chinese population. Trust in the younger generation to take care of the environmental problems of the future makes formal education efforts further important in this regard.

2.6 Previous studies on environmental values and attitudes in textbooks

The findings of a 1999 study by Jennifer Campbell Bradley, Tina M. Waliczek and Jayne M. Zajicek showed that exposure to environmental curriculum appeared to produce a more positive environmental attitude among secondary school students.[81] Later important contributions include the European Biohead-Citizen project, which included a multinational, comparative study on ecology and environmental education approaches in textbook manuals.[82] The findings of this study presented a collected image of Environmental Education where the planet was mainly seen as a resource for humankind, while scarce emphasis was given to the human role in solving environmental problems. Further, ethical controversies were underrepresented to socio-economic ones. The manuals exhibited an unlimited trust in science and technology solutions, without references to alternative perspectives or views, and people's participation in decisions concerning environmental policies were left unmentioned. The conclusion of these findings are according to Carvalho et al., that there needs to be "a revision of the content of the subjects (specifically of sciences) in view of educating cognitively equipped citizens for a more sustainable future, capable of understanding and critically using the knowledge that the scientific community is making available to the public."[83]

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[80] Tracana and Carvalho, "Ecosystems, Pollution, and Use of Resources," 1.
[81] Jennifer Campbell Bradley, Tina M. Waliczek, and Jayne M. Zajicek, "Relationship between Environmental Knowledge and Environmental Attitude of High School Students,"*The Journal of Environmental Education* 30, no. 3 (1999).
[82] G. Carvalho et al., "Biohead-Citizen: Biology, Health and Environmental Education for Better Citizenship, Final Report," in *Brussels: FP6, Priority* (2008), accessed May 20, 2016, http://cordis.europa.eu/result/rcn/47881_en.html.
[83] Ibid., 43.

Using the analysis grid constructed for the Biohead-Citizen project, several accompanying studies were carried out using textbook analysis as a primary tool. For instance, the studies by Rosa Branca Tracana et al. and Claudia Ferreira et. al. are worth mentioning.[84] The results of these studies generally coincided with the conclusions of the main Biohead project. However, Tracana and Carvalho's study showed that the topics of Ecosystems, Pollution, and Use of Resources presented a mainly ecocentric perspective (humans as guests of nature and not its owner) in the textbooks of 14 European countries. But even though information of how nature needs to be preserved as it is were expressed, this was however not accompanied by conveyals of what measures people must take to ensure that nature is not destroyed.[85] From this can be taken that in these European textbooks measures have been taken towards conveying the nature-centred values that are in line with guidelines for sustainable development, but these are not carried through when it comes to measures of environmental responsibility.

In Sweden, Leif Östman has analysed science books, while Johan Larsson, in a thesis submitted to the University of Uppsala, has analysed geography books. Both examine the expressions of nature view and humans' relation to nature.[86] Östman found that the science textbooks were characterised by a scientifically rational discourse which included anthropocentric environmental ethics, where nature does not possess any intrinsical value.[87] Larsson used ideology analysis with ideal types to show that content concerning environmental problems expressed statements of late modern anthropocentrism with some ecocentric exceptions. Biocentrism was found to be nearly non-existent in the geography

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[84] Rosa Branca Tracana et al., "Analysing the Theme of Pollution in Portuguese Geography and Biology Textbooks,"*International Research in Geographical and Environmental Education* 17, no. 3 (2008); Rosa Branca Tracana et al., "Biodiversity in School Textbooks of 13 Countries," (2008); Tracana and Carvalho, "Ecosystems, Pollution, and Use of Resources."; Cláudia Ferreira et al., "Pollution in Textbooks from 16 Countries: Socio-Economic and Ethical Issues; Individual or Social Responsibility?," (2008); Rosa Branca Tracana and Graça Simões de Carvalho, "Ecocentric Emphasis in Environmental Education Subtopics (Ecosystems, Pollution and Use of Resources) in Textbooks of 14 Countries," (2010).
[85] Tracana and Carvalho, "Ecocentric Emphasis in Environmental Education Subtopics (Ecosystems, Pollution and Use of Resources) in Textbooks of 14 Countries," 4.
[86] Johan Larsson, "Människan, Livet & Ekosystemen - En Analys Av Miljöetiskt Innehåll I Läroböcker Ämnade För Geografi" [The human, the life and the ecosystems - an analysis of the environmental ethical content in textbooks intended for geography] (Thesis, Uppsala university, 2011); Leif Östman, "Socialisation Och Mening: No-Utbildning Som Politiskt Och Miljömoraliskt Problem" [Socialization and meaning: Science education as a political and environmental moral problem] (PhD dissertation, Uppsala University, 1995).
[87] Östman, "Socialisation Och Mening."

textbooks' descriptions, something which, according to Larsson, runs counter to the intentions of the school policy documents in Sweden.[88]

This type of research has not been exclusive to the Euro-American academical sphere. Maryam Allah Pour and Naser Saraj Khorami have done a content analysis of Iranian Science textbooks with regard to conservation of the environment, in which they refer to earlier, similar research done in Iran the latest decade. Their findings show that the topic of environmental conservation lacks horizontal and vertical relationships, and that the schoolbook content should increase peoples' recognition of mutual social, economic and cultural reactions and enhance the understanding of human's relationship with the environment.[89]

A similar study, with a specific focus on environmental values and attitudes in textbook content, has to my knowledge yet to be carried out in a Chinese context. In their assessment of Chinese Environmental Education, McBeath and McBeath indicate several areas where further research is needed. They call for further analysis of the comprehensiveness of environmental issues incorporated in the curriculum, to gain better understanding of embedded values and to which degree they reflect those of the state, science and global environmental goals.[90]

In their 2014 book *Environmental Education in China*, McBeath et al. touch upon many aspects of environmental education in China (such as teacher training, environmental NGOs and media's involvement). Featured is also a case study-based presentation of the status of environmental education in China's primary and middle schools. The focus of their presentation is on the implementation and practice of EE. However, one of the foundations for this practice, the textbook, is evaluated only in a general summary.[91]

This chapter has defined the central concepts of 'environmental attitude' as both awareness about the environment and the perspectives on it, and 'values' as broad, fundamental norms shared by members of a society. The importance of values for environmental attitudes are traced to how they help to define peoples' relation to the environment. The field of

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[88] Larsson, "Människan, Livet & Ekosystemen," 32-34.

[89] Maryam Fath Allah Pour and Naser Saraj Khorami, "A Content Analysis of Sciences Coursebooks in Regard with Conservation of the Environment at Elementary Schools in 2013-14 School Year,"1, no. 5 (2015): 45.

[90] McBeath and McBeath, "Environmental Education in China: A Preliminary Comparative Assessment".

[91] McBeath et al., *Environmental Education in China*, 51-57.

environmental ethics provides the categorisations needed to determine which human-nature relationship is promoted in the textbooks, mainly through the key division between human-centred and nature-centred environmental views. This human-nature relationship is chosen as the first conception with which to characterise the environmental attitudes that Chinese authorities try to promote through compulsory textbooks. The second conception is that of environmental responsibility, divided into individual responsibility and social (state) responsibility.

3 Research Methodology

This chapter describes and discusses the process of the analysis as well as the motivation behind the choices that have been done during the process.

3.1 Case Study Research

This study is structured as a case study using qualitative content analysis with categorisations described as ideal types. Robert K. Yin defines the case study research strategy as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used.[92] Yin further asserts that the distinctive need for case studies arises out of the desire to understand complex social phenomena.[93]

The social phenomena that is investigated in this study is how political authorities attempt to build environmental consciousness in contemporary China. The case chosen for this investigation is compulsory school textbooks. This has been chosen because of the formal and formative qualities they have as communicators of offically sanctioned facts and attitudes. But just as case studies in their very essence are limited to the scope of the case in question, this study can only be generalised to the scope of the authorship and readership of the chosen textbooks. However, as Frederick Erickson argues, the general lies in the particular, and what we learn in a particular case can be transferred to similar situations by the reader. Case study research can be generalisable, not by presenting abstract universals but through the use which its findings are put.[94] Hopefully the findings of this case study can contribute to the understanding of the phenomenon in question: what environmental attitudes Chinese authorities promote through compulsory textbooks.

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[92] Robert K. Yin, *Case Study Research : Design and Methods*, 4 ed., vol. 5, Applied Social Research Methods Series (Thousand Oaks, CA: Sage, 2009), 13.
[93] Ibid., 3.
[94] Frederick Erickson, "Qualitative Methods in Research on Teaching," in *Handbook of Research on Teaching*, ed. M.C Wittrock (New York: MacMillan, 1986), 130.

3.2 Qualitative Content Analysis

Florian Kohlbacher argues that qualitative content analysis is a useful tool for analysing data material in case study research. Among the contributions of using qualitative content analysis in case study research he mentions that the procedures of content analysis – which in a structured manner reduces complexity and filters out the main points of analysis – perfectly fits the goal of case study research to help to understand complex social phenomena.[95]

Hsiu-Fang Hsieh and Sarah E. Shannon define qualitative content analysis as:*"a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns."*[96]

Research made with qualitative content analysis focuses on the content or contextual meaning of text. Weber describes how a central idea in content analysis is to classify larger amount of text into an efficient number of content categories. These categories, consisting of either words, phrases or other units, represent similar meanings. The similarity of the categorisation depends on the purposes of the study, but may represent either explicit communication such as the precise meaning of words, or implicit communication such as grouping together several words implying concern with a certain concept.[97] It is the latter which will be used in this study.

3.3 Ideal type analysis

The content categories used in this study are classified according to ideal types. Ideal type is a typological term most closely associated with the German sociologist Max Weber. Ideal type analysis springs out from the position that the ideal types chosen are not there in reality, but are constructed extreme images of the phenomenon in question. The ideal types are meant to clarify important attributes of the phenomenon; a simplified description that is not, however, a falsification.[98] Using the ideal type as an analytical instrument allows for finding

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[95] Florian Kohlbacher, "The Use of Qualitative Content Analysis in Case Study Research,"*Forum Qualitative Sozialforschung / Forum: Qualitative Social Research* 7, no. 1 (2006): 24-25.

[96] Hsiu-Fang Hsieh and Sarah E. Shannon, "Three Approaches to Qualitative Content Analysis,"*Qualitative health research* 15, no. 9 (2005): 1278.

[97] Robert Philip Weber, *Basic Content Analysis*, vol. 07-049, Sage University Papers on Quantitative Applications in the Social Sciences (Newbury Park: Sage Publications, 1990), 12.

[98] Peter Esaiasson et al., *Metodpraktikan: Konsten Att Studera Samhälle, Individ Och Marknad* [Method practice. The art of studying society, the individual and the market] (Norstedts juridik, 2007), 154.

characterising features in the empirical data by comparing it with the extreme theoretical ideal feature, enabling an assessment of to which degree a phenomenon resembles the typical.

For this thesis an analysis tool has been formulated, consisting of two sets of ideal types, one for each of the conceptions 'human-nature relationship' (anthropocentric and naturocentric, table 1) and 'management-responsibility' (individual and social, table 2). This has been modelled on the classifications provided by Stenmark,[99] Caravita et al.,[100] and Vilkka.[101]

Table 1: Ideal type characteristics for the conception 'human-nature relationship'

Ideal type:	Anthropocentrism	Naturocentrism
Relation between man and nature:	Nature should be controlled and nurtured on behalf of humans	Adaptation and consideration for other life
Morally significant:	Focus on humans today and in the future	Focus on all living species and ecological entireties
View on technology:	Unlimited trust in science and technology solutions	Principle of precaution
Evaluation of impacts, costs, priorities	Human benefits	Ecological benefits
Dimensional emphasis:	Emphasis on economic aims	Emphasis on social, cultural and ethical aims

Table 2: Ideal type characteristics for the conception 'management-responsibility'

Ideal type:	Individual focus	Social focus
Relation to change:	Emphasis on change in individual behaviours	Emphasis on change in life style on society level
Adhesion to moral norms:	Descending from community involvement	Descending from sources of authority
Responsibility and literacy:	Moral	Political

An important starting point for a text analysis is asking analysis questions to the chosen texts, questions that correspond to the main research questions. The variable values estimated to characterise the different ideal types shown in the chart above are turned into the answers to these questions. These questions were adjusted to each chosen environmental theme, as is described in the analysis chapter. The analysis was then carried out for each chosen environmental theme, where the analysis tool was used to estimate which variable value the text highlighted the most. The classification process within the analysis then formed the basis

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[99] Stenmark, *Miljöetik Och Miljövård*, 133-134, 186-187.
[100] Caravita et al., "Construction and Validation of Textbook Analysis Grids," 108-112.
[101] Vilkka, *The Intrinsic Value of Nature*, 59, 8, 32-33.

for the discussion of what constitutes the environmental awareness and attitudes that are promoted in the texts, the research questions that form the inquiry of this study.

3.4 Selection of analysis data

As this study aims to investigate the ideological and ethical basis to environmental issues in contemporary China, the outset for the selection was compulsory schoolbooks. Compulsory schoolbooks not only represent the view of the school system as a whole, in China they are all either written or approved by governmental institutions, either on a regional (province) level, or nationally by the Ministry of Education.[102] As such, they can here be viewed as conveying an officially approved version of both environmental values and attitudes.

Among the compulsory textbooks available, the selection consisted of middle school (junior second education) textbooks, ranging from school year 7 to 9. The reason for choosing this age range is that it is the three last years of compulsory education. These school years include more specialized courses where environmental content can easily be incorporated into the textbooks – such as geography and biology. In addition, similar research done on EE content in other countries indicate that textbooks for 12-15 year old pupils have the most occurrences of environmental issues compared to 6-11 or 16-18-year olds.[103]

A few of the compulsory middle school courses; math, chinese and painting, were left out of the selection due to capacity concerns. I also did not expect them to include any significant environmental subject matter, a judgement based in part on the summary of the integration of national curricular standards of EE across the disciplines in Chinese primary and middle schools done by McBeath et al.[104]

The selection to be analysed consisted of the school books belonging to the remaining 7 compulsory school courses : biology (year seven to eight) , geography (year seven to nine), history and society (year seven to nine), chemistry (year nine), physics (year eight to nine), moral education (year seven to nine), as well as science books (year seven to nine). In all, thirty books were selected, with a total page count of 3360.

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[102] Joanne Smith Finley and Xiaowei Zang, *Language, Education and Uyghur Identity in Urban Xinjiang* (Routledge, 2015), 117.
[103] See for example Tracana and Carvalho, "Ecosystems, Pollution, and Use of Resources."
[104] McBeath et al., *Environmental Education in China*, chap. 4, table 3.1.

All school subjects but one have nationally used and approved compulsory textbooks that are designed to meet the national syllabus and curriculum. The nationally used books analysed are published by People's education press (人民教育出版社 Rénmín jiàoyù chūbǎn shè), the specialized publishing house directly under the leadership of the Ministry of Education of the PRC. These are the books used by middle schools all over China as they have been approved by the Ministry of Education. The science subject is arranged provincially, with the aim to reflect local circumstances. Being a student at Zhejiang University between 2015 and 2016, I chose the Science books provided to Zhejiang students. These science books are from Zhejiang Education Press (浙江教育出版社 Zhèjiāng jiàoyù chūbǎn shè). As a collection, all books analysed here are compulsory text material for middle school students in Zhejiang.

It was of importance to find the most current school books possible. This is of extra importance when studying environmental topics, as they have been evolving and changing within the curriculum as well as having been given more emphasis from the authorities of later years, for example through the National environmental awareness education platform.[105] All textbooks analysed in this thesis, while first published between 2012 and 2015, are the latest editions as of January 2016.

3.5 Execution and delimitation of the analysis

The coding and categorisation stage of the analysis was undertaken with the help of the computer analysis program NVivo.[106] The complete set of textbooks was scanned and turned into readable textfiles using text-recognition software, OCR. It was then put into NVivo, where the text could be searched for keywords and themes. The software further facilitated the coding process; text passages considered to belong to the chosen themes were coded into the different conceptions and their ideal-type variables. This keyword-in-context approach was done using the program to search for each keyword, and then every hit was manually read and categorised into the program again. The advantage of using an analysis software is the opportunity to achieve a systematic categorisation, a crucial part of content analysis and especially helpful when the amount of data is large. It also prevents missing certain words and passages of text, increasing the confidence level and reliability in the coding process. Generally, the use of analysis software enables analysis of larger amounts of text by finding

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[105] Ministry of Environmental Protection (2011).
[106] Nvivo qualitative data analysis Software; QSR International Pty Ltd. Version 11.

the relevant keywords directly. However, when working with software to analyse large sets of data (three thousand plus pages of text) in this manner, there is a risk of missing possible relevant content which does not feature the chosen keywords. In order to minimize the risk of leaving out relevant content, the environmental themes chosen in the analysis are more or less directly connected to their respective keywords, i.e. the themes are not likely to be discussed in the books without using the keywords. The step of using optical character recognition (OCR) also provides a potential source of errors, in that the software may misinterpret possible instances of a keyword. This was checked by a manual count in a textbook for one keyword, this was then compared to the keyword count by the software, after which the process of using the software was judged to be valid.

As EE is not a compulsory school subject on its own, but a subject spread over several subjects, my analysis started with an initial mapping among the entire selection of middle school textbooks. By using keywords related to environmental education, a search was done to find environmental content in the 30 school books.[107] The keywords combined could point towards the concentration of environmental content in the different books. The first keyword-based query confirmed the fact that environmental content is spread out over the different subjects, with some topics appearing more frequently in some books while other topics are frequent in other books. (For reference, see appendix 3: "Chart: keyword search for environmental topics in all textbooks").

This initial mapping resulted in an overview of which keywords/topics are useful in finding environmental content in the books, and which books seem to have a lot of environmental content. One interesting find is that the books within the same subject displayed very different levels of environmental content at the different grades. For example, the textbook Science 9b contains significantly more environmental content than 9a. However, this form of mapping is only cursory, and an extended approach is necessary to delve deeper into the curriculum. The weakness with a simple keyword search is the risk of wrong context. Especially for more general words such as 'nature' 'organism' and 'environment', the usage can be related to other content than environmental. Therefore, a manual read-through was carried out using the results from the initial keyword search. This revealed where the chosen keywords were featured in the context of environmental education. This formed the basis for the delimitation

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[107] Keywords based in part on Caravita et al., "Construction and Validation of Textbook Analysis Grids."; (2003); Ministry of Environmental Protection (2011).

of the analysis, which meant finding topics or *themes* that not only refer to environmental content but also deal with environmental problems and challenges, i.e. the negative consequences related to man's interaction with nature and the possible solutions to them. The selection of and focus on certain environmental themes was aimed at reducing the width of the analysis and finding in-depth text material to analyse, ultimately with the aim to investigate how the textbooks relate to these topics from an environmental ethics perspective. These are themes which in themselves are value-laden, therefore they can hopefully convey the systematic opinions and values the textbooks express about humans relation to nature.

This process led to the selection of three environmental themes, which all can be said to appear more or less explicitly in passages of texts which deal with environmental problems and challenges: 'pollution', 'sustainable development' and 'use of resources'. These themes showcased the strongest claims related to human-nature relationship and action, and responsibility to nature. Both pollution and use of resources have been referred to as topics that particularly involve values and beliefs, topics central in an education for a sustainable future.[108] The topic of sustainable development is interesting because it is a multifaceted concept which is founded on the interrelatedness of society, economy and environment,[109] subject content offering opportunities for viewpoints on what humans' relation to nature should look like.[110]

After the initial keyword search and selection of environmental themes, these themes were subject to a manual coding process, where passages of text within each theme referring to environmental problems, challenges and management of the theme were identified. This was followed by a classification coding according to the two conceptions of 'human-nature relationship' and 'management-responsibility'. After identification and classification, these passages of texts were subjected to an analysis guided by the questions of which ideal types of standpoints they expressed. Ultimately, a summarized judgement of the identified text was carried out, together with the selection of representative paragraphs pointing towards the characterising features leading to the judgement of these standpoints. The selection of citations from the texts has been judged as exhibiting explicit or implicit values and normativity concerning humans' relation to nature (environmental ethics).

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[108] Caravita et al., "Construction and Validation of Textbook Analysis Grids," 108.
[109] Olsson et al., "Young People's 'Sustainability Consciousness'," 15.
[110] Larsson, "Människan, Livet & Ekosystemen," 5.

3.6 Validity and reliability

High validity and reliability is important in any empirical social research.[111] For content analysis, reliability can be achieved by: coding more than once by the same person (stability), coding by a second person and obtaining the same results (reproducibility) and comparing the coding to a standard (accuracy).[112] For this study, a second coding or coding by a second person was opted out of because of both time constraints and the premises of the thesis (a one-person study). Furthermore, there was no standard coding available for this circumstance, making accuracy assessment impossible. However, the absence of these factors does not necessarily mean that the study is unreliable; it means that the quality of the study relies more on the coder to be meticulous and careful during the coding process. As far as possible, reliability has also been considered by comparing passages of texts coded into the same variable value to each other to avoid unsystematic measuring errors.

Validity is a central problem within empirical social research, and deals with the recurring problem of "translating" between the empirical research and the theoretical level.[113] Most content analyses rely on face validity, which comprises the correspondence between the researcher's definitions of concepts and the categories that measure them.[114] This study also relies on face validity because of a lack of other studies with which to correlate the data. Some construct validity is, however, gained by using operationalisations provided in the study made by Caravita et al.[115] In the words of Weber, "A measure has construct validity to the extent that it is correlated with some other measure of the same construct."[116]

As this study has been done on Chinese-language material, semantic validity needs to be considered; the implication that a native speaker would agree with the chosen categories.[117] This study does not provide any data on whether native Chinese speakers would agree with the chosen categories and codings. The semantic validity can however be tested by the excerpts of text with translations that are provided in appendix 2. These excerpts, with references to the pages in the textbooks from which the categorisation is built, along with the

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[111] Esaiasson et al., *Metodpraktikan*, 61.
[112] Weber, "Basic Content Analysis," 17.
[113] Esaiasson et al., *Metodpraktikan*, 61.
[114] Weber, "Basic Content Analysis," 18-19.
[115] Caravita et al., "Construction and Validation of Textbook Analysis Grids."
[116] Weber, "Basic Content Analysis," 19.
[117] Ibid., 21.

quotes provided in the analysis, also heeds the requirement of intersubjectivity in the study. It allows for external inspection and assessment of the interpretations made of the material.

This chapter has described the structure of the analysis as a case study of compulsory middle school textbooks, with the method of qualitative content analysis using categorisations described as ideal types. The choice of compulsory school textbooks is based on their importance as mediums of officially sanctioned knowledge and attitudes. Qualitative content analysis is chosen as a method as it enables a structured selection of main points in the content, important to help understand such a complex social phenomenon as environmental attitudes. The ideal types are meant to clarify important attributes of different views on the human-nature relationship and environmental responsibility. They are used in the analysis tool formulated for the content analysis of environmental themes. It consists of two sets of ideal types, one each according to the conceptions of 'human-nature relationship' (anthropocentric and naturocentric) and 'management-responsibility' (individual/social). The selection of analysis data consists of compulsory textbooks for Chinese middle schools, year seven to nine, which are in use in the school year of 2015—2016. The analysis was carried out by first doing keyword search of environmental content in the analysis data, a process that led to the selection of three environmental themes that feature environmental problems and challenges which can be viewed according to the chosen conceptions: the themes of pollution, sustainable development and use of resources. Finally, questions of validity and reliability have been addressed, mainly by referring to the excerpts of text that are provided in the appendices, which provides some semantic validity as well as intersubjectivity.

4 Analysis – environmental themes and the conceptions of human-nature relationship and environmental responsibility

This chapter features a presentation of the process of analysis, as well as a presentation of the results. It is arranged after each chosen theme, where every theme is presented, and the findings according to the two conceptions are displayed. The findings of the analysis is illustrated with selected quotes from the primary sources, meant to illustrate the classification according to ideal types. The chapter ends with a conclusive discussion on the conceptions of human-nature relationship and environmental responsibility in the environmental themes as a collection.

4.1 Theme: Pollution

The first topic examined in-depth of is pollution. The Chinese word for pollution is (污染 wūrǎn) meaning pollute; contaminate. An initial word search revealed all of the instances of 'pollution' present. A manual read-through of the found instances was done in order to find the theme of pollution as the harm that contaminants entering the environment does to man and nature; its origins and implications. This way of investigating the theme of pollution directly involves environmental problems connected to responsibility, management and humans' relation to nature. This means that more 'neutral', scientific information, for instance on the chemical composition of pollutants, was not the focus of the coding process. For the conception of responsibility (social – individual), the theme was searched for how pollution is suggested to be managed and prevented. For the other conception 'human-nature relationship', the theme was searched for impact – who and what is affected by pollution. Is there a focus on human or ecological impact? The result of this coding selection showed that the theme of pollution was most widely discussed in the subjects Chemistry and Science. The distribution of the coding selection through the books is displayed in figure 1.
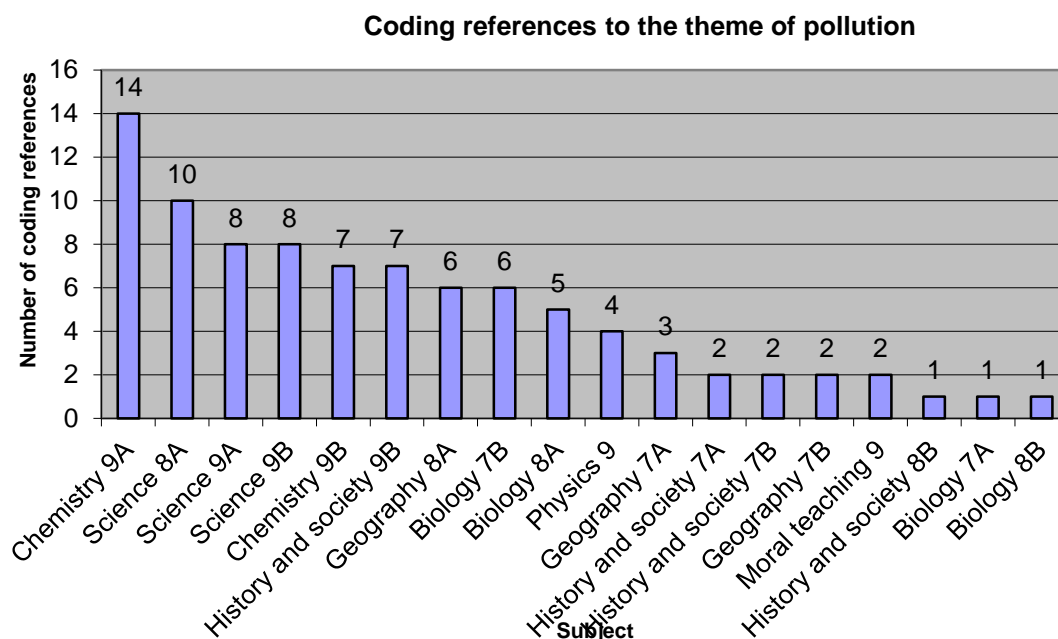
Figure 1: Result of coding passages for the theme pollution (污染) in all textbooks.

The most common topic within the theme of pollution is air pollution (空气污染 kōngqì wūrǎn), and secondly water pollution (水污染 shuǐ wūrǎn). For further information on the context of the coded passages and references to the respective books, see appendix 1— "Data selection according to theme". The next step of the analysis process was to code the selection according to the ideal types with the help of the analysis tool, by looking at how the passages describe the human-nature relationship. The ideal type distribution is displayed in Table 3.

Table 3: Results of coding passages for the theme "pollution" (污染) into the ideal types 'human-nature relationship' and 'management-responsibility', including page references to the respective textbooks

Human-Nature relationship		Management-Responsibility	
Anthropocentric	**Naturocentric**	**Social**	**Individual**
Science 8b, 119-120, 122-124	Science 8b, 120	Science 8b, 120, 124	Chemistry 9a, 70, 72, 73
Science 9a, 39-40	Science 9a, 53	Science 9a p. 67, 68	Chemistry 9b, 107
Science 9b, 67-68, 105	Science 9b, 67	Science 9b, 69	Geography 8a, 63
Chemistry 9a, 30, 71	Chemistry 9a, 30	Chemistry 9a, 30,71	Physics 9,180
History and Society 7a, 72	Chemistry 9b, 19, 107	Chemistry 9b, 107	
History and Society 8b, 83	Geography 7b, 98	History and Society 8b, 55	
History and Society 9b, 104	Geography 8a, 48	History and Society 9b, 108	
Geography 7a, 51	Physics 9, 178-179	Geography 8a, 79	
Moral teaching 9, 54	Biology 7a, 75	Biology 7b, 110	
	Biology 7b, 104, 109		
	Biology 8a, 5,26		
	Biology 8b, 16		

4.1.1 Human-nature relationship in pollution content

Descriptions relating to humans' relationship to nature within the theme of pollution are to a large degree related to the impact of pollution. Although the analysis found more instances coded into of 'impact on other life and ecosystems' (naturocentric) than 'impact on humankind' (anthropocentric) as shown in table 3, the descriptions of the impact of pollution featured more strongly and specifically how it affects humans. Especially the most featured topic, air pollution, mentions almost exclusively the way in which air pollution threatens human health, way of life and development. This is exemplified by the introductory passage in the chapter '空气污梁与保护' (Kōngqì wū liáng yǔ bǎohù) 'Air pollution and protection' in Science 8b:

> The thin atmosphere surrounding the earth is a natural resource shared by all humankind, under its protection we live and multiply. However, air pollution is threatening the survival and development of human beings. It is our duty to protect the atmosphere.[118]

'Impact on other life and ecosystem' is also featured throughout the books, but the tendency overall is that references to this term are subordinate to the impact on human life. This can be seen in the level of detail in which the two different viewpoints are presented. The impact on human life-viewpoint is more often exemplified by elaborations on how and why humans are affected by pollution, such as descriptions of how particle matter in the air affect human health.[119] When it comes to impact on other life and ecosystems, the segments are mostly short formulations describing general negative effects on the environment as a whole, usually expressed together with impacts on humans. This can be exemplified by the passage concerning acid rain:

> Acid rain causes serious damage to living things. For example, acid rain can impose chemical reactions to the soil nutrients, which can not be absorbed by plants; acid rain can acidify rivers and lakes, and then affect the growth of aquatic organisms, for example fish and shrimps, and even cause their death; acid rain can cause water acidification, which affects the drinking water and then threatens people's health; acid rain also harms plants, buds and leaves, in extreme cases it could cause the death of plants. Just as acid rain, other environmental pollution would threaten living things including humans. For example, toxic and hazardous substances discharged into the water may increase the probability of mutation-induced cancer when in contact with the human body, various heavy metal contaminants existing in water and soil, such as mercury, cadmium

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[118] See Appendix 2, quote no 1.

[119] See for example Appendix 4.7 (Geography 7a), 51-52; Appendix 4.28 (Science 8b), 119-126.

and arsenic, can be accumulated and passed along the food chain, ultimately endangering human health.[120]

This description of the negative effects of acid rain includes impact on other life by mentioning harm to plants and biological life. The ultimate dangers are, however, those directly threatening to humans, making naturocentric viewpoints subordinate to anthropocentric ones in this case.

4.1.2 Management and responsibility in pollution content

The second conception analysed within the theme of pollution is that of management, responsibility and prevention. Specifically, the analysis focuses on whether social or individual responsibility is highlighted, and whether there is a reliance on improvement in technology or social/individual behaviour change in the prevention of pollution. This item related to human management of pollution is less referred to in the sources than the previous item of negative impact (anthropocentric vs naturocentric). From an educational perspective, this could be viewed as a rather skewed proportion when it comes to teaching not only awareness about environmental problems, but also an understanding of the protection of the environment and promotion of environmental sustainability.

As shown in table 3, there are more referrals to social than individual responsibility. Regarding what has been done to reduce pollution, only state and social efforts are highlighted. On what needs to be done against pollution, the clear focus is on social/governmental efforts. Among the approaches to solve pollution problems there is a stronger focus on science and technological solutions than on precaution and behaviour change. The focus on state efforts and trust in technology can be illustrated by this text about measures against air pollution in Science 8b:

> In order to have a blue sky there needs to take all kinds of active measures to control air pollution. First of all, the emissions of pollutants need to be reduced. To achieve that purpose, we need to explore non-polluting energy sources such as solar energy, wind energy, hydro energy, and low-polluting energy sources, such as natural gas; further, adopt fuel pre-treatment (such as desulfurization of coal), improve combustion technology can also reduce the amount of emission. Second, we need to make proper plans of industrial zones and non industrial zones. To avoid a severe pollution in certain area, we need to make reasonable site selection and planning

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[120] See Appendix 2, quote no 2.

of urban centers and industrial zones, stop the excessive concentration of emissions in one region to prevent having overlapping pollution.[121]

There are however openings towards individual responsibility and behavioural change in parts of the texts. Most of them are quite general in nature, urging for reduced emissions and water saving. One of the few specific appeals for individual behaviour change is mentioned in relation to synthetic materials, plastics and so called "white pollution":

> To solve the "white pollution" problem, the following aspects should be processed: 1. Reduce the unnecessary use of plastic products, such as using cloth bags instead of plastic bags; 2. Reuse certain plastic products, such as plastic bags, plastic boxes; 3. Use biodegradable plastic material, such as microbial degradation plastic and light degradable plastics; 4. Recycle wasted plastics.[122]

With relation to responsibility, a lot of the passages refer to a "we" (我们 wǒmen) that needs to protect the environment.[123] Rhetoric-wise, these passages could be interpreted as an intention to incorporate a shared responsibility for nature and urge for behavior change. However, the occurrances of including-we are used in such general terms that, while perhaps instilling a sense of shared (individual and social) responsibility, they can not be interpreted as urging for individual behavioral change in any larger sense. Examples of this are:

> "Air is very important to human beings and all kinds of life. To protect the air, we need to take effective actions."[124]

> "Confronted by environmental problems including resource constraints, severe environmental pollution, the degradation of the ecosystem, each of us need to embrace the idea of respecting, comply with and protect nature; also to conserve resources, protect the environment and then build our homeland. Currently, environmental protection organizations and monitoring stations have been established in various places in our country to solve the environment pollution problems. In order to realize the goal of natural ecological system and environmental protection, we must carry out the policy of " combining prevention with control with emphasis on the first."[125]

Some passages in the texts highlight more personal responsibility however. These promote recycling, reuse and resource saving. Despite not given much space in the textbooks, these references represent a promotion of civic participation in the management of the environment and prevention of pollution. This is in correspondence with the goals of environmental

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[121] See Appendix 2, quote no 3.
[122] See Appendix 2, quote no 4.
[123] See Appendix 2, quote no 5,6,7.
[124] SeeAppendix 2, quote no 5.
[125] See Appendix 2, quote no 6

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education. There are no references to individual behavioral change concerning the most featured topic in the book; air pollution. Instead, the focus seems to be on spreading awareness about the severity of air pollution. Apart from general urges to "reduce emissions", there are no mentions of introducing the "low carbon" choices that can be made in peoples' daily life.

4.2 Theme: Sustainable Development

As a concept, the term Sustainable Development (SD) was established in 1980 through channels such as IUCN and WWF. Crucial to the spreading of the concept was the Brundtland report in 1987, which brought environmental, social and economic dimensions together into a single concept.[126] The report includes a definition of SD: "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs". [127]This is only one of many definitions of SD, but at the core of most of them lies the tension between the three dimensions of ecology, society, and economy. SD was incorporated into education internationally through UN efforts, most importantly the United Nations decade of education for sustainable development (DESD 2005—2014). Through UN policies, SD in an educational context constitutes many different sub-themes that highlight either the environmental, economic or social dimension.[128]

Sustainable development is an interesting concept when investigating environmental education and environmental awareness for several reasons. First of all, it is a multifaceted concept; the complex relationships between the economy, society and environment involves aspects that could be found throughout the curricula. As such, I expected to find sustainable development mentioned in discussions on for example poverty reduction, population limitation, health and equality issues. The presence of SD throughout the curricula can indicate the promotion of an environmental awareness that is incorporated into all teaching. Secondly, the interrelatedness of society and environment within the concept of sustainable development directly connects to the theme of human-nature relationship. As the needs of the future is at the core of SD, the question of management and responsibility (second theme) is central in this concept.

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[126] Olsson et al., "Young People's 'Sustainability Consciousness'," 15.
[127] Brundtland et al., "Report of the World Commission on Environment and Development," 43.
[128] Olsson et al., "Young People's 'Sustainability Consciousness'," 17-18.

As before, divisions can be made between anthropocentric and ecocentric focus in the texts. These positions correspond to what Hodge and Dunn in their 1992 book *Rural Change and Sustainability* have, respectively, soft and hard sustainability. The characteristics of soft sustainability correspond to anthropocentric concerns, with a focus on prevention of catastrophe for human society, acceptance of science and modern technology. Hard sustainability on the other hand, promotes a society in harmony with the ecosystem and questions science for seeking alternative technologies, both concerns correlating to naturo(eco)-centrism. Hard sustainability also promotes a shift to new systems and institutions, while soft sustainability wants marginal changes made to existing systems and institutions.[129] While not using the terms soft and hard sustainability, the same characteristics of anthropocentric and naturocentric concern related to sustainable development will be used in the following analysis. The other theme, management and responsibility is again divided into individual vs social (state) focus.

The Chinese term for sustainable development is (可持续发展/持续发展 (kě) chíxù fāzhǎn). After an initial word search, a manual coding process coded the passages with the theme of sustainable development present, as shown in figure 2.
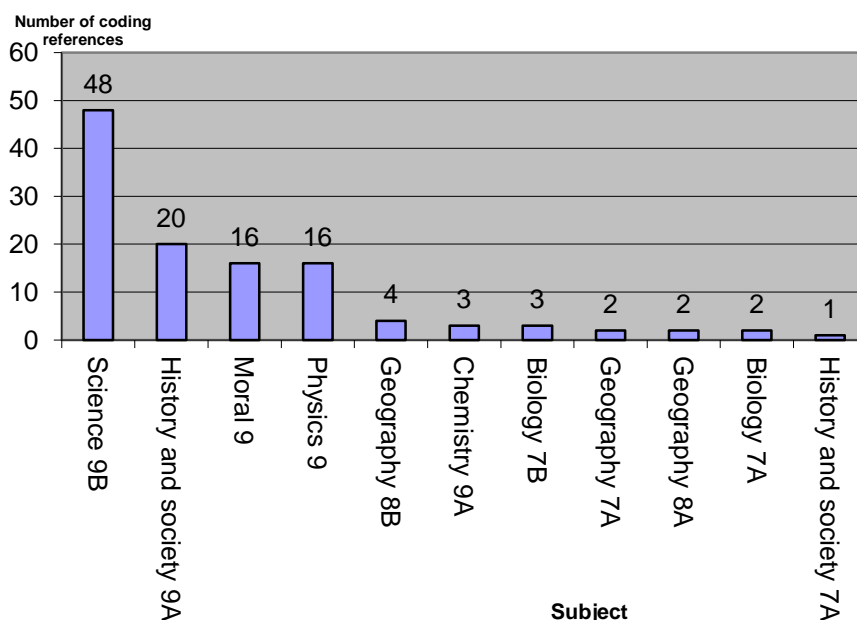
Figure 2: Result of coding selection for the theme sustainable development (可持续发展/持续发展) in all textbooks.

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[129] Quoted in Ian Drummond and Terry Marsden, *The Condition of Sustainability* (Routledge, 2005), 7-8.

The coding selection for 'sustainable development' confirmed that the concept is used across the subjects (figure 2). The number of references are however unevenly spread out and concentrated within only a few books, leaving the greater amount of books without any mention of the term. This can indicate that SD content is treated only as its own theme, instead of referred to in other content.

The closer analysis revealed in which contexts the term (and theme) sustainable development is used.[130] In three books, Science 9B, History and Society 9B and Moral teaching 9, the concept is featured in depth, with entire chapters devoted to it. These three different contexts reveal that SD is considered to be not only a subject important to the natural sciences, but involves social and ethical issues as well.

SD is most commonly used in relation to passages about resources and energy. Most definitions of sustainable development place a central significance on the role of resources and many visions of unsustainability are founded on the contention that resources are being degraded or destroyed. Another core issue to sustainable development in the books is population restriction, described as fundamental to establish sustainability. For further information on the context of the coded passages and references to the respective books, see appendix 1. The ideal type coding distribution according to how the passages describe the human-nature relationship and responsibility is displayed in table 4.

Table 4: Results of coding passages for the theme "sustainable development" (可持续发展/持续发展) into the ideal types 'human-nature relationship' and 'management-responsibility', including page references to the respective textbooks in all textbooks.

Human-Nature relationship		Management-Responsibility	
Anthropocentric	**Naturocentric**	**Social**	**Individual**
Science 9b, 121, 132, 138, 140-143	Science 9b, 138	Science 9b, 138, 141, 142	Science 9b, 132, 136, 137, 138
Chemistry 9a, 101	History and Society 9b, 111	History and Society 9b, 111, 114	Moral teaching 9, 59, 101
Geography 8b, 30, 101, 102	Geography 7a, 4	Moral teaching 9, 58	
Moral teaching 9, 55, 56	Geography 8a, 69		
Physics 9, 180	Moral education 9, 56, 57		

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[130] See Appendix 1.

4.2.1 Human-nature relationship in sustainable development content

Descriptions that treat humans' relationship with nature within passages of sustainable development can overall be described as using anthropocentric viewpoints – nature should be controlled and nurtured for humans. The anthropocentric view on sustainable development can be exemplified by this excerpt from under the title "The meaning of sustainable development":

> Sustainable development encourages economic growth, further improves the living standards of contemporary people and enhances national power through economic growth. Sustainable development does not only put emphasis on the quantity of economic growth, but also pursues the quality of economic growth. Sustainable development meets the needs of human beings, improves human life, improves human health, creates a highly developed spiritual life and material life in the social environment.[131]

This passage focuses solely on the human benefits of SD with a clear focus on the development part. In the passage above, as in other passages, the sub-themes to SD seem to highlight the economic and social dimension of SD rather than the environmental dimension.

One difficulty with analysing the theme of SD is that the concept is, in many cases, used in very general terms, making it hard to uncover the schoolbook's perspective on what sustainable development really means, and how the reader should relate to the concept. There are a lot of slogan-like referrals to that sustainable development should be carried out, but not much mention of how or why. This sort of presentation complicates an interpretation of the environment-ethical justification of sustainable development, about the moral significance of humans, creatures or ecosystems.

The descriptions that do refer to measures of sustainable development have a strong focus on science and technology, as opposed to principles of precaution and restriction. This can be exemplified by the excerpt below, also under the title "The meaning of sustainable development":

> Taking the road of sustainable development needs modern science and technology as a support. There is a need to rely on the progress of science and technology for population control, prevention and control of environmental pollution, rational development and utilization of

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[131] See Appendix 2, quote no 8.

resources. Science can provide the necessary theoretical support for the formulation of a sustainable development plan.[132]

The theme of sustainable development, more than any other environmental theme in the books analysed, is presented as having a holistic nature view, where the environment is inseparable from humans and society, and all is interdependent on each other. This sort of reasoning could open up for a more naturocentric viewpoint where all life and ecosystems are taken into consideration and have intrinsic value. In these books, the main focus overall is considered to be on humans as the ultimately morally significant. As opposed to in the theme of pollution however, future generations of humans are taken more into consideration with relation to development, as in this passage from the moral teaching book 9, under the title "Taking the road of sustainable development":

> Just as population and environmental issues, the resource problem is also a development issue. The development of human society today, with increasing population, a shortage of resources, environmental degradation, ecological crisis among others, has been a direct threat to us and our offspring's survival.[133]

Within the theme of sustainable development then, the books present a holistic nature view, and descriptions of the problems of development take future generations of humans into consideration. These are two characteristics of the late-modern anthropocentrism as described by Stenmark and Sandell, Öhman and Östman.[134]

4.2.2 Management and responsibility in sustainable development content

Management and responsibility when it comes to sustainable development, i.e. what it takes to achieve SD, and who is responsible for achieving it, is largely described through spreading general awareness about environmental problems. The responsibility described is largely a political one, leaving individual moral responsibility largely unmentioned. This top-down approach to achieving SD is exemplified by the passage from science book 9b under the title "Achieving Sustainable Development":

> Under the premise of strict population control, improving the population quality and protecting the environment, rational use of resources, sustainable development coordinates the

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[132] See Appendix 2, quote no 9.
[133] See Appendix 2, quote no 10.
[134] Stenmark, *Miljöetik Och Miljövård*, 45-47, 49-52; Sandell, Öhman, and Östman, *Miljödidaktik*, 94-95.

development of economy and society, pursues the harmonious relationship between human and nature, make the sustainable development strategy planning, coordinate the social, economic, and environmental development to face the challenges in human society.[135]

There are a few instances where people's individual responsibility and literacy is emphasised in relation to SD, mostly in passages about use of resources. One concept that is mentioned in relation to sustainable development is the so-called "low carbon life" (低碳生活 dī tàn shēnghuó):

> "Low-carbon life" is a philosophy and attitude for us. We should actively promote a "low carbon life", pay attention to energy-saving, fuel-efficiency, solar terms. Low-carbon life starts from me. "Low-carbon life" (low-carbon life) refers to trying to reduce energy consumption in daily life, and thereby reduce carbon dioxide emissions and reduce the pollution of the atmosphere.[136]

This passage is the only referral to low-carbon living throughout the books (the term is used in total ten times, all related to this passage). The text instills a sense of individual responsibility, but there is little concrete when it comes to management and actions, especially when considering that this is one of the few referrals to individual responsibility. The other occasions of management and responsibility focus on state policy plans and sustainable development as a national strategy. They mainly highlight the efforts made by the Chinese government nationally and internationally.

Interestingly, while stressing the fact that SD can only be reached through jointly working on environmental, social and economic development, it is often economic development that is mentioned in the forefront:

> China will take human beings as the essential, take the harmonious development of human and nature as the main line, take economic development as the core, take improving the life quality of people as the fundamental starting point, take scientific and institutional innovation as the breakthrough point, continuously improve the comprehensive national power and competitiveness, and comprehensively promote economic, social and population, resources and environment sustainable development, in order to lay a solid foundation for the basic realization of modernization in the middle of this century.[137]

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[135] See Appendix 2, quote no 11.
[136] See Appendix 2, quote no 12.
[137] See Appendix 2, quote no 13

4.3 Theme: Use of Resources

Resource can be defined as a form of matter and energy which is essential for the functioning of organisms, populations and ecosystems. Air, water, soil, forests, vegetables and energy (fossil fuels, solar power etc.) etc. are all resources.[138]

Use of resources is a theme directly linked to the concept of SD. As such, it is also a core theme within environmental education internationally.[139] Investigating how use of resources is treated in the schoolbooks thereby tells us something about which philosophical views and environmental values guide the content of environmental education in the Chinese schoolbooks.

Use of resources is an interesting theme when it comes to investigating both human-nature relationship and management and responsibility. Looking at how the texts focus on either protection and development in the management of natural resources or limits and control in the use of natural resources can tell whether an anthropocentric or naturocentric viewpoint is highlighted. Essential to the naturocentric viewpoint is the notion of the planet having limited resources, and the awareness and acceptance of this affecting the management of resources. More generally, the anthropocentric/naturocentric viewpoints are also expressed through referring to natural resources as either for the use by and for humankind or as shared with other living beings.

When it comes to management and responsibility, the focus of the analysis – just as in the other themes, is on whether individual behavior change or bigger social and economic policy changes are highlighted in passages relating to strategies of sustainable use of resources. An individual focus can for example refer to resource saving behaviors such as reuse and recycling or consumerism. A social focus refers to mentions policy changes on society level, where the responsibility lies mainly with the authorities. 'Use of resources' is most commonly translated into '资源利用' (zīyuán lìyòng) in Chinese. However, as this term does not cover all the referals to use of resources, my initial word search only included the word 'resource' (资源 zīyuán). This was, as usual, followed by a manual analysis, coding the instances where the theme of use of resources were covered. The result of this analysis shows the spread and coverage of the theme 'use of resources' (figure 3):

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[138] Anil Kumar De, *Environmental Education* (New Age International, 2007), 63.
[139] Joy Palmer, *Environmental Education in the 21st Century: Theory, Practice, Progress and Promise* (Routledge, 2002), 16.
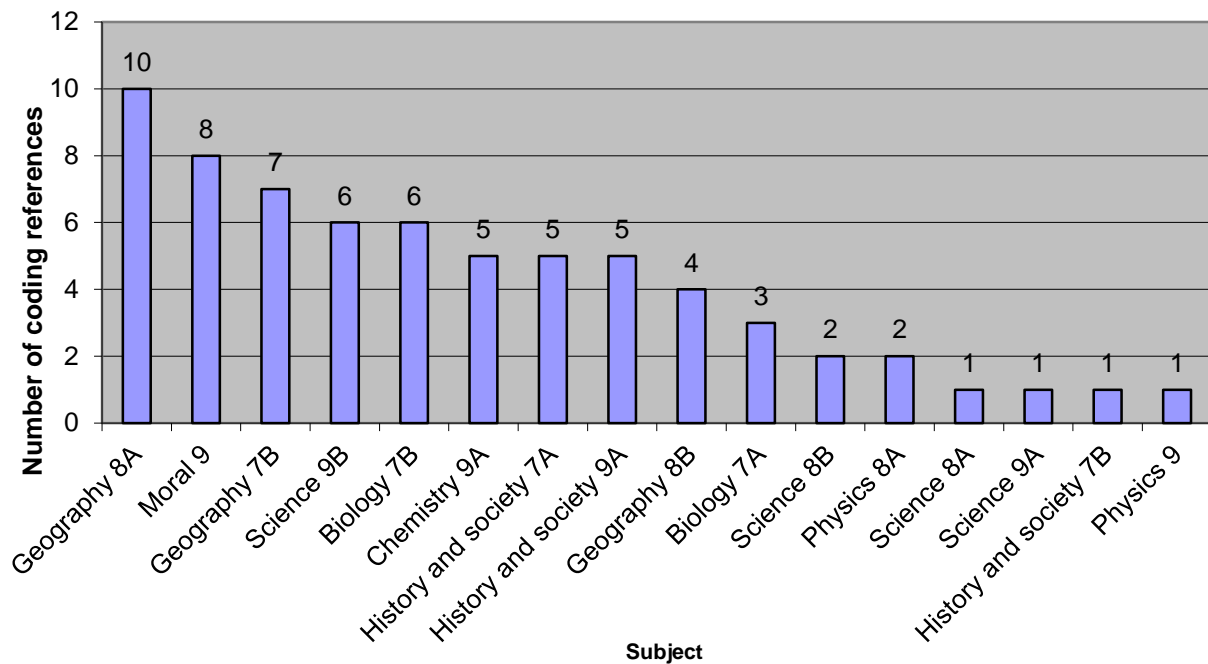
Figure 3: Coding results for the theme use of resources (资源利用) in all textbooks.

The most common topic in which use of resources is found, is use and protection of water resources, both when describing China, but also other countries in the world. This could reflect a high concern surrounding this issue, considered as being a high priority nationally. As shown in Table 5, use of resources as a theme covers both human-nature relationship and responsibility extensively.

Table 5: Result of coding passages for the theme "use of resources" (资源利用) into ideal types of human-nature relationship and responsibility, including page reference to the respective textbooks.

Human-Nature relationship		Responsibility	
Anthropocentric	**Naturocentric**	**Social**	**Individual**
Science 8a, 39	Science 8b, 161	Science 8b, 159	Science 8a, 41, 43
Science 8b, 157, 158, 159-160	Science 9a, 39	Science 9a, 40	Science 9a, 39
Science 9a, 39-40	Science 9b, 117, 120, 122, 139-140	Science 9b, 142	History and Society 9b, 102
Science 9b, 122, 142	History and Society 9b, 103	History and society 9b, 101-102	Geography 7b, 99
Chemistry 9a, 68, 70	Geography 7b, 98-99	Geography 7b, 99	Geography 8a, 66, 80, 81, 82
History and Society 7a, 87	Geography 8 a, 63	Geography 8a, 66, 72, 77, 79	Moral teaching 9, 59
History and Society 9b, 99-101, 104	Biology 7b, 115	Geography 8b, 101	Physics 8a, 66
Geography 7b, 63, 87		Moral teaching 9, 54, 58	Biology 7b, 113
Geography 8a, 76		Biology 7a, 134-135	
Moral teaching 9, 54-57		Biology 7b, 103, 113	
Biology 7a, 134			
Biology 7b, 115			

4.3.1 Human-nature relationship in use of resources content

Within the conception 'human-nature relationship', the descriptions looked for were of human as legitimate agents and users of resources, a focus on protection in the management of nature, and human and societal gains taking precedence over ecological gains in the use of resources to define anthropocentric viewpoints. Naturocentric viewpoints were defined by expressions of limits and control in the use of natural resources and measures to reduce resource consumption as well as a general focus on the ecological impact of using non-renewable resources.

The text references to use of resources in the textbooks largely adopt an anthropocentric viewpoint, where the shortage of natural resources is described in relation to its effect on people's living and economic development. This is exemplified by passages such as:

"The shortage of water resources affects people's living and constrains economic development."[140]

As was the case with the theme sustainable development, there is a general tendency within 'use of resources' content to mention the interdependency between man, society and nature. As such, the books can be seen as having a holistic view of nature. This view can be exemplified by this passage from the Society and History year 9a textbook:

> There is a complex relationship between human development and problems including the rapid growth of population, the shortage of natural resources, the deterioration of the ecological environment. Since the birth of mankind, there has been solidarity with nature. Nature influences human production and life, and human activities, in turn, affect nature. In a sense, the history of human existence and development is the history of the interaction, mutral development and evolution with nature. Looking back to the history, the degree of human utilization and the way of reforming nature at different time is influenced by their "human and nature views".[141]

The holistic nature view means that there is an interaction and interdependence between humans and all other organisms in natural systems and between different natural systems. (Ecological) holism is the approach that the biosphere is an interrelated and interdependent entity.[142] This tells us something about the human-nature relationship expressed in the books, in that humans are seen as being a part of, and not separate, from nature. However, it does not automatically assume a position on how humans should act in relation to nature, or whose interests should first be taken into account when dealing with nature.

An interesting find is how non-renewable energy resources are covered, especially fossil fuels. A longer passage on oil exploitation in the geography book for year 8 for example, explicitly encourages oil exploitation, while also stressing that it must be done responsibly. It is not followed by any debate on the ethical problems with using non-renewable resources such as oil:

> At present, more than a dozen large oil and gas fields have been built in the Tarim basin, and through the west east gas pipeline project gas will be transported to the eastern region of China. This oil and gas resources development, has not only brought economic development opportunities for the Xinjiang area and meant resource advantages for the western region, but also alleviated the East China's energy supply tensions, optimized the energy structure of the eastern region. Tarim Basin is a fragile environment, when developing and utilizing oil and gas

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[140] See Appendix 2, quote no 14. See also Appendix 2, quote no 15.
[141] See Appendix 2, quote no 16.
[142] Stenmark, *Miljöetik Och Miljövård*, 45-47.

resources, there needs to be taken various measures to avoid damage to the environment, and strengthen environmental protection of the oasis.[143]

This constitutes a somewhat contradictory message passed on to students when it comes to renewable or non-renewable resources. Although a considerable amount of text throughout the books discusses the importance of using renewable resources, it is not compared against using non-renewable resources. This again can suggest the societal importance given to the economic and social dimension over the environmental dimension. Ultimately, it shows an anthropocentric view where natural resources exist to serve human interests; humans are the legitimate agent and users of natural resources. This seems to take precedence over the choice between renewable and non-renewable resources.

Overall though, for the analysis of human and nature relationship as far as resource availability is concerned, the analysed textbooks tend to transmit that natural resources are limited.[144] With the exception of content concerning water resources, the passages do not tend to expand on how these resources should be economically and rationally used or that the consumption of them should be reduced. So even though the stress on resources as limited and finite is an indication of a naturocentric position, the textbooks do not fully transmit ecological values in this regard. Rather, the stress on the limitation of resources in the books corresponds to the characteristics of"late-modern anthropocentrism"[145] or"the ethics of sustainable development".[146]

4.3.2 Management and responsibility in use of resources content

The analysis of the textbooks showed that there is a greater emphasis on social management than individual management. This is shown through the emphasis on national policies and governmental projects in managing resources:

> In order to change the situation of shortage of resources in some areas, our country has implemented the project of cross regional allocation of natural resources. "West east gas transmission project", is the re-allocation of the energy resources between the western area and the eastern region where there is relative shortage of energy sources. The implementation of this project, has not only promoted the development of resources in the western region, but also met

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[143] See Appendix 2, quote no 17.
[144] See Appendix 2, quote no 18, 19, 20, 21.
[145] Sandell, Öhman, and Östman, *Miljödidaktik*, 94-95.
[146] Stenmark, *Miljöetik Och Miljövård*, 49-52.

the energy needs of the eastern region, promoted the economic development and improved people's living standards of both the eastern and western regions.[147]

One tendency in the textbooks when it comes to management, prevention and solutions to problems with resource usage and shortage, is a general vagueness, or in fact circular argumentation. Many passages mentioning use of resources refer back to sustainable development as a means to handle resource problems:

> In our country there are several challenges. The contradiction of population, resources and environment in our country is becoming more and more prominent, sustainable development is facing greater pressure while facing various of problems such as resources shortage (especially energy shortage); environmental pollution, ecological deterioration. To deal with these challenges, there is need to coordinate the relationship between people and land, to build an ecological civilization and to take the road of sustainable development.[148]

However, out of the three themes investigated here, use of resources is the one theme which features the most focus on individual behavior change. For example, regarding water saving, several strategies on the individual level is mentioned, as here:

> In our home or school, how shall we save water? Please talk about the concrete method of saving water. The reusing, reducing and recycling of water are three basic methods of water conservation. For example, water the flowers with used domestic water, use a shower nozzle with low flow rate, collect rainwater for domestic water use.[149]

These passages are often formulated in the question style of "what can you do to take care of our resources?", which opens up for personal reflection and, hopefully, is taken on by the lecturers.

Altogether, the analysis of the three themes pollution, sustainable development and use of resources shows an overall focus on the negative impact of environmental problems on humankind. This focus can be interpreted as belonging to the moral norm that nature is a resource to be used by and for people. On the whole, the different textbooks can all be seen to express anthropocentric values in their discussions of humans' relation to nature, where predominantly humans are regarded as morally significant. This is also expressed in the recurring appeals to cherish and protect nature, passages generally grounded on the idea that this should be done in order to protect humans.

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[147] See Appendix 2, quote no 22.
[148] See Appendix 2, quote no 23.
[149] See Appendix 2, quote no 24.

This anthropocentric perspective is, however, used multidimensionally in light of the different environmental themes. Eco-holistic and intergenerational viewpoints appear only in discussions of some environmental themes, which makes for a contradictory view on how the relationship between humans and nature is promoted in the overall text. All themes however display a clear anthropocentric and economic focus.

There are some openings towards giving moral considerations also to plants, animals and ecosystems in the texts. These are however mostly connected to their resource (instrumental) value or are shortly commented on though, making the moral significance in these passages hard to interpret. The general tendency to end passages of concern for non-humans and nature in general with concern for humans, often with a larger level of detail, shows that anthropocentrism takes precedence over naturocentrism. These occasional openings that include animals, other living beings and ecosystems in the scope of moral considerations can be interpreted as expressions of weak anthropocentrism as defined by Vilkka.[150]The overall focus on anthropocentric values indicates that a utilitarian and rational attitude towards the value of the natural environment is promoted in the textbooks.

The conception management and responsibility is less referred to than the conception human-nature relationship, both in terms of occurrances and level of detail. Descriptions of responsibility are characterised by an overall vagueness and generality when describing how environmental challenges should be addressed. Of the two ideal types used in the analysis, there is a greater emphasis on social responsibility and management than on the responsibility of the individual. This is shown through the emphasis on national policies and government projects. This indicates an adhesion to moral norms that descends from sources of authority instead of from individual and community involvement. This focus can be interpreted as promoting a (personal) external locus of control – leaving environmental problems to the experts rather than the individual. This external locus of control is also evident in the reliance on science and technology to solve environmental problems, again a common feature of all references to management and responsibility. As shown by the study of Uitto et al., the reliance on technology can also be traced to an anthropocentric viewpoint.[151] By highlighting technology, the responsibility and control is external as opposed to urging for personally responsible behavior.

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[150] Vilkka, "The Varieties of Intrinsic Value in Nature," 149.
[151] Uitto et al., "Who Is Responsible for Sustainable Development?," 97.

5   Human-centred attitudes and state responsibility

The purpose of this thesis has been to trace environmental attitudes as promoted by Chinese authorities through compulsory middle school textbooks. By looking at how topics of environmental concern are discussed in the textbooks, and how they present the relation between humans and the environment and environmental responsibility, I have intended to show how values contribute to the construction of environmental attitudes and worldviews. Through a content analysis with ideal types of environmental ethical philosophies and views on environmental responsibility, the thesis has shown that with text content about environmental challenges follows expressions of environmental values that are characterised by anthropocentrism and social (state) responsibility. The environmental themes pollution, sustainable development and use of resources display different forms of anthropocentric views, and even though elements of naturocentric concerns do come across, these are underrepresented.

The findings of the analysis further show that social (state) responsibility of nature are promoted more often than individual responsibility. The absence of human management in the overall text may send a message suggesting that environmental degradation is irreversible and that individual citizens can do very little to improve the situation. Former studies have agreed on the importance of an internal locus of control in developing environmental responsibility.[152]

How can this pattern of highlighting anthropocentric values and social responsibility in relation to environmental themes in the textbooks be understood? First of all, based on the reasonings by Blaut and Jacob on the social importance of textbooks in conveying what is considered valid and acceptable knowledge and values, this pattern can be seen as exhibiting the officially accepted moral standpoint on environmental issues.[153] The way the conceptions 'human-nature relationship' and 'management-responsibility' are addressed, forms the officially accepted environmental attitude as promoted by compulsory schoolbooks. This is an environmental attitude which is utilitarian and rational, and which puts human need and

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[152] See for example Fransson and Gärling, "Environmental Concern."; Hungerford and Volk, "Changing Learner Behavior."

[153] Blaut, *The Colonizer's Model of the World*, 6.

development in front of concerns for the natural environment. In other words, the elaborations on environmental challenges do not in themselves challenge the mode of operation of the current social and economic system. As Ferreira et al. suggest, the preponderance of socio-economic controversies over ethical ones do not challenge the expectations the individual has of himself/herself and society, nor challenge the values that highlight the importance that is given to economic growth and consumption.[154]

Investigating the full reasons behind this promotion of anthropocentric values and state responsibility is beyond the scope of this thesis. However, given the heightened importance given to environmental awareness and environmental education within China during the recent years and considering the importance of attitudes for environmental behaviour, knowing what these attitudes consist of in terms of values and responsibility, enables further research on what needs to be done in order to increase the environmental thinking and behaviour of the Chinese population. As these attitudes indicate how Chinese pupils are encouraged to view the natural environment, expected to behave toward it and respond to efforts to protect it, it is also important for Chinese and international educators and policymakers to look into exactly what attitudes, values and behaviours their efforts to educate the population about the environment actually express. This would hopefully enable a shift in these attitudes, values and behaviors toward even more pro-environmental ones. There are several types of similar research into this theme which could be interesting to pursue in the future. A historically comparative study of both textbooks and curriculum with respect to environmental ethics could show how the subject has developed and evolved. A thorough, comparative study between environmental education school policy and textbooks/curriculum, in order to determine to which degree their ideological/ethical basis correspond to eachother would give indications of the successfulness of curriculum implementation. A survey- and participant-observation- based study on how these textbooks are interpreted and implemented in schools, would further cover the issue of implementation of EE.

There are still more possibilities to link knowledge about the environment with attitudes and values for the environment. As a whole, the themes of pollution, sustainable development and use of resources, did not fully develop the ethical reasonings for pro-environmental behaviour. With the subject of ideology and moral teaching (思想品德 sīxiǎng pǐndé) for example, educators have the possibility to introduce an ethical debate on the moral

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[154] Ferreira et al., "Pollution in Textbooks from 16 Countries," 7.

connotations of human interaction with nature. Perhaps, as proposed by Shapiro, Guo and Marinova and McBeath et al., one way for the authorities could be to connect these issues to traditional Chinese philosophy in the curriculum.[155] However, the ideology and moral teaching textbooks did not expand more on the underlying moral connotations of the themes than the science books. Hopefully, the importance of ethics as an essential foundation for environmental attitudes and consequent behaviour will be further taken into account by environmental educators. In China's future generation, i.e. the readers of these textbooks, lies an opportunity to approach environmental issues in a new way – where everyone takes responsibility for their environment and relate to nature in a way that gains both current and future generations of humans, but also nature itself. It is worth questioning if the textbooks of today are promoting the necessary development of attitudes in order to deal with the complexity of environmental problems and solutions facing current and future generations of Chinese citizens. As stated already in the 1972 report "How do you want to live?" by the British Department of the Environment: "It is essential to realise that the world of the human habitat is not just a world of objects; it is a world of values. The moral purpose of environmental education is to enable the citizen to understand these values, to criticise them and where necessary to change them."[156]

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[155] See Shapiro, *Mao's War against Nature*, 212-215; McBeath et al., *Environmental Education in China*, chap. 2; Guo and Marinova, "Environmental Awareness in China," 1678.

[156] Quoted in: Palmer, *Environmental Education in the 21st Century*, 10.

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Appendix 1 – Data selection according to theme

Due to practical considerations, the referrals made to primary source material in Appendices 1 and 2 refer to the bibliography of primary sources found in Appendix 4. Each book is referred to in brackets after the quote with a letter, the shortened English title and page number.

Theme A: pollution

Chapters devoted to pollution:

1. '空气污梁与保护'

    'Air pollution and protection' (Appendix 4.28: Science 8b, 119-126)

2. '爱护水资源'

    'Conservation of water resources' (Appendix 4.15: Chemistry 9a, 68-73)

3. 探究环境污染对生物的影响

    'Exploring the impact of environmental pollution on living organisms' (Appendix 4.12: Biology 7b, 108-115)

Chapters where the theme of pollution is mentioned in more detail:

4. '材料的耐用与发展'

    'The durability and development of materials' (Appendix 4.29: Science 9a, 66-71)

5. '人类发展与环境问题'

    'Human development and environmental problems' (Appendix 4.30: Science 9b, 118-122)

6. '生态系统的稳定性'

    'The stability of the ecosystem' (Appendix 4.30: Science 9b, 64-73)

7. '保护空气'

    'Air protection' subtitle to 空气 *'Atmosphere'* (Appendix 4.15: Chemistry 9a, 30-31)

8. '有机合成材料'

    'Organic and synthetic materials' (Appendix 4.16: Chemistry 9b, 102-111)

9. '化学肥料'

    'Chemical fertilizers' (Appendix 4.16: Chemistry 9b, 79-85)

10. '愈演愈烈的环境问题'

    'Intensified environmental problems' (Appendix 4.6: History and Society 9b, 103-108)

11. '我们需要洁净的空气'

    'We need clean air' subtitle to ' 多变的天气 – 'Changeable weather' (Appendix 4.7: Geography 7a, 51-52)

12. '自然资源的基本特征'

    'Basic characteristics of natural resources' (Appendix 4.9: Geography 8a, 62-66)

13. '合理利用与保护水资源'

    'Rational utilization and protection of water resources' (Appendix 4. 9: Geography 8a, 78-82)

14. '能源消耗对环境的影响'

    'The impact of energy consumption on the environment' (Appendix 4.19: Physics 9, 178-180)

Chapters where the theme of pollution mentioned in less detail:

15. '世界各国对海洋渔业资源的保护 '

    'International conservation of marine fishery resources' (Appendix 4.1: History and Society 7a, 72)

16. '我国的经济中心 —— 上海'

    'Our Country's economic centre – Shanghai (Appendix 4.2: History and society 7b, 55)

17. '感悟工业时代的社会变迁'

    'Comprehension of the social changes during the industrial revolution (Appendix 4.4: History and Society 8b, 83)

18. '极地地区的环境保护'

    'Environmental Protection of the Polar regions' (Appendix 4.8: Geography 7b, 98)

19. '探讨长江流域的生态建设'

    Explore the ecological construction of the Yangtze river basin*'* (Appendix 4.9: Geography 8a, 48)

20. '计划生育与保护环境的基本国策'

    'The basic national policies for family planning and environmental protection' (Appendix 4.29: Moral 9, 54)

21. '鱼与人类生活的关系'

    'The relationship between fish and human life' (Appendix 4.13: Biology 8a, 23-24)

22. ' 苔薛植物'

    'Moss species' (Appendix 4.11: Biology 7a, 75)

23. ' 两栖动物的生殖发青与环境条件'

    'Amphibians reproductive and environmental conditions' (Appendix 4.14: Biology 8b, 15)

Theme B: Sustainable development

Chapters devoted to sustainable development:

1. '现可持续发展'

   'Sustainable Development' (Appendix 4.30: Science 9b, 118-145)

2. '发展的选择'

   'The Choice of Development' (Appendix 4.6: History and Society 9b, 109-114)

3. '实施可持续发展战略'

   'Adopt a Sustainable Development Strategy' (Appendix 4.24: Moral teaching 9, 55-59)

4. '能源与可持续发展'

   'Energy and Sustainable Development' (Appendix 4.19: Physics 9, 178- 181)

Chapters where the theme of sustainable development is mentioned in more detail:

5. '中国在世界中'

   'China in the World' (Appendix 4.15: Chemistry 9a, 100-103)

6. '发展中面临的挑战'

   'The challenges in the process of development' (Appendix 4.10: Geography 8b, 100-103)

7. '终身学习 持续发展 '

   'Lifelong Learning Sustainable Development' (Appendix 4.24: Moral teaching 9, 144-146)

Chapters where sustainable development is mentioned in less detail:

8. '爱护水资源'

   'Conserve water resources' (Appendix 4.15: Chemistry 9a, 70)

9. '北欧国家关注海洋可持续发展'

   'The Nordic countries pay close attention to the sustainable development of marine resources'
   (Appendix 4.1: History and Society 7a, 27)

10. '联合国与走向世界的中国'

    UN and China marching towards the world arena (Appendix 4.6: History and Society 9b, 81)

11. '共同面对前所未有的挑战'

    'Facing an unprecedented challenge together' (Appendix 4.6: History and Society 9b, 91)

12. '学习地理有什么用?'

    'How is it useful to study geography?' (Appendix 4.7: Geography 7a, 4)

13. '退田还湖'

    'Reclaimed farmland to lake' (Appendix 4.9: Geography 8a, 48)

14. '类型齐全，耕地比重小'

    'Farmland only takes up a small proportion' (Appendix 4.9: Geography 8a, 69)

15. '水土保持'

    'Soil and Water Conservation' (Appendix 4.10: Geography 8b, 30)

16. '学会理财 合理消费'

    'Learn financial management and rational consumption' (Appendix 4.24: Moral teaching 9, 101)

17. '从我做起，保护植被'

    'Starting from myself, protecting the vegetation' (Appendix 4.11: Biology 7a, 134-135)

18. '探讨人口增长及其对环境的影响'

    'Discuss population growth and explore its impact on the environment' (Appendix 4.12: Biology 7b, 103)

Theme C: Use of Resources

Chapters devoted to use of resources:

1. '日益严峻的资源问题'

    'Increasingly serious resource problems' (Appendix 4.6: History and Society 9b, 97-102)

2. '人口增长对资源及环境的影响'

    'The influence of population growth on resources and environment (Appendix 4.30: Science 9b, 120-123)

Chapters with use of resources mentioned in greater detail:

3. '中国的自然资源'

    'Natural resources in China' (Appendix 4.9: Geography 8a, 61-82)

4. '水资源的利用,开发和保护'

    'Utilization, development and protection of water resources' (Appendix 4.27: Science 8a, 39-45)

5. '保护土壤'

    'Protecting the soil' (Appendix 4.28: Science 8b, 147- 150)

6. '金属的污染和回收利用'

    'Metal pollution and -recycling' (Appendix 4.29: Science 9a, 39-40)

7. '爱护水资源'

    'Conservation of water resources' (Appendix 4.15: Chemistry 9a, 68-73)

8. '认识人口 、资源、 环境和发展之间的关系'

   'Understanding of the relationship between population, resources, environment and development'
   (Appendix 4.15: Chemistry 9a, 102-103)

9. '热带雨林的开发与保护'

   'Development and protection of tropical rain forests' (Appendix 4.8: Geography 7b, 87-88)

10. '我们共同的家园'

   'Our Common Home' (Appendix 4.24: Moral 9, 55-57)

11. '水循环'

   'The Water Cycle' (Appendix 4.17: Physics 8a, 65-66)

Chapters with use of resources mentioned in less detail:

12. '油气资源的开发'

   'Oil and Gas exploitation' (Appendix 4.15: Chemistry 9a, 80-81)

13. '金属资源的利用和保护'

   'Utilization and protection of metal resources' (Appendix 4.16: Chemistry 9b, 17-20)

14. '海洋对人类的影响'

   'The impact of the ocean on humanity' (Appendix 4.1: History and Society 7a, 28-29)

15. '我国植被面临的主要问题'

   'Primary problems of vegetation in China' (Appendix 4.11: Biology 7a, 134-135)

16. '拟定保护生态环境的计划'

   'Making plans for the protection of the ecological environment' (Appendix 4.12: Biology 7b, 112)

Appendix 2 – Illustrative quotes from the selection according to theme

Due to practical considerations, the referrals made to primary source material in Appendices 1 and 2 refer to the bibliography of primary sources found in Appendix 4. Each book is referred to in brackets after the quote with a letter, the shortened English title and page number.

Theme: Pollution

1. ”包围在地球周围的那层薄薄的大气是人类共有的资源，我们在大气层的保护下生息繁衍。 然而，空气污染却时刻威胁着人类的生存和发展，保护大气是我们应尽之职责。”

”The thin atmosphere surrounding the earth is a natural resource shared by all humankind, under its protection we live and multiply. However, air pollution is threatening the survival and development of human beings. It is our duty to protect the atmosphere.” (Appendix 4.28: Science 8b, 119-126)

2. ”酸雨对生物有极大的危害。例如，酸雨可以使土壤中的养分发生化学变化，从而不能被植物吸收利用；酸雨可以使河流和湖泊酸化，从而影响鱼虾等水生生物的生长发育，甚至造成水生生物死亡；酸雨可以引起水源酸化，影响饮用，威胁人们的健康；酸雨直接危害植物的芽和叶，严重时使成片的植物死亡。和酸雨一样，其他的环境污染也会对包括人类在内的生物造成危害。例如，排人水中的有毒有害物质接触人体，可能会增加基因突变概率，诱发癌症；水中、土壤中很多重金属污染物，如汞、镉、砷，还会通过食物链积累，最终危害人体健康。”

”Acid rain causes serious damage to living things. For example, acid rain can impose chemical reactions to the soil nutrients, which can not be absorbed by plants; acid rain can acidify rivers and lakes, and then affect the growth of aquatic organisms, for example fish and shrimps, and even cause their death; acid rain can cause water acidification, which affects the drinking water and then threatens people's health; acid rain also harms plants, buds and leaves, in extreme cases it could cause the death of plants. Just as acid rain, other environmental pollution would threaten living things including humans. For example, toxic and hazardous substances discharged into the water may increase the probability of mutation-induced cancer when in contact with the human body, various heavy metal contaminants existing in water and soil, such as mercury, cadmium and arsenic, can be accumulated and passed along the food chain, ultimately endangering human health.” (Appendix 4.12: Biology 7b, 109-110)

3. ”为了使天空更蓝，需采取各种措施积极地防治空气污染。减少污染物排放量。在人类的生产和生活中，尽可能开发无污染能源（如太阳能、风能、水力发电）和低污染能源（如天然气），对燃料 进行预处理（如烧煤前先进行脱硫），改进燃烧技术等都可减少排污量。合理规划工业区与非工业区。要合理选择厂址，规划城区与工业区，不要让排放的废气过度集中，不要造成重复叠加污染，以免造成局部地区严重污染的发生。”

”In order to have a blue sky there needs to take all kinds of active measures to control air pollution. First of all, the emissions of pollutants need to be reduced. To achieve that purpose, we need to explore non-polluting energy sources such as solar energy, wind energy, hydro energy, and low-polluting energy sources, such as natural gas; further, adopt fuel pre-treatment (such as desulfurization of coal), improve combustion technology can also reduce the amount of emission. Second, we need to make proper plans of industrial zones and non industrial zones. To avoid a severe pollution in certain area, we need to make reasonable site selection and planning of urban centers and industrial zones, stop the excessively concentration of emissions in one region to prevent having overlapping pollution.” (Appendix 4.28: Science 8b, 120)

4. ”要解决“白色污染”问题，应该从以下几个方面着手：1. 减少使用不必要的塑料制品，如用布袋代替塑料袋等；2. 重复使用某些塑料制品，如塑料袋、 塑料盒等；3. 使用一些新型的、可降解的塑料，如微生物降解塑料和光降解塑料等；4. 回收各种废弃塑料。”

”To solve the "white pollution" problem, the following aspects should be processed: 1. Reduce the unnecessary use of plastic products, such as using cloth bags instead of plastic bags; 2. Reuse certain plastic products, such as plastic bags, plastic boxes; 3. Use biodegradable plastic material, such as microbial degradation plastic and light degradable plastics; 4. Recycle wasted plastics. ” (Appendix 4.16: Chemistry 9b, 107)

5. *”空气对人类及各种生物十分重要，我们要采取有效措施加以保护。”*

”Air is very important to human beings and all kinds of life. To protect the air, effective actions should be taken.” (Appendix 4.28: Science 8b, 125)

6. ”面对资源约束趋紧、环境污染严重、生态系统退化的严峻形势，我们每个人都必须牢固树立尊重自然、顺应自然、保护自然的生态文明理念，节约资源，保护环境，建设美丽家园。目前，我国各地都相继建立了环境保护机构和监察站，对各种环

境污染进行综合治理。为了实现对自然生态系统和环境保护的目标，必须贯彻实行"以防为主，防治结合"的方针。"

"Confronted by environmental problems including resource constraints, severe environmental pollution, the degradation of the ecosystem, each of us need to embrace the idea of respecting, comply with and protect nature; also to conserve resources, protect the environment and then build our homeland. Currently, environmental protection organizations and monitoring stations have been established in various places in our country to solve the environment pollution problems. In order to realize the goal of natural ecological systems and environmental protection, we must carry out the policy of " combining prevention with control with emphasis on the first". " (Appendix 4.30: Science 9b, 68-69)

7. "保护环境、控制和消除大气污染，已经成为当前世界需要解决的重要课题。我们既要有效地利用能源，又要很好地控制和消除污染。总之，人类不应当无限制地向大自然索取，我们必须在提升物质文明的同时，保持与自然、环境的和谐与平衡"

"How to protect environment, control and further eliminate air pollutions has been an urgent issue confronted with the world. On the one hand, we need to use energy effectively, on the other hand, we have to control and further eliminate those pollution problems rooted in exploring energy. One thing for certain, human should not unconditionally deprive nature of her resources, instead, we need to maintain the harmony relationship with nature and environment while advancing the material civilization. " (Appendix 4.19: Physics 9, 180)

Theme: Sustainable Development

8. "可持续发展鼓励经济增长，通过经济增长提高当代人生活水平，增强国力。可持续发展不仅重视经济增长的数量，更追求经济增长质量。 可持续发展要满足人类自身的需要，改善人类生活，提高人类健康水平，创造一个精神生活和物质生活高度发达的社会环境。"

"Sustainable development encourages economic growth, further improves the living standards of contemporary people and enhances national power through economic growth. Sustainable development does not only put emphasis on the quantity of economic growth, but also pursues the quality of economic growth. Sustainable development meets the needs of human beings, improves human life, improves human health, creates a highly developed spiritual life and material life in the social environment." (Appendix 4.30: Science 9B, 140)

9. "走可持续发展之路需要现代科学技术作为支撑。人口控制、环境污染的防治、资源的合理开发与利用，需要依托科学技术的进步来解决。科学可以为制定可持续发展规划提供必要的理论支持。"

"Taking the road of sustainable development needs modern science and technology as a support. There is a need to rely on the progress of science and technology for population control, prevention and control of environmental pollution, rational development and utilization of resources. Science can provide the necessary theoretical support for the formulation of a sustainable development plan."
(Appendix 4.30: Science 9b, 142)

10. "同人口、环境问题一样，资源问题说到底也是发展问题。人类社会发展到今天，人口剧增、资源短缺、环境恶化、 生态危机等一系列的世界性问题，已经直接威胁到我们和子孙后代的生存。"

"Just as population and environmental issues, the resource problem is also a development issue. The development of human society today, with increasing population, a shortage of resources, environmental degradation, ecological crisis among others, has been a direct threat to us and our offspring's survival. " (Appendix 4.24: Moral teaching 9, 56-57)

11. "可持续发展要求在严格控制人口、提高人口素质和保护环境、合理利用资源的前提下进行经济和社会的协调发展，追求人与自然的和谐，建设可持续发展战略和规划，迎接人类面临的共同挑战，实现社会、经济、环境的协调发展。"

"Under the premise of strict population control, improving the population quality and protecting the environment, rational use of resources, sustainable development coordinates the development of economy and society, pursues the harmonious relationship between human and nature, make the sustainable development strategy planning, coordinate the social, economic, and environmental development to face the challenges in human society." (Appendix 4.30: Science 9b, 140-141)

12. "低碳生活"对于我们来说，更是一种理念和态度。 我们应该积极提倡 并去实践"低碳生活"，注意节电、节油、节气，从点滴做起，从身边做起。低碳生活从我做起。 "低碳生活"(low-carbon life) 是指生活中所消耗的能量要尽力减少，从而减少二氧化碳的排放量，减少对大气的污染。"

"Low-carbon life" is a philosophy and attitude for us. We should actively promote a "low carbon life", pay attention to energy-saving, fuel-efficiency, solar terms. Low-carbon life starts from me. "Low-

carbon life" (low-carbon life) refers to trying to reduce energy consumption in daily life, and thereby reduce carbon dioxide emissions and reduce the pollution of the atmosphere." (Appendix 4.30: Science 9b, 136-137)

13. "中国将以人为本，以人与自然和谐发展为主线，以发展经济为核心，以提高人民群众生活质量为根本出发点，以科技和体制创新为突破口，不断提高综合国力和竞争力，全面推进经济、社会与人口、资源、环境的持续发展，为在本世纪中叶基本实现现代化奠定坚实的基础"

"China will take human beings as the essential, take the harmonious development of human and nature as the main line, take economic development as the core, take improving the life quality of people as the fundamental starting point, take scientific and institutional innovation as the breakthrough point, continuously improve the comprehensive national power and competitiveness, and comprehensively promote economic, social and population, resources and environment sustainable development, in order to lay a solid foundation for the basic realization of modernization in the middle of this century. " (Appendix 4.30: Science 9b, 141)

Theme: Use of Resources

14. "水资源短缺影响人民生活，制约经济发展的局面。"

"The shortage of water resources affects people's living and constrains economic development." (Appendix 4.15: Chemistry 9A, 70)

15. "水是生命之源，也是农业和工业生产的基本条件，水资源的危机，严重制约着经济和社会的发展;能源的消耗与日俱增，化石燃料消耗殆尽的日子迟早会到来，能源危机是人类发展中一个极大的忧患;可耕地面积减少，粮食减产，森林面积减少，地球之"肺"遭到破坏，人类生存环境受到严重影响"

"Water is not only the source of life, but also the basic condition for agricultural and industrial production. The crisis of water resources, seriously restricts the economic and social development. Energy consumption grows day by day, the fossil fuel will sooner or later be consumed, the energy crisis is a potential crisis in human development; the reduction of arable land, food production, reducement of forest area, the destruction of the "lungs of the earth", the human living environment is seriously affected. (Appendix 4.30: Science 9b, 122)

16. "人口的快速增长、自然资源的 短缺、生态环境的恶化等问题与人类社会的发展之间存在着错综复杂的关系。人类自诞生的那一天起， 就与自然休戚与共。 自然影响着人类的生产与 生活， 人类活动反过来也影响着自然。 从某种意义上说， 人类生存与发展的历 史， 就是同大自然相互作用、 共同发展和不断进化的历史。 回顾历史， 不同时 期人类利用与改造自然的程度与方式， 受到不同 "人地观" 的影响。"

"There is a complex relationship between human development and problems including the rapid growth of population, the shortage of natural resources, the deterioration of the ecological environment. Since the birth of mankind, there has been solidarity with nature. Nature influences human production and life, and human activities, in turn, affect nature. In a sense, the history of human existence and development is the history of the interaction, mutual development and evolution with nature. Looking back to the history, the degree of human utilization and the way of reforming nature at a different time is influenced by their "human and nature views"." (Appendix 4. 5: History and Society 9A, 109-110)

17. "目前，塔里木盆地已建设了十几座大型的油气田， 并通过西气东输工程将 这里的天然气运送到我国东部地区。 这些油气资源的开发， 不仅为新疆带来了 经济发展的机遇， 发挥了西部地区的资源优势， 而且也缓解了我国东部地区的 能源供应紧张局面， 优化了东部地区的能源结构。 塔里木盆地环境脆弱， 在开发利用油气资源的同时， 需要采取多种措施避 免破坏环境， 并加强绿洲的环境保护。"

"At present, more than a dozen large oil and gas fields has been built in the Tarim basin, and through the West-east gas pipeline project gas will be transported to the eastern region of china. This oil and gas resources development, has not only brought economic development opportunities for the Xinjiang area and meant resource advantages for the western region, but also alleviated the East China's energy supply tensions, optimized the energy structure of the eastern region. Tarim Basin is a fragile environment, when developing and utilizing oil and gas resources, there needs to be taken various measures to avoid damage to the environment, and strengthen environmental protection of the oasis." (Appendix 4.10: Geography 8b, 81)

18. "土壤资源是有限的。"

"Soil resources are limited" (Appendix 4.28: Science 8B, 161)

19. "地球上的自然资源是有限的，地球对人口的承载能力也是有限的。"

"The earth's natural resources are limited, and the earth's population carrying capacity is also limited." (Appendix 4.30: Science 9B, 120)

20. *"地球上淡水资源有限，分布不均匀，污染引起水质恶化，进而导致水资源危*
"The earth's fresh water resources are limited, uneven distribution, water pollution caused by deterioration of water quality, which further leads to a water resource crisis." (Appendix 4.30: Science 9B, 121)

21. *"波斯湾地区的国家因大量出口石油而成为富裕国家。但石油资源并不是取之不尽、用之不竭的，这些产油国在稳定石油生产的同时，也在努力寻找新的经济发展方式"*

"Countries in the Persian Gulf have become rich due to a large export of oil. But oil resources are not inexhaustible, these oil-producing countries are trying to look for a new way of economic development while keeping a steady oil production,." (Appendix 4.1: History and Society 7a, 84)

22. *"为了改变一些地区的资源短缺状况，我国实施了自然资源的跨区域调配工程。"西气东输"工程，就是把西部地区丰富的能源资源调往能源相对短缺的东部地区。工程的实施，不仅带动了西部地区的资源开发，还满足了东部地区的能源需求，同时促进了东西部地区经济的发展和人们生活水平的提高等。"*

"In order to change the situation of shortage of resources in some areas, our country has implemented the project of cross regional allocation of natural resources. "West east gas transmission project", is the re-allocation of the energy resources between the western area and the eastern region where there is relative shortage of energy sources. The implementation of this project, has not only promoted the development of resources in the western region, but also met the energy needs of the eastern region, promoted the economic development and improved people's living standards of both the eastern and western regions." (Appendix 4.6: History & Society 9b, 101)

23. *"我国人口、资源、环境的矛盾越来越突出，可持续发展的压力越来越大，面临着资源特别是能源紧缺、环境污染、生态环境恶化等方面的突出问题。协调人地关系，建设生态文明，走可持续发展的道路，是应对这些挑战的正确选择。"*
"In our country there are several challenges. The contradiction of population, resources and environment in our country is becoming more and more prominent, sustainable development is facing greater pressure while facing various of problems such as resources shortage (especially energy shortage); environmental pollution, ecological deterioration. To deal with these challenges, there is

need to coordinate the relationship between people and land, to build an ecological civilization and to take the road of sustainable development." (Appendix 4.30: Science 9B, 101)

24. *"在家中或学校里，我们应该如何节约用水？请谈谈节约用水的具体方法。水的再循环、减少水的使用及水的回收利用是保护和节约用水的三种主要方法。用洗脸水浇花，采用低流量的淋浴喷头，收集雨水作为生活用水。"*

"In our home or school, how shall we save water? Please talk about the concrete method of saving water. The reusing, reducing and recycling of water are three basic methods of water conservation. For example, water the flowers with used domestic water, use a shower nozzle with low flow rate, collect rainwater for domestic water use." (Appendix 4.27: Science 8A, 41-43)

Appendix 3 – Keyword search results for environmental topics in all textbooks

	自然，大自然 nature	水土 natural env. and climate	生物层，生物界，生物链 bio-sphere	环境 environment	生物 living thing; organism	生态: ecology	生态系统 eco-system	生物多样性 biodiversity	气候变化，气候变暖 climate change	污染 pollution	环境保护，环保 environ-mental protection	可持续发展 sustainable development	能源 energy, energy sources	资源 natural resources	生活方式 life-style
1 : Chemistry,9a	45	5	0	38	17	16	1	2	9	41	5	3	10	41	0
2 : Chemistry 9b	17	1	0	23	8	1	0	0	0	25	2	0	4	30	0
3 : History and Society 7a	65	0	0	49	2	4	0	0	0	4	3	1	1	46	5
4 : History and Society 7b	61	25	0	53	2	4	0	0	0	3	2	0	6	32	6
7 : History and Society 8a	8	0	0	11	0	1	0	0	0	0	1	0	0	1	1
8 : History and Society 8b	15	0	0	4	2	0	0	0	0	2	1	0	3	2	5
5 : History and Society 9a	88	3	1	101	9	26	3	1	2	25	3	20	16	136	2
6 : History and Society 9b	4	0	0	6	0	0	0	0	0	0	1	0	0	2	2
9 : Geography 7a	46	0	0	29	2	0	0	0	1	9	0	2	1	11	0
10 : Geography 7b	46	3	0	44	16	8	0	3	2	6	9	0	3	54	2
11 : Geography 8a	73	30	0	57	4	22	0	3	9	1	5	4	6	32	10
12 : Geography 8b	109	14	0	37	7	10	0	0	1	19	5	2	6	143	1
13:Ideology and Morality 7a	15	0	1	12	9	2	0	0	0	0	1	0	0	0	1
14:Ideology and Morality 7b	4	0	0	14	3	0	0	0	0	1	0	0	0	4	0
16:Ideology and Morality 8a	23	0	0	17	0	1	0	0	0	2	1	0	0	2	2

	自然，大自然 nature	水土 natural env. and climate	生物层，生物界，生物链 bio-sphere	环境 environment	生物 living thing; organism	生态: ecology	生态系统 eco-system	生物多样性 biodiversity	气候变化，气候变暖 climate change	污染 pollution	环境保护，环保 environ-mental protection	可持续发展 sustainable development	能源 energy, energy sources	资源 natural resources	生活方式 life-style
17:Ideology and Morality 8b	1	0	0	17	1	1	0	0	0	0	6	0	0	2	0
15:Ideology and Morality 9	26	2	0	54	1	10	0	0	0	15	11	16	3	40	5
19 :Physics 8a	8	0	0	18	3	1	0	0	0	5	3	0	4	9	0
20 :Physics 8b	2	0	0	1	0	0	0	0	0	0	0	0	1	3	0
18 : Physics 9 full	19	2	0	23	6	2	0	0	1	9	2	16	133	3	0
21 :Biology 7a	23	3	9	123	530	111	103	1	8	3	2	2	0	10	1
22 :Biology 7b	10	4	1	88	119	27	0	0	5	31	3	3	2	7	2
23 :Biology 8a	44	1	0	66	315	41	38	42	0	7	5	0	4	6	2
24 :Biology 8b	35	0	2	45	271	1	0	0	0	1	1	0	0	1	24
25 : Science 7a	51	1	1	29	158	2	1	0	0	4	0	0	1	6	3
26 :Science 7b	20	1	0	28	20	0	0	0	0	11	1	0	0	6	3
29 :Science 8a	15	0	0	18	11	1	1	1	1	3	0	0	3	18	1
30 :Science 8b	39	10	0	38	67	2	0	0	2	68	5	0	3	14	1
27 :Science 9a	29	0	1	37	53	2	0	0	1	40	2	0	7	3	1
28 :Science 9b	93	7	4	173	335	131	113	4	7	39	4	48	133	72	10

Appendix 4 - Primary sources used in analysis

(Citations in chapter 4, Appendix 1 and 2 refer to this list.)

History and Society/历史与社会:

1. Lìshǐ yǔ shèhuì kèchéng jiào cūn yánjiū kāifā zhōngxīn 历史与社会课程教村研究开发中心[History and Society Curriculum, Teaching, Research and Development Center] (2012). Yìwù jiàoyù jiàokēshū - lìshǐ yǔ shèhuì, qī niánjí shàngcè 义务教育教科书 - 历史与社会，七年级 上册 [Compulsory Textbook - History and Society, grade 7 volume A]. Rénmín jiàoyù chūbǎnshè 人民教育出版社: 北京. 2012 年第一版，2012 年第 1 次印刷.

2. Lìshǐ yǔ shèhuì kèchéng jiào cūn yánjiū kāifā zhōngxīn 历史与社会课程教村研究开发中心[History and Society Curriculum, Teaching, Research and Development Center] (2012). Yìwù jiàoyù jiàokēshū - lìshǐ yǔ shèhuì, qī niánjí xià cè 义务教育教科书 - 历史与社会，七年级 下册 [Compulsory Textbook - History and Society, grade 7 volume B]. Rénmín jiàoyù chūbǎnshè 人民教育出版社: 北京. 2012 年第一版，2014 年第 3 次印刷.

3. Lìshǐ yǔ shèhuì kèchéng jiào cūn yánjiū kāifā zhōngxīn 历史与社会课程教村研究开发中心 [History and Society Curriculum, Teaching, Research and Development Center] (2013). Yìwù jiàoyù jiàokēshū - lìshǐ yǔ shèhuì, bā niánjí shàngcè 义务教育教科书 - 历史与社会，八年级 上册 [Compulsory Textbook - History and Society, grade 8 volume A]. Rénmín jiàoyù chūbǎnshè 人民教育出版社: 北京. 2013 年第一版，2013 年第 1 次印刷.

4. Lìshǐ yǔ shèhuì kèchéng jiào cūn yánjiū kāifā zhōngxīn 历史与社会课程教村研究开发中心[History and Society Curriculum, Teaching, Research and Development Center] (2013). Yìwù jiàoyù jiàokēshū - lìshǐ yǔ shèhuì, bā niánjí xià cè 义务教育教科书 - 历史与社会，八年级下册 [Compulsory Textbook - History and Society, grade 8

volume B]. Rénmín jiàoyù chūbǎnshè 人民教育出版社: 北京. 2013 年第一版，2015 年第 3 次印刷.

5. Lìshǐ yǔ shèhuì kèchéng jiào cūn yánjiū kāifā zhōngxīn 历史与社会课程教村研究开发中心[History and Society Curriculum, Teaching, Research and Development Center] (2014). Yìwù jiàoyù jiàokēshū - lìshǐ yǔ shèhuì, jiǔ niánjí shàngcè 义务教育教科书 - 历史与社会，九年级 上册 [Compulsory Textbook - History and Society, grade 9 volume A]. Rénmín jiàoyù chūbǎnshè 人民教育出版社: 北京. 2014 年第一版，2014 年第 1 次印刷.

6. Lìshǐ yǔ shèhuì kèchéng jiào cūn yánjiū kāifā zhōngxīn 历史与社会课程教村研究开发中心[History and Society Curriculum, Teaching, Research and Development Center] (2014). Yìwù jiàoyù jiàokēshū - lìshǐ yǔ shèhuì, jiǔ niánjí xià cè 义务教育教科书 - 历史与社会，九年级 下册 [Compulsory Textbook - History and Society, grade 9 volume B]. Rénmín jiàoyù chūbǎnshè 人民教育出版社: 北京. 2014 年第一版，2014 年第 1 次印刷.

Geography/地理：

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8. Dìlǐ kèchéng jiào cūn yánjiū kāifā zhōngxīn 地理课程教村研究开发中心[Geography Curriculum, Teaching, Research and Development Center] (2012). Yìwù jiàoyù jiàokēshū – dìlǐ, qī niánjí xià cè 义务教育教科书 – 地理， 七年级 下册 [Compulsory Textbook - Geography, grade 7 volume B]. Rénmín jiàoyù chūbǎnshè 人民教育出版社: 北京. 2012 年第一版，2014 年第 3 次印刷.

9. Dìlǐ kèchéng jiào cūn yánjiū kāifā zhōngxīn 地理课程教村研究开发中心[Geography Curriculum, Teaching, Research and Development Center] (2013). Yìwù jiàoyù jiàokēshū – dìlǐ, bā niánjí shàngcè 义务教育教科书 – 地理， 八年级上册

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Biology/生物学:

11. Shēngwù kèchéng jiào cūn yánjiū kāifā zhōngxīn 生物课程教村研究开发中心 [Biology Teaching, Research and Development Center] (2012). Yìwù jiàoyù jiàokēshū – shēngwù xué, qī niánjí shàngcè 义务教育教科书 – 生物学， 七年级 上册 [Compulsory Textbook - Biology, grade 7 volume A]. Rénmín jiàoyù chūbǎnshè 人民教育出版社: 北京. 2012 年第一版，2014 年第 3 次印刷.

12. Shēngwù kèchéng jiào cūn yánjiū kāifā zhōngxīn 生物课程教村研究开发中心 [Biology Teaching, Research and Development Center] (2012). Yìwù jiàoyù jiàokēshū – shēngwù xué, qī niánjí xià cè 义务教育教科书 – 生物学， 七年级 下册 [Compulsory Textbook - Biology, grade 7 volume B]. Rénmín jiàoyù chūbǎnshè 人民教育出版社: 北京. 2012 年第一版，2012 年第 1 次印刷.

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(Geography and biology is replaced by chemistry and physics by year 8/9, which is why no geography or biology books from year 9 are present).

Chemistry/化学:

15. Huàxué kèchéng jiàocūn yánjiū kāifā zhōngxīn 化学课程教村研究开发中心 [Chemistry Curriculum, Teaching, Research and Development Center] (2012). Yìwù jiàoyù jiàokēshū – huàxué, jiǔ niánjí shàngcè 义务教育教科书 – 化学，九年级 上册 [Compulsory Textbook - Chemistry, grade 9 volume A]. Rénmín jiàoyù chūbǎnshè 人民教育出版社: 北京. 2012 年第一版，2014 年第 3 次印刷.

16. Huàxué kèchéng jiàocūn yánjiū kāifā zhōngxīn 化学课程教村研究开发中心 [Chemistry Curriculum, Teaching, Research and Development Center] (2012). Yìwù jiàoyù jiàokēshū – huàxué, jiǔ niánjí xià cè 义务教育教科书 – 化学，九年级 下册 [Compulsory Textbook - Chemistry, grade 9 volume B]. Rénmín jiàoyù chūbǎnshè 人民教育出版社: 北京. 2012 年第一版，2014 年第 2 次印刷.

Physics/物理:

17. Wùlǐ xué kèchéng jiào cūn yánjiū kāifā zhōngxīn 物理学课程教村研究开发中心 [Physics Teaching, Research and Development Center] (2012). Yìwù jiàoyù jiàokēshū – wùlǐ, bā niánjí shàngcè 义务教育教科书 – 物理，八年级 上册 [Compulsory Textbook - Physics, grade 8 volume A]. Rénmín jiàoyù chūbǎnshè 人民教育出版社: 北京. 2012 年第一版，2014 年第 3 次印刷.

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19. Wùlǐ xué kèchéng jiào cūn yánjiū kāifā zhōngxīn 物理学课程教村研究开发中心 [Physics Teaching, Research and Development Center] (2013). Yìwù jiàoyù jiàokēshū – wùlǐ, jiǔ niánjí quán yī cè 义务教育教科书 – 物理，九年级 全一册 [Compulsory

Textbook - Physics, grade 9 entire volume]. *Rénmín jiàoyù chūbǎnshè* 人民教育出版社: 北京. 2013 年第一版，2013 年第 1 次印刷.

Ideology and moral teaching/思想品德:

20. *Sīxiǎng pǐndé kèchéng jiào cūn yánjiū kāifā zhōngxīn* 思想品德课程教村研究开发中心[Ideological and Moral Education Curriculum, Teaching, Research and Development Center] (2013). *Yìwù jiàoyù jiàokēshū – sīxiǎng pǐndé, qī niánjí shàngcè* 义务教育教科书 – 思想品德，七年级 上册 [Compulsory Textbook - Ideology and Moral Education, grade 7 volume A]. *Rénmín jiàoyù chūbǎnshè* 人民教育出版社: 北京. 2013 年第一版，2014 年第 6 次印刷.

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22. *Sīxiǎng pǐndé kèchéng jiào cūn yánjiū kāifā zhōngxīn* 思想品德课程教村研究开发中心[Ideological and Moral Education Curriculum, Teaching, Research and Development Center] (2013). *Yìwù jiàoyù jiàokēshū – sīxiǎng pǐndé, bā niánjí shàngcè* 义务教育教科书 – 思想品德，八年级 上册 [Compulsory Textbook - Ideology and Moral Education, grade 8 volume A]. *Rénmín jiàoyù chūbǎnshè* 人民教育出版社: 北京. 2013 年第一版，2015 年第 14 次印刷.

23. *Sīxiǎng pǐndé kèchéng jiào cūn yánjiū kāifā zhōngxīn* 思想品德课程教村研究开发中心[Ideological and Moral Education Curriculum, Teaching, Research and Development Center] (2013). *Yìwù jiàoyù jiàokēshū – sīxiǎng pǐndé, bā niánjí xià cè* 义务教育教科书 – 思想品德，八年级 下册 [Compulsory Textbook - Ideology and Moral Education, grade 8 volume B]. *Rénmín jiàoyù chūbǎnshè* 人民教育出版社: 北京. 2013 年第一版，2014 年第 11 次印刷.

24. *Sīxiǎng pǐndé kèchéng jiào cūn yánjiū kāifā zhōngxīn* 思想品德课程教村研究开发中心[Ideological and Moral Education Curriculum, Teaching, Research and

Development Center] (2013) Yìwù jiàoyù jiàokēshū – sīxiǎng pǐndé, jiǔ niánjí quán yī cè 义务教育教科书 – 思想品德，九年级 全一册 [Compulsory Textbook - Ideology and Moral Education, grade 9 entire volume]. Rénmín jiàoyù chūbǎnshè 人民教育出版社: 北京. 2013 年第一版，2013 年第 13 次印刷.

Science/科学:

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