



Character Education Analysis in The Natural Sciences Textbook of 9th Grade (Student Book): a Case of Chemistry Subject

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Abstract

Education is not only to develop cognitive aspects but also to develop the character of a human being. As one of the primary learning sources, the textbook also has to accommodate character education. This study aimed to analyze character education in chemistry subject in the natural sciences textbook of 9th Grade, especially student book. The textbook that was analyzed was published by the Ministry of Education, Culture, Research, and Technology. The study was conducted by a qualitative method using the content analysis technique. Two chapters are analyzed. Particles Composing Objects and Living Things and Eco-friendly Technologies. The study revealed that these two chapters contained all values of Basic Competencies 3 and 4 in Curriculum 2013 (religious, care, responsibility, discipline, honesty, confidence, communicative, creative, scientific thinking, curiosity, democratic, and collaboration).

Keywords: *Character education, Chemistry subject, Natural sciences textbook*

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INTRODUCTION

Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious-spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation, and state (Ministry of Law and Human Rights, 2003). In other words, education should create not only intelligent human resources but also be able to make human beings civilized. Strengthening character education is one of the keys to achieving real educational goals.

Because of the importance of character education, the government issued (Ministry of Law and Human Rights, 2018). The regulation states that strengthening character education in formal education units is integrated, both in intra-curricular, co-curricular and extra-curricular activities. In other words, supporting character education must also be integrated into learning. The character education values applied in Strengthening Character Education mainly include religious values, honesty, tolerance,

discipline, hard work, creative, independent, democratic, curiosity, national spirit, love for the homeland, respect for achievement, communicative, loves peace, likes to read, cares about the environment, cares about social, and responsible.

Character education is a reasonably complex terminology to interpret. The definition of character education is also very much. One that is widely used today is the definition coined by the Character Education Partnership (CEP). Character education is the intentional, proactive effort by schools, districts, and states to embed in their student essential core ethical values such as caring, honesty, fairness, responsibility, and respect for self and others. The U.S. Department of Education (U.S. DoE-a, n.d.) defines character education as: A learning process that enables students and adults in a school community to understand, care about and act on core ethical values such as respect, justice, civic virtue and citizenship, and responsibility for self and others. Upon such core values, we form the attitudes and actions that are the hallmark of safe, healthy and informed communities that serve as the foundation of our society (para 5) (Protz, 2013).

In line with this, (Ministry of Education and Culture, 2016) divides core competencies into spiritual attitudes, social attitudes, knowledge, and skills. Implementing the curriculum in the schools certainly requires the support of learning resources. One of the primary learning resources used in the schools is textbooks. Textbooks are also one of the keys to education success in Finland, a very advanced education country (Moate, 2021).

Based on Ministry of Law and Human Rights (2017), textbooks are divided into two types, namely main textbooks and companion textbooks. The main textbooks are textbooks that must be used in learning based on the applicable curriculum and are provided by the Central Government. In comparison, companion textbooks are textbooks compiled by the community based on the curriculum and have been approved by the Central Government. The Central Government referred to in this case is the ministry that organizes educational and cultural affairs, namely the Ministry of Education, Culture, Research, and Technology.

The importance of textbooks for implementing learning in schools is not comparable to the number of studies that focus on the textbooks themselves. The literature review conducted by Vojir & Rusek (2019) stated that in the period 2000 to 2018, there were only five journals in Indonesia that focused on textbooks. Research conducted by Mithans & GRMEK (2020) found that teachers in Slovenia use textbooks to teach educational content.

Several studies related to the analysis of character education in textbooks, including analysis the content of character education in science textbooks for class VII conducted by Permatasari & Anwas (2019). The content of character values in the Indonesian Class XI Curriculum 2013 textbook also was conducted by Meilani (2017). Analysis character education in science textbooks, especially the VIII class biology material published by the Ministry of Education and Culture was carried out by Mutmainah (2020). Character values analysis in the Social Sciences textbook for class VII Curriculum 2013 was carried out by Lukman (2020). The character value content in the Class VIII Junior High School PPKn textbook was analysed by Haryati & Khoiriyah (2017). Meanwhile, the analysis of the content of character education in the 2013 Curriculum IX grade natural sciences textbooks published by the

Ministry of Education and Culture has never been carried out.

Natural Sciences subjects are subjects that are very close to everyday life. Natural Sciences subjects so far seem to be synonymous with cognitive content, memorizing material, counting, and so on. Therefore, the character values that often appear only focus on natural sciences values, such as scientific thinking and curiosity. However, if examined further, natural sciences subjects contain a deep spiritual significance. By studying various natural phenomena through natural sciences, we will understand that God created the universe and everything in it so perfectly that nothing in this world was created in vain. That way, we will be more grateful for everything in this world to be wiser in treating the environment and other living things. In this case, natural sciences subjects also contain values in line with Pancasila, such as fair and civilized humanity. More specifically, in this discussion, the material taken is chemistry. Whether we realize it or not, everything on this earth is made up of chemicals. But all this time, sometimes we misunderstand chemistry. When we mention chemicals, what comes to our mind are dangerous and synthetic materials. The air we breathe every day also consists of chemical elements (oxygen). There's even a quote that "Life is chemistry, there is no life without chemistry." This study aimed to analyse the content of character education in the Natural Sciences Textbook Class IX Curriculum 2013 published by the Ministry of Education and Culture, especially in Chemistry.

RESEARCH METHOD

The research method used in this study is qualitative analysis with content analysis techniques. The object of research used is the Natural Science Textbook for 9th Grade published by the Ministry of Education and Culture in 2018 written by Zubaidah *et al.* (2018). An analysis was carried out on the chemical material in the book. The chemical materials in the natural sciences textbooks for 9th Grade are Chapter 8 of Particles Composing Objects and Living Things and Chapter 10 of Environmentally Friendly Technologies. The reference in this analysis is the 2013 curriculum. The instrument used in this study is the values of character education derived from Basic Competencies 3 and 4. Basic Competencies 3 and 4 are derived from Core Competencies of knowledge and skills. Character education in Core Competency 1 and Core

Competency 2 can be obtained if students can understand the knowledge contained in Core Competency 3 and practice it with Core Competency 4. Instrument grid shown in table 1.

Table 1. Instrument Grid

Basic Competencies	Character Values Contained in Basic Competencies
3.8 Connecting the concept of matter particles (atoms, ions, molecules), the structure of simple substances with the properties of materials used in everyday life, as well as the impact of their use on human health	<ul style="list-style-type: none"> • religious, • care, • responsibility, • discipline, • honesty, • confidence, • communicative, • creative, • scientific thinking,
4.8 Presenting the results of investigations about the nature and use of materials in everyday life	<ul style="list-style-type: none"> • curiosity, • democratic, • collaboration.
3.10 Analyzing eco-friendly technology processes and products for sustainable life	<ul style="list-style-type: none"> • religious, • care, • responsibility, • discipline, • honesty, • confidence, • communicative, • creative, • scientific thinking,
4.10 Presenting works on simple eco-friendly technological processes and products	<ul style="list-style-type: none"> • curiosity, • democratic, • collaboration.

RESULT AND DISCUSSION

The initial stage in the textbook content analysis is to determine the character values contained in Basic Competencies 3 and 4 in Chemistry subjects. Basic Competency 3 in the 2013 Curriculum is a derivative of knowledge Core Competence. While Basic Competency 4 is a derivative of skills Core Competence. When students have the knowledge and can carry out activities related to their understanding, they will be able to apply the character values contained in these competencies. Based on Ministry of Law and Human Rights (2018), character education values applied in Strengthening Character Education mainly include religious values, honesty, tolerance, discipline, hard work, creative, independent, democratic, curiosity, national spirit, love for the homeland, respect for achievement, communicative, loves peace, likes to read, cares about the environment, cares about social, and responsible. Meanwhile, scientific values include practice, intellectual, educational, socio-political-economic, and religious values (Yudianto, 2006).

Chemistry chapters in the natural sciences textbook of 9th Grade were Chapter 8: Particles Composing Objects and Living Things and Chapter 10: Eco-friendly Technologies

Content Analysis of Chapter Particles Composing Objects and Living Things

The result revealed religious (gratitude), care, responsibility, curiosity, discipline, honesty, creativity, scientific thinking, confidence, collaboration, and democratic value contained in chapter 8.

Firstly, Religious value (gratitude) was explicitly delivered in the apperception shown in Figure 1.

Maha Besar Tuhan yang telah menciptakan alam ini lengkap dengan berbagai zat yang berfungsi untuk menjaga kelangsungan hidup berbagai makhluk hidup. Tuhan juga telah menciptakan berbagai proses yang dibutuhkan oleh makhluk hidup untuk menjalankan kehidupannya, misalnya fotosintesis yang terjadi pada tumbuhan, berperan menyediakan oksigen dan bahan makanan bagi makhluk hidup lain, seperti hewan dan manusia. Daun yang sudah tua kemudian jatuh menjadi sampah dan akan mengalami proses pembusukan atau penguraian. Pada proses penguraian, zat-zat penyusun daun akan diubah menjadi zat-zat yang lebih sederhana dan dapat digunakan sebagai pupuk kompos. Dari penjelasan tersebut, kita mengetahui bahwa di alam ini terjadi proses pembentukan zat-zat seperti pada fotosintesis dan juga penguraian zat-zat seperti pada pembusukan daun.

Figure 1. Apperception Containing Religious Value (Zubaidah *et al*, 2018)

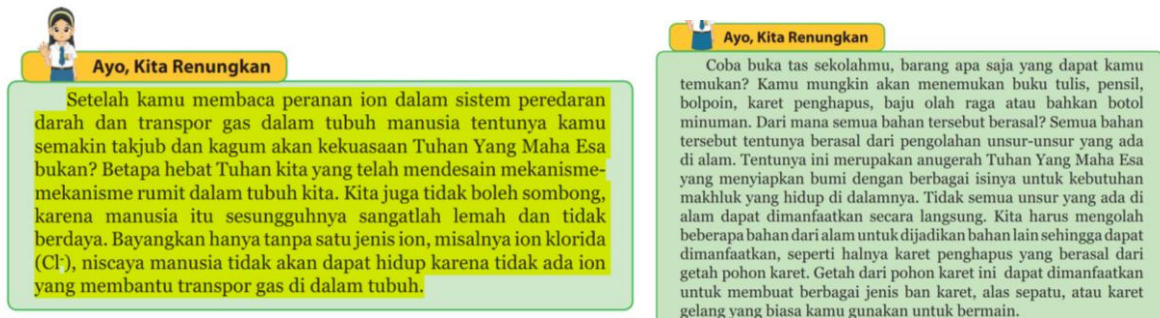


Figure 2. Rubric Ayo, Kita Renungkan (Zubaidah *et al*, 2018)

There was also a particular rubric that explicitly guided students to be grateful, named Ayo, Kita Renungkan (Figure 2).

Religious or gratitude values also appeared in another part (Figure 3). Writers mentioned gratitude value after discussing of chemical and physical properties of aluminum.

Pada bagian sebelumnya, kamu telah mengetahui alasan penggunaan aluminium sebagai bahan pembuatan peralatan memasak. Selain memiliki titik leleh yang tinggi dan memiliki stabilitas yang tinggi, aluminium juga bersifat tidak reaktif. Bayangkan jika aluminium memiliki reaktivitas yang tinggi dengan air! Ketika kamu memasak, kamu pasti akan kaget dan tidak dapat memasak air karena panci aluminium telah bereaksi membentuk zat lain! **Tentu kita wajib bersyukur kepada Tuhan Yang Maha Esa karena telah menciptakan aluminium yang memiliki sifat fisika dan sifat kimia yang sesuai untuk memenuhi kebutuhan kita.**

Figure 3. Gratitude Value at the End of Certain Discussion (Zubaidah *et al*, 2018)

Religious values are generally embedded in books without distinguishing one religion from another. This is in line with UNESCO (2017), which states that textbooks must be inclusive of religion, gender, and culture. Textbooks play a critical role in the process of raising awareness of other people's beliefs and encourage understanding about and respecting, the diversity

of beliefs that exist in society and the world in general.

The second value was care. Care can be defined as environmental care and also care for each other. In this chapter, the care that was explicitly mentioned was care for environment. This value was mentioned at the beginning of the chapter to lead students to the purpose (Figure 4).



Figure 4. Environmental care at the Beginning of Chapter A (Zubaidah *et al*, 2018)

Environmental care value also was mentioned in the middle of the case explanation. The writers explained a case of heavy metal

pollution that happened in Minamata. In this case, writers lead students to be aware of environmental sustainability (Figure 5). This is in

line with Bohlin (2005), who mentions that the study of literature provides students with an occasion for focused moral reflection and

dialogue, an occasion to examine what informs the moral compass guiding fictional lives.

Kejadian musibah Minamata membuat perhatian warga dunia untuk lebih menjaga lingkungan dari pencemaran, khususnya pencemaran logam berat. Teluk Minamata akhirnya ditetapkan bebas merkuri pada bulan Juli 1997 (41 tahun kemudian) dan warga sekitar dapat beraktivitas secara normal baik untuk menangkap ikan maupun berenang di laut.

Figure 5. Environmental care in the middle of phenomenon explanation (Zubaidah *et al*, 2018)

Writers mentioned other values in the activities. Rubric Ayo, Kita Lakukan was an activity that suggested students conduct experiments related to the topic. In these activities, there were some values appeared. Responsibility, discipline, and honesty were implicitly contained in the instruction, such as students had to be careful of using dangerous things. Students also had to be disciplined to conduct experiments as instructed to avoid unwanted things. In the case of reporting the result, students had to present the actual result. In this case, the honesty value was significant. In

line with this, in a survey by NatCen Social Research and the National Children's Bureau used a wide variety of curricular and extra-curricular activities to provide character education, including: assemblies, subject lessons, dedicated character education lessons, sports, performance arts clubs, outward bound activities, hobby clubs, and subject learning clubs (Department of Education, 2019). These opportunities help young people to explore and express their character and build the skills they need for resilience, empathy and employability.

Ayo, Kita Lakukan

Aktivitas 8.1 Mengidentifikasi Perbedaan Zat dalam Benda dan Makhluk Hidup secara Sederhana

Apa yang kamu perlukan?

1. Bulu unggas	7. Daun
2. Beberapa helai rambut	8. Kain perca jenis katun
3. Sepotong daging	9. Karet ban atau bahan lain yang ada di sekitarmu
4. Plastik	10. Pinset atau penjepit kayu
5. Kayu	11. Gunting atau pisau
6. Kertas	12. Pembakar spiritus

Apa yang harus kamu lakukan?

- Buatlah kelompok yang beranggotakan 4-5 orang.
- Potonglah kain perca yang bersih dan kering dengan ukuran 4x4 cm.
- Jepit salah satu ujung kain tersebut dengan pinset.
- Ciumlah bau atau aroma kain tersebut.
- Nyalakan pembakar spiritus.
- Bakarlah ujung kain dengan hati-hati.**

Ingat! Berhati-hatilah dalam menggunakan pembakar spiritus! Jangan sampai pakaian atau badanmu terbakar!

- Setelah ujung kain terbakar, segera matikan api pada ujung kain yang terbakar.
- Ciumlah kembali bau kain sudah terbakar.

Hati-hati! Jangan membau baunya terlalu lama dan jangan terlalu dekat dengan hidung! Identifikasilah bau secara tidak langsung yaitu dengan mengibaskan tangan di atas bahan ke arah hidung!

Figure 6. Responsibility, Discipline, and Honesty Value in the Activity (Zubaidah *et al*, 2018)

In the same activity, there were also other values. Creativity and scientific thinking are the values in the rubric Ayo Kita Lakukan. Scientific thinking is that mode of thinking about any scientific subject, content, or problem in which the thinker improves the quality of their thinking

by skillfully taking charge of the structures inherent in thinking and imposing intellectual standards upon them (Paul & Elder, 2008). Students were asked to find references and define their observations related to the topic, as shown in Figure 7.

2. Tentukan jumlah proton, neutron, dan elektron pada atom tersebut.
3. Buatlah bulatan sebesar kelereng besar dengan menggunakan plastisin sebagai model proton dan neutron. Untuk membuat model elektron buatlah bulatan yang lebih kecil. Gunakan plastisin yang berbeda warna untuk pembuatan model neutron, proton, dan elektron.
4. Buatlah lingkaran kulit-kulit atom menggunakan kawat tembaga. Bila kulit atom lebih dari satu, kamu dapat membuat lingkaran dengan jari-jari berbeda.
5. Tempelkan model proton, neutron, dan elektron yang telah kamu buat pada kawat tembaga yang telah ditempelkan pada kertas karton, kemudian berikan nama dan lambang atom sesuai dengan jenis atom yang kamu buat.
6. Carilah informasi tambahan mengenai manfaat atau fungsi dari jenis atom unsur yang telah kamu buat dalam kehidupan sehari-hari.
7. Presentasikan model atom yang kamu buat di depan kelas.
8. Agar kamu lebih jelas, perhatikan contoh model atom litium (Li) berikut!

Figure 7. Activity (Rubric Ayo Kita Lakukan) to Guide Creativity and Scientific Thinking (Zubaidah *et al*, 2018)

Another activity, named Ayo, Kita Pikirkan! also was used by writers to embed scientific thinking and curiosity. Students were

asked to think about the linkages between the topic explained and the daily phenomenon.

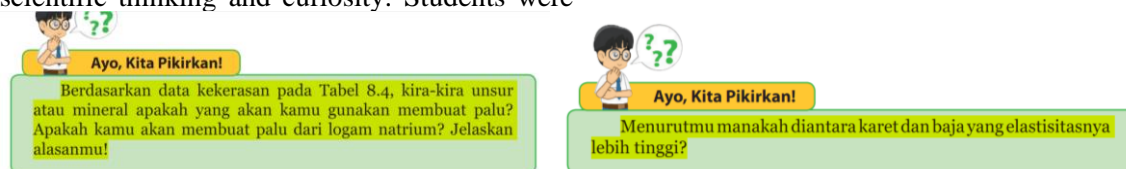


Figure 8. Ayo, Kita Pikirkan, containing scientific thinking (Zubaidah *et al*, 2018)

In the activity, some projects were designed to be conducted in a group. Conducting a project in a group was able to embed some

values, such as collaboration, communication, and democratic.

Ayo, Kita Lakukan
Aktivitas 8.4 Mengidentifikasi Berbagai Jenis Bahan dan Pemanfaatannya dalam Kehidupan Sehari-hari

Apa yang kamu perlukan?

1. Alat tulis
2. Kertas

Apa yang harus kamu lakukan?

1. Buatlah kelompok yang beranggotakan 4-5 orang.
2. Buatlah tabel pengamatan seperti pada Tabel 8.7.
3. Bersama kelompokmu lakukan identifikasi berbagai jenis bahan, sifat dari bahan tersebut, dan pemanfaatannya dalam kehidupan sehari-hari. Kamu dapat melakukan pengamatan di rumah, di sekolah, atau di lingkungan sekitar tempat tinggalmu.
4. Tulislah hasil identifikasi yang telah kamu lakukan pada tabel yang telah kamu buat.

Figure 9. Group Activity (Zubaidah *et al*, 2018)

At the end of some projects, students were asked to present their results in front of the class.

In this activity, confidence and communicative value were embedded.

Ayo, Kita Cari Tahu

Bersama kelompokmu, coba carilah sifat kimia selain yang telah kamu pelajari, yang perlu untuk dipertimbangkan ketika akan memanfaatkan suatu bahan! Kemudian presentasikanlah hasilnya di kelas!

Figure 10. Presentation activity (Zubaidah *et al*, 2018)

Content Analysis of Chapter Eco-Friendly Technologies

The result revealed religious (gratitude), care, responsibility, honesty, creativity, scientific thinking, confidence, curiosity, communication, collaboration, and democratic in Chapter 10

(Eco-Friendly Technologies). Religious value was mentioned explicitly in the apperception shown in Figure 11.

Bahan bakar bensin, LPG, batu bara, dan minyak bumi merupakan bahan bakar fosil. Bahan bakar fosil merupakan sumber energi yang berasal dari sisa-sisa makhluk hidup yang ada dalam bumi dan tidak dapat diperbarui karena dibutuhkan waktu jutaan tahun untuk menghasilkannya. Sumber energi lainnya seperti matahari, angin, aliran air, kayu, dan panas bumi merupakan sumber energi yang dapat diperbarui. Sumber energi tersebut dapat terbentuk kembali secara alami dalam waktu-waktu tertentu. Maha Besar Tuhan yang telah menciptakan berbagai sumber energi untuk kehidupan kita di bumi. Oleh karena itu, kita harus selalu bersyukur atas segala nikmat-Nya dengan menggunakan sumber energi secara bijak dan menjaga ketersediaannya.

Figure 11. Apperception Containing Religious Value (Zubaidah *et al.*, 2018)

In the middle of the explanation, the religious value was also mentioned. Writers

guide students to be grateful for everything they have related to the topic (Shown in Figure 12).

Beberapa teknologi ramah lingkungan yang telah dikembangkan yaitu pembangkit listrik yang memanfaatkan angin, cahaya matahari, panas bumi, bahan bakar dari tumbuhan (*biofuel*), dan dari gas hidrogen (H_2). Teknologi tersebut dikembangkan untuk memenuhi kebutuhan manusia dengan tetap mengutamakan kelestarian alam. Tentu kita wajib bersyukur kepada Tuhan Yang Maha Esa karena telah menciptakan sumber energi tersebut dan memberikan akal pikiran pada manusia untuk mengembangkan berbagai teknologi, sehingga kita lebih mudah melakukan berbagai kegiatan. Tiap-tiap teknologi yang dikembangkan manusia memiliki keunggulan dan kekurangan. Untuk memahami lebih lanjut, ayo kita pelajari bagian berikut ini dengan penuh semangat!

Figure 12. Gratitude value (Zubaidah *et al.*, 2018)

The topic in this chapter was related to environmental sustainability. Writers connected the crude oil phenomenon to environmental

sustainability directly. Therefore, it can also contain care value, especially care for the environment (Figure 13).

Pada tahun 1990, hampir 40% kebutuhan energi dipenuhi dari minyak bumi. Berdasarkan kenyataan tersebut, pernahkah kamu berpikir apabila minyak bumi digunakan terus menerus, apakah minyak bumi akan habis? Selain keberadaan minyak bumi yang semakin menipis, penggunaan minyak bumi sebagai bahan bakar juga memiliki beberapa dampak pada lingkungan. Coba pikirkan apa saja dampak penggunaan minyak bumi bagi kelestarian lingkungan? Dampak yang paling dapat kita rasakan akibat penggunaan minyak bumi sebagai bahan bakar adalah terjadinya pencemaran udara. Oleh karena itu, saat ini mulai banyak ilmuwan yang mengembangkan teknologi yang lebih ramah lingkungan.

Figure 13. Care value (Zubaidah *et al.*, 2018)

In this chapter, there was an activity named Ayo, Kita Diskusikan. In this activity, students were asked to conduct group discussions about various fuels and present their results in front of

the class. From this activity, there were some values that can be appeared indirectly. There was scientific thinking, collaboration, democratic, confidence, and communication

Ayo, Kita Diskusikan

Perhatikan Gambar 10.4. Bersama dengan teman sebangkumu, identifikasilah hal-hal berikut pada teknologi bus dan mobil surya.




Sumber: (a) images google.com (b) Dok. Kemdikbud
Gambar 10.4 (a) Bus, (b) Mobil Tenaga Surya

1. Sumber energi apa yang digunakan kedua alat transportasi tersebut? Coba jelaskan menurut sumber, keterbaruan, dan keramahan terhadap lingkungan!
2. Bagaimana emisi/produk sisa yang dihasilkan?
3. Apa dampak emisi yang dihasilkan kendaraan tersebut bagi lingkungan dan manusia untuk jangka pendek dan jangka panjang?
4. Manakah dari kendaraan tersebut yang merupakan kendaraan ramah lingkungan dan kendaraan yang tidak ramah lingkungan?
5. Presentasikan hasil diskusi kelompok pada forum diskusi kelas!

Figure 14. Rubric Ayo, Kita Diskusikan (Zubaidah *et al*, 2018)

Another activity was conducted in group discussion, titled *Ayo, Kita Cari Tahu*. Group discussion was able to enhance collaboration, democratic, and communicative values. Students

have to identify various technologies around them and classify the eco-friendly technologies. Therefore, this activity also can enhance curiosity and scientific thinking.

Ayo, Kita Cari Tahu

Perhatikan teknologi yang ada lingkungan sekolah atau rumahmu! Sebutkan nama teknologi dan di mana teknologi tersebut digunakan? Apakah teknologi tersebut ramah lingkungan? Apa saja syarat-syarat teknologi ramah lingkungan?

Untuk mempermudah kegiatanmu, lakukan kegiatan tersebut dalam kelompok. Gunakan sumber lain seperti buku, koran, dan internet untuk melengkapi hasil diskusimu. Kamu juga dapat bertanya pada orang tuamu atau anggota keluarga lainnya.

Figure 15. Rubric Ayo, Kita Cari Tahu (Zubaidah *et al*, 2018)

Similar to chapter 8, there was also rubric *Ayo, Kita Lakukan* in this chapter. Students were asked to conduct an observation about environmental problems around them. This activity is able to develop scientific thinking and curiosity. The activity also can create

responsibility and discipline because students have to complete the task according to instruction. The activity was designed in a group. Working in a team is able to enhance collaboration, democratic, and communicative.

Ayo, Kita Lakukan

Aktivitas 10.1 Mengidentifikasi Proses, Teknologi, dan Permasalahan Lingkungan

Perhatikan lingkungan tempat tinggalmu! Termasuk kawasan apakah tempat tinggalmu? Apakah kawasan pertanian, perkebunan, peternakan, kawasan industri skala besar, rumah tangga, atau lingkungan perumahan padat penduduk? Setelah mengenali lingkungan tempat tinggalmu, lakukan kegiatan observasi berikut!

Apa yang kamu perlukan?

1. Alat tulis
2. Lembar observasi
3. Kamera (jika ada)

Apa yang harus kamu lakukan?

1. Buatlah kelompok yang terdiri atas 4-5 orang.
2. Pilih dan pergilah ke suatu kawasan yang memanfaatkan teknologi sesuai dengan kondisi di sekitar tempat tinggal atau sekolahmu, misalnya pabrik atau industri rumah tangga.

Mintalah surat izin dari sekolah dan bantuan orang tua untuk pergi ke tempat tersebut jika memang kelompokmu memerlukannya.

3. Deskripsikan hasil observasimu, meliputi hal-hal berikut:

Kawasan/nama tempat :
 Teknologi/alat yang digunakan :
 Bahan baku :
 Produk :

Apa yang perlu kamu diskusikan?

Figure 16. Rubric Ayo, Kita Lakukan (Zubaidah *et al*, 2018)

In this chapter, there was another rubric Ayo, Kita Lakukan. The activity was to guide students in making a simple water purifier. Students have to conduct this experiment according to the instruction given. In this case, students have to be responsible and disciplined to

work the investigation ultimately. Besides that, this activity guide students to work in a team. Therefore, the activity can enhance collaboration, democratic, and communicative. In the end, the activity also enhances scientific thinking.

Ayo, Kita Lakukan

Aktivitas 10.2 Membuat Alat Pemurnian Air Sederhana

Apa yang kamu perlukan?

1. 1 buah botol air minum ukuran besar (1 liter atau lebih)
2. 2 gelas pasir
3. 2 gelas kerikil
4. 1 gelas batu
5. Arang
6. Ijuk atau sabut kelapa
7. Kapas/kain
8. Tongkat bambu
9. Kawat
10. Baskom/wadah air
11. Karet gelang/tali
12. Air kotor

Perhatikan Gambar 10.21 untuk membuat alat pemurnian air sederhana.

Sumber: Dok. Kemdikbud

Gambar 10.21 Skema Teknologi Pemurnian Air Sederhana

Apa yang harus kamu lakukan?

1. Potonglah satu botol air mineral seperti pada Gambar 10.21.
3. Kamu dapat mengganti urutan-urutan lapisan bahan sesuai dengan kesepakatan kelompok.
4. Catatlah urutan-urutan lapisan yang kamu buat jika memang berbeda dengan petunjuk.
5. Pasang kapas atau kain pada bagian ujung botol, lalu ikat dengan karet atau tali.
6. Letakkan botol pada suatu penyangga.
7. Tuangkan air kotor ke alat yang sudah kamu siapkan. Amati air yang keluar dari alat tersebut.
8. Bandingkan kejernihan air yang keluar dengan air yang masuk.
9. Catatlah juga kecepatan dalam proses penyaringan. Kecepatan proses penyaringan dapat dihitung dengan membandingkan volume air yang tertampung dengan waktu tertentu (misalnya dalam waktu 15 menit).
10. Bandingkan kualitas air hasil saringan kelompokmu dengan kelompok yang lain.

Apa yang perlu kamu diskusikan?

1. Bagaimana keadaan air pada saat dimasukkan ke dalam alat yang kamu buat dan pada saat ke luar dari alat tersebut? Coba kamu bandingkan! Gunakan data hasil pengamatan untuk memperoleh jawabannya!
2. Apakah kualitas air hasil kelompokmu berbeda dengan kelompok yang lain? Mengapa demikian?
3. Setelah membandingkan hasil percobaan kelompokmu dengan hasil percobaan kelompok lain, bagaimanakah hubungan kecepatan pemurnian air dengan kejernihan air yang dihasilkan?

Apa yang dapat kamu simpulkan?

Berdasarkan percobaan dan diskusi yang telah kamu lakukan, apa yang dapat kamu simpulkan?

Figure 17. Rubric Ayo, Kita lakukan (Zubaidah *et al*, 2018)

In this chapter, there was another activity named *Ayo, Kita Selesaikan*. In this activity, students were asked to identify the practice of

energy saving in their daily lives after discussing energy saving. It will enhance scientific thinking.

Ayo, Kita Selesaikan

Selain perilaku hemat energi yang telah dipaparkan di atas, apakah yang dapat kamu terapkan dalam kehidupan sehari-hari agar dapat menghemat energi? Tuliskan pada tabel berikut!

Tabel 10.1 Daftar Perilaku Hemat Energi

No	Perilaku Hemat Energi	Kendala/Kekurangan dalam Pelaksanaan

Diskusikan di kelas perilaku hemat energi yang dapat diterapkan bersama-sama.

Figure 18. *Ayo, Kita Selesaikan* (Zubaidah *et al*, 2018)

Based on the research results above, the conformity of Material and Character Education in Basic Competencies 3 and 4 can be presented in table 2.

Table 2. The Conformity of Material and Character Education in Basic Competencies 3 and 4

Character Education Values	Chapter		
	Particles Composing Objects and Living Things	Composing	Eco-friendly Technology
Religious (Gratitude)	√		√
Care	√		√
Responsibility	√		√
Discipline	√		√
Honesty	√		√
Confidence	√		√
Communicative	√		√
Creative	√		√
Scientific thinking	√		√
Curiosity	√		√
Democratic	√		√
Collaboration	√		√

CONCLUSION

A textbook is one of the primary learning media. Textbook, as a curriculum translation, should not only contain subject material but also contain character values. According to the result, all the values include religious (gratitude), care, responsibility, discipline, honesty, confidence, communicative, creative, scientific thinking,

curiosity, democratic, and collaboration contained in the basic competencies 3 and 4 of Particles Composing Objects and Living Things and Eco-friendly Technology. These values were mentioned explicitly and implicitly in the explanation and also through various activities.

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