The Earth is Our Home: Embodied Environmental Learning

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This curriculum unit is recommended for:
First grade Dual Language Immersion students

Keywords: Embodied learning, physical movement, interactivity, Chinese, language immersion, tactile experiences, sensory learning, elementary school, science, environment

Teaching Standards: See Appendix 1 for teaching standards addressed in this unit.

Synopsis: In this curriculum unit, first grade Chinese language immersion students will participate in a series of activities and lessons that will be held in indoor and outdoor settings, employing the use of physical movement and other forms of embodied learning. Through various methods, students will be introduced to environmental science and learn about interacting with and living on Earth. Students will do interactive firsthand exploration of the observable properties that our physical environment has–such as in geographic features like soil, rocks, and grass, and make connections between these properties and their own lives and communities. This unit will be aligned to the North Carolina first grade science standards and grade-appropriate Chinese language standards, and is designed to incorporate the embodied learning experience throughout. –

I plan to teach this unit in November of the school year of 2021-2022 to 18 students in the Chinese language immersion first grade program.

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Grace Han

Introduction

As students begin returning to in-person learning after a tumultuous year of Zoom lessons and otherwise restless online learning, it becomes increasingly important for us as educators to depend not on the technology we have become all too familiar with over the course of the past semesters, but to depend on the tangible, engaging, markedly more human aspects of face-to-face classroom experiences–something that this curriculum unit aims to do.

Young students have been denied this full experience that is crucial for their development for over a year now, taught concepts over a screen that are undoubtedly more foreign to them than if they had been able to see them demonstrated in real life. This especially applies to subject areas that rely heavily upon interpersonal communication and environmental engagement, challenging teachers in the language and science fields to not only reinforce material that was taught online, but provide learners with quality instruction at their grade level to do so.

In order to teach students these subjects, and overall, it is necessary to supply them with a foundation that makes learning something that is appealing, assists students in retaining the information they learn, and reinforces what they know to guide them forward. When we look to tools we have available not just in the classroom, but tools that each young learner uses from day one–such as movement, physical and tactile engagement, and hands-on practice, we see that one type of learning utilizes interaction with the environment and people around us more than any other for this "learning foundation": embodied learning. Embodied learning has long been used in classrooms to help students grow into their world, employing and combining sensory experiences with observation and interaction to capture students' attention and immerse them in their learning experience. The older students get, the more of a pattern it seems to be that educational institutions tamp down these forms of learning in favor of telling students to sit tight and passively absorb information, forgetting that all of us, as humans, still have these capabilities inside–embodied methods should be ingrained into curriculums for students of all ages to facilitate active and meaningful learning, starting from youth.

School / student demographics

I teach at the South Academy of International Languages, also known as SAIL. SAIL is a K-8 county-wide magnet school in the South Learning Community. SAIL has a school population of 1230. The school has a very diverse student body and staff corresponding to its

focus in education being diverse languages–the majority of teachers and staff are bilingual, and 30% of teachers and teacher assistants hold primary citizenship in another country. Furthermore, the student body is 38% Caucasian, 21% African American, 28% Hispanic, 6% Asian, 6% multiracial and less than 0.1% each American Indian and Pacific Islander.

SAIL offers five language programs; Chinese, French, German, and Japanese are introduced as language immersion in elementary school, and Spanish is added as a language at the middle school level. At the elementary level, students receive their instruction in one of the four core languages offered that are listed above. Most enter the language program in kindergarten or first grade, and are taught the fundamentals of their target language - speech, reading, and writing. Eventually, they cross - apply these literacy and fluency skills between their target language and English, strengthening each subject as they progress.

Following the total immersion model, formal English instruction is only introduced in 3rd grade when students begin to receive one hour of English instruction daily, where from kindergarten to second grade, students receive 45 minutes of English instruction daily. By the time students reach fifth grade, most are considered bilingual and are able to understand, speak, read, and write in their target language with varying levels of proficiency.

Unit Goals

Throughout this unit, students will:

- ➢ Improve proficiency in and cross-apply content from English, Chinese, and science lessons to communicate and interact with subject matter
- ➢ Utilize embodied learning to engage with the outside environment
- ➢ Learn about North Carolina ecosystems and factors (living and nonliving) within ecosystems through firsthand observation and documentation
- ➢ Learn about Earth materials in the world around us and document their observable properties and usage through embodied learning experiences
- ➢ Learn about and retain key vocabulary in Chinese and English relating to earth science
- ➢ Learn about environmentalist practice in Chinese cultures
- ➢ Draw conclusions about and summarize their experiences in the environment
- ➢ Participate in and present a project on the environment using key vocabulary, students' findings, group work, English, and the target language

Content Research

What is embodied learning?

Embodied learning “refers to approaches that focus on the non-mental factors involved in learning, and that signal the importance of the body and feelings” (OECD 2018). Contrary to traditional teaching, which focuses on passive absorption of content rather than active involvement in the learning process, embodied learning uses humans’ natural spatial awareness and the body to help students retain information.

Macedonia explains that the key principles of Western education (and its relation to embodied learning) have their origins in Western philosophy, with scholars Descartes, Locke, and Kant among others first distinguishing the mind from the body as separate entities, maintaining where one is strictly for thinking, reason, and learning, the other is solely to sustain life and perform necessary bodily functions - these principles were Rationalist (2019).

However, as technology and research develops, the growth of neuroscience has proven an increasingly strong link between the body and mind as parts of a system working together in harmony. “Neuroscientific studies have demonstrated that processing of objects, spatial information, music, faces, flavors, odors, and also mere thinking of these concepts evokes sensorimotor responses” (Macedonia 2019). Networks within the brain and body work in harmony to process and store information, and motor and sensory experiences contribute to learning concepts across subject areas.

With this knowledge, educators may approach teaching with the mindset that lived experiences, where students consciously and unconsciously engage with and respond to their environment, are valuable and necessary for a comprehensive learning experience (OECD 2018).

How is embodied learning used, and what are its benefits?

Embodied learning may be implemented through a multitude of methods. Any kind of learning that synthesizes the body and mind, such as gestures, sensory play, engaging in the arts, and physical movement may all be used as ways to incorporate embodied learning into lessons. Each form of embodied learning may bring different benefits depending on how students retain and interact with information, as the mental and physical processes involved in each scenario vary (Skulmowski and Daniel Rey 2018).

However, embodied learning does bring proven benefits: students who engage in embodied learning strengthen their creative skills, socio-emotional skills, metacognitive, and executive skills through the sustained connection of mind function, feelings, and the body. Additionally, as embodied learning immerses students throughout the learning process, those who struggle with attention span and confidence in the classroom may benefit.

What is the relationship between embodied learning and K - 12 students?

Embodied learning is an incredibly versatile practice that may be used for K-12 students in teachers' learning approaches. A meta-analysis conducted by Georgiou and Ioannu suggests that students participating in embodied learning retain information better than those who are subject to the traditional learning experience (2019). Lack of engagement and collaboration are challenges that K-12 teachers struggle with, and embodied learning improves the likelihood that students will both engage and collaborate. Incorporating technology into the embodied learning process may even further enhance the effect; furthermore, embodied learning may especially benefit school - age learners with physical and cognitive disabilities through fostering a more inclusive environment with a less rigid structure than traditional classrooms (Georgiou and Ioannou 2019). K-12 students whose educators employ embodied learning may reap the benefits it has to offer as an immersive and holistic educational experience.

Instructional Implementation

Teaching Strategies

Project based learning

To maximize student interaction with the subject matter taught in this unit, this curriculum is designed with a project-based learning approach. As students gather new knowledge and experiences over the course of the unit, they will, in groups, demonstrate their skill and level of understanding through a media presentation of their choice that incorporates elements of embodied learning, Chinese, English, and earth science to display their conclusions.

Inquiry based learning

Synthesizing with the project-based learning elements of this curriculum, students' introduction to and exploration of properties of Earth and ecosystems will be through "big questions" that will be asked to the class at the start of each lesson. Students will approach their data collection and tactile experiences with these "big questions" in mind, drawing upon their experiences and reasoning to reach conclusions about the subject matter. In addition, each student presenting will create and answer a "big question" in their culminating group project.

Guided practice

Through guided practice, the instructor will introduce embodied learning in the form of physical gestures associated with each key term/concept in the unit (see Appendix 2). The teacher will

model gestures and encourage students to repeat the gestures, reinforcing what each gesture means and its relation to the key terms. Each gesture will appropriately correspond with these key terms, using bodily movement to convey meaning to the students. Furthermore, when students are utilizing embodied learning in their outside environment, the teacher will demonstrate how to safely, responsibly, and respectfully interact with the environment and guide students through their sensory experience and data collection.

Formative assessments

For the duration of the unit, before each lesson begins, students will self - evaluate their progress using a KWL chart (see Appendix 3) during their warmup. This KWL chart will visually display which concepts the students are familiar with but do not have a substantial understanding of, those that they would like to further learn about, and those that they have learned about. As the unit goes on, the instructor should notice that more and more concepts move towards the "Learned" section of the chart as students log these incremental progress reports.

Discussion / project groups

During each class, students will have the opportunity to use Chinese and English to discuss the subject matter in smaller groups. Discussions will be based on teacher - led inquiries centered around lesson objectives, which the students will be encouraged to individually expand upon using their own personal perspectives within their groups. Discussions will also be based on students' data collection and embodied learning experiences in relation to each environmental factor and ecosystem feature discussed in class.

Unit Objectives

The objective of this unit is to teach students about two key topics covered in the North Carolina first grade science standards: "Earth Systems, Structures, and Processes", and "Ecosystems". Students will be introduced to key concepts and vocabulary in English and the target language (Chinese), and these concepts will be reinforced and employed throughout the unit. Students will self-evaluate their progressing knowledge each day. Students will engage in embodied learning to synthesize and document the learned material using a variety of methods, including but not limited to tactile interaction with their environment outdoors, sensory experiences with environmental factors, and firsthand creation of resources demonstrating mastery of the subject matter. Students will then participate in a culminating group project answering key questions about our environment and the ecosystems within, using embodied methods as well as learned information, English, and the target language to collaborate, create, and eventually present their projects.

Prior Knowledge

In previous units on Chinese, Social Studies, Math, and Science, students have built their interpersonal communication skills through first participating in partner work and strengthening relationships with the class to begin feeling confident working with others. Then, small group discussions have also been used to facilitate group work, collaboration, and learning to productively communicate with peers. From there, they have been able to work together during classes to produce and present sentences, short written responses (to math equations, connecting concepts in Chinese, social studies concepts such as friends and school, etc.), and pieces of 2 - D art (drawings and sketches) to represent class material. I have strongly encouraged group work and in each unit previously taught, holding at least one collaborative activity per lesson per subject taught each day. This has allowed students to feel comfortable interacting with others, built confidence in negotiating, and working with materials involving physical and verbal engagement.

Classroom lessons / activities

Day 1: Creating Vocabulary Cards

Materials needed: science notebook, pencil, list of key terms / concepts (see Appendix 2), colored pencils / crayons, scissors, glue, notecards, plastic Ziploc bags, whiteboard / SmartBoard, KWL chart template (see Appendix 3)

Essential question: What do we know about the environment and ecosystems around us? What are the key terms we need to know to describe and learn about our environment?

Warmup: Have students complete this activity in a designated science notebook. On the SmartBoard / whiteboard, write the essential question and draw an example KWL chart for students to copy onto their papers. Explain what a KWL chart is, and that each day over the course of the unit, students will be using this chart each day to track their growth and mastery of the content being taught. Display on the board / provide students with a list of key terms and concepts (add on to this list during the unit if needed). Encourage students to put each concept under the Know, Want to Know, or Learned columns. As students fill out the chart, the instructor should make note of which concepts need reinforcement, which students seem to be proficient in, and adjust the teaching plan accordingly.

Lesson and activities:

- Introducing the unit through video and discussion: Teacher will display a Chinese song about protecting the earth, and humans' role in Earth's ecosystems, to the class. (https://youtu.be/wUCbWbp1Iuc) Following the video, the teacher will ask questions such as: what is the environment? What is in the environment? What is happening in the environment (good / bad)? What part do we, as humans, play in the environment? Using their previous knowledge of Chinese vocabulary and earth science to grasp the meaning of the video guided by the instructor, students will break into partners, rotating around the room to find a new partner after each question to discuss.

- Key words: From the core words / concepts list found in Appendix 2, the teacher will formally introduce each word going down the list. These words will be introduced in the target language (Chinese), and students will each be provided with the sheet listing terms in both English and Chinese, as well as one notecard for each term, gluesticks, and colored pencils / crayons. As the instructor introduces each concept, going down the list, students will be given the opportunity to cut out the term from the list, glue it onto a notecard, and draw and color a corresponding image on the notecard. These flashcards will be a resource for the students throughout the unit, and creating them should familiarize students with the meanings of each term as they prepare to explore deeper. When the list of terms is exhausted and students have finished creating their flashcards, the teacher should distribute plastic Ziploc bags to each student and encourage them to dispose of paper waste appropriately by recycling (one of the terms on the list), clean up their area, and put the completed flashcards in the bags, which then can be stapled by the teacher to each student's science notebook.

- Cultural discussion: Using the video and new vocabulary words as a supplement, teacher displays images of environmentalist practice in China. These pictures will include modern city design (high rise / high density eco - friendly housing), electric vehicles, carbon reduction initiatives (tree planting locations, green urban planning), and other examples. Teacher facilitates a discussion, referencing vocabulary words and encouraging students to "act" out the words, making associations with each image during the discussion.

Day 2: A Walk in Our Environment

Materials needed: science notebook, pencil, list of key terms / concepts (see Appendix 2), flashcards, whiteboard / SmartBoard, KWL chart template (see Appendix 3)

Essential question: What does the environment around us look, smell, sound, and feel like? What is our role in the environment around us?

Warmup: Have students complete this activity in their designated science notebook. On the SmartBoard, write the essential question and draw an example KWL chart for the students to copy onto their papers. Display the list of key terms and concepts, and encourage students to put each concept under the Know, Want to Know, or Learned columns, using flashcards for reference as necessary. As students fill out the chart, the instructor should make note of which concepts need reinforcement, which students seem to be proficient in, and adjust the teaching plan accordingly.

Lesson and activities:

- Reinforcing key words: Have students begin the lesson by showing them a video called "地球是我们的家", or "Earth Is Our Home". (https://youtu.be/eITb1L2w1YM). As students watch the video, encourage students to mimic the gestures displayed in the video and make connections between gestures and the terms on the flashcards created in the previous lesson. Reinforce meanings, relationships, and context behind each term as necessary. When the video ends, supplement the words not included in the video by guiding students to create their own gestures to correspond with terminology. Throughout this process, use both English and Chinese as you incorporate physical movements to strengthen the intersection between each skill.

- Nature area exploration: Take students outside to areas around the school where they are able to experience and interact with various elements of the environment safely. Ask students the essential questions: "What does the environment around us look, smell, sound, and feel like? What is our role in the environment around us?". Demonstrate what respectful and responsible interaction with the environment looks like (not disturbing wildlife, being careful not to tread on plants, etc.), and encourage students to begin using their senses of sight, hearing, smell, and touch to observe the ecosystems around them. As they explore their environment, use the list of key words / teacher's set of flashcards to explore how all the concepts listed are related and manifest in the nature setting. Finally, have students document the findings that they feel most relate to the essential questions and details that they found interesting, new, or unfamiliar in their science notebooks.

- ➢ Debrief: When students return to the classroom, encourage small group discussion about terms that students were able to experience firsthand, and new conclusions about Earth and ecosystems that they are able to draw from their experience.

Day 3: Practice Making Our Models

Materials needed: science notebook, pencil, list of key terms / concepts (see Appendix 2), flashcards, whiteboard / SmartBoard, KWL chart template (see Appendix 3)

Essential question: How do people interact with and change the earth? What does this change in ecosystems? How can we protect Earth?

Warmup: Have students complete this activity in their designated science notebook. On the SmartBoard, write the essential question and draw an example KWL chart for the students to copy onto their papers. Display the list of key terms and concepts, and encourage students to put each concept under the Know, Want to Know, or Learned columns, using flashcards for reference as necessary. As students fill out the chart, the instructor should make note of which concepts need reinforcement, which students seem to be proficient in, and adjust the teaching plan accordingly.

Lesson and activities:

- ➢ Focused nature area exploration: Follow the same protocols to take students to a nature area around the school, and encourage them to use the same tactile methods of observation as in the previous lesson outdoors. However, with this visit, encourage students to differentiate their experience from the previous lesson by notating in their notebooks not just what the environment looks, sounds, smells, and feels like, but specifically human influences on Earth such as environmental shaping and littering that they may physically observe. Guide students in using unit vocabulary to describe their experience in English and the target language.

- ➢ Individual project demonstration: Introduce the question “how do people interact with Earth?” Facilitate short small group discussion, encouraging students to use their learned vocabulary and cultural context, with a focus on America and China’s environments. With the whole class, conduct a “brainstorm” session using unit vocabulary and compile answers / students’ ideas. Provide a display of an example final project, which incorporates one of the answers students come up with during discussion. This project may be in the form of a 2 - D / 3 - D model or a tactile display using paper, colors, interactive material, etc. Teacher details how the project shows the answer to the

question, explaining using physical gestures and an in-depth exploration of the model with students. Teacher outlines the criteria that make the project adequate for answering the question, including but not limited to a) including a physical representation of at least 5 vocabulary terms, b) illustrating a familiar environment in either America or China) having an interactive element (such as panels, 3 - D accessories, etc).

- ➢ Individual project practice: Provide students with materials necessary for a condensed version of the final physical project. This could include paper, glue, colored pencils, figurines, and more project examples to base their project on. Encourage students to create a 2 - D poster incorporating each of the previously addressed criteria on their own with cutouts, drawings, and layers, checking in as the teacher monitors class progress and further demonstrates as necessary.

Day 4: Making Our Models in Groups

Materials needed: science notebook, pencil, list of key terms / concepts (see Appendix 2), flashcards, whiteboard / SmartBoard, KWL chart template (see Appendix 3)

Essential question: How do people interact with and change the earth? What does this change in ecosystems? How can we protect Earth?

Warmup: Have students complete this activity in their designated science notebook. On the SmartBoard, write the essential question and draw an example KWL chart for the students to copy onto their papers. Display the list of key terms and concepts, and encourage students to put each concept under the Know, Want to Know, or Learned columns, using flashcards for reference as necessary. As students fill out the chart, the instructor should make note of which concepts need reinforcement, which students seem to be proficient in, and adjust the teaching plan accordingly.

Lesson and activities:

- ➢ Debrief: As a progress check and reinforcement activity from the previous day's nature walk, direct students' attention via open ended questions to how we as humans interact with Earth, how we live on Earth's land and use its resources, what effects we have on Earth, and how these alter the environmental factors students are able to observe (e.g. humans cut down trees for logs to burn fires, what does that mean for trees like the ones we are able to see?). Encourage group discussion to answer these questions, using students' notebooks as a reference as needed. Also connect this to the examples of Chinese environmentalism displayed on Day 1, and encourage comparison between the

ways in which each culture interacts with their environment, as well as how environmentalist practices help maintain the earth in each.

- ➢ Cumulative project preparation: Divide students up into small groups for creating and presenting a final project. Each group will be assigned an essential question to answer with their final product and presentation to the class, including but not limited to "What does the environment around us look, smell, sound, and feel like?", "How do we play a role on Earth", and "How can we protect Earth?". Display the video played on the first day of the unit (https://youtu.be/wUCbWbp1Iuc) as students arrange themselves into their groups and begin discussing their essential question in order to reinforce concepts with students' new perspectives and information that they have gained over the course of the unit. When discussion is over, introduce the format that students' presentations will be in, and explain what a hands - on project will entail (2 - D or 3 - D model, tactile displays using paper, colors, interactive material, etc.).

- ➢ Check in: Close out the lesson by allowing students to brainstorm amongst themselves using their flashcards and notebooks as reference, and visit with each small group to answer any questions and provide guidance as necessary.

Day 5: Making Our Models in Groups, Continued

Materials needed: science notebook, pencil, list of key terms / concepts (see Appendix 2), flashcards, whiteboard / SmartBoard, KWL chart template (see Appendix 3), gluesticks, colored pencils, crayons, markers, construction paper, cardboard boxes, butcher paper, scissors

Essential question: How can we draw conclusions from data that we have collected to present information?

Warmup: Have students complete this activity in their designated science notebook. On the SmartBoard, write the essential question and draw an example KWL chart for the students to copy onto their papers. Display the list of key terms and concepts, and encourage students to put each concept under the Know, Want to Know, or Learned columns, using flashcards for reference as necessary. As students fill out the chart, the instructor should make note of which concepts need reinforcement, which students seem to be proficient in, and adjust the teaching plan accordingly.

Lesson and activities:

- ➢ Cumulative project - physical work: These lessons will be dedicated to students' creation and preparation time for their cumulative group projects. Prior to any group work, the instructor should revisit any necessary materials / concepts based on the students' self evaluation to ensure that students have the informational background they need to employ in their project. After supplementing any necessary information, the instructor should split students up into the groups formed in the prior lesson and refresh each group on the essential question they are answering. The teacher should encourage students to look to their science notebooks and flashcards as a resource as they work to create a model of the environment that corresponds with their "answer" to the question presented. The teacher should provide the students with a variety of creative materials to give the students flexibility in the media they choose for their presentation, including but not limited to glue sticks, colored pencils, crayons, markers, construction paper, cardboard boxes, butcher paper, and scissors. The teacher should provide an example or otherwise guide the students to create a realistic model of Earth / the environment / ecosystems relevant to their question. Students should utilize their experience with the unit's key terms and the nature area to incorporate the unit's key terms and concepts within the model. The teacher should emphasize that what cannot be demonstrated materially within the model may be physically and verbally demonstrated during the group presentation.

- ➢ Other notes: This process will invoke the use of students' tactile learning experience through asking them to first create images, 2-D or 3-D, of all our concepts relevant to their essential question (trees, trash, buildings, land, etc.) and doing their best to accurately represent those concepts, then using those images to create an "environment" on paper where all the factors interact with each other. Throughout this process, they will reinforce their knowledge on what the environment around us is, looks like, and our role as humans in it, recalling memories from our experience outdoors as well as previous lessons.

- ➢ Cumulative project - practice: Students will complete all necessary tasks relating to the physical model of their presentation. Students will then collaborate in their groups to develop a verbal and physical demonstration aligning with their essential question and presentation, employing gestures, the target language (Chinese), and English to synthesize their learning into one concise product.

Day 6: Presenting Our Projects

Materials needed: Completed physical model for project, science notebook, pencil, list of key terms / concepts (see Appendix 2), flashcards, whiteboard / SmartBoard, KWL chart template (see Appendix 3)

Essential question: How can we present information to our peers using verbal, physical, and visual resources?

Warmup: Have students complete this activity in their designated science notebook. On the SmartBoard, write the essential question and draw an example KWL chart for the students to copy onto their papers. Display the list of key terms and concepts, and encourage students to put each concept under the Know, Want to Know, or Learned columns, using flashcards for reference as necessary. As students fill out the chart, the instructor should make note of which concepts need reinforcement, which students seem to be proficient in, and adjust the teaching plan accordingly.

Lesson and activities:

- ➢ Guided presentation practice: Prior to beginning presentations for the class, demonstrate how to present a project - with a model or slideshow exemplar, call 3 students up to the front of the room to assist in demonstration. Model how to delegate presentation sections to each student through discussion. Present corresponding section of the exemplar, using physical and verbal demonstration of all vocabulary terms included (gestures, sounds, referencing project model) throughout. Emphasize movement and projection to the class as demonstration occurs.

- ➢ Presentation practice: Allow students 10 to 15 minutes in their small groups to refresh the presentation plans from the day before and practice running through their presentation once.

- ➢ Class presentations: Students will present their projects in small groups. As each small group presents, the teacher should encourage students to take notes on other groups' presentations in their science notebooks. Presentations will be done in Chinese to reinforce the connections between the Chinese and English core concepts / terms for the unit, and will connect each language to the physical model environment itself. Each environmental factor should connect to the others in its display, and ultimately, the group should effectively answer their given essential question using bodily movement (similar or the same as demonstrated earlier in the unit), verbal communication, and the environmental model as a product of their learning (with clear foundations in the core concepts and essential questions) over the course of the unit.

- Other notes: For reference, links to example products are as follows:
  https://youtu.be/qvmfTz3H4UI
  https://youtu.be/yao0KHtyBEo
  https://youtu.be/r_v1cnwGiHE

- Debrief: The instructor will take notes on each presentation for students' mastery of the content, and when each group is done presenting, the students will engage in a classroom-wide discussion and reflection on significant elements of the unit including material covered, tactile learning throughout the unit, presentation preparation, and presenting itself. Post - debrief, the instructor should compare demonstrated skill and mastery of content to initial self - assessments at the beginning of the unit.

Appendix 1: North Carolina Essential Standards

Earth Systems, Structures, and Processes

- 1.E.2 - Understand the physical properties of Earth materials that make them useful in different ways.
  - 1.E.2.1 Summarize the physical properties of earth materials, including rocks, minerals, soils and water that make them useful in different ways.

Ecosystems

- 1.L.1 Understand characteristics of various environments and behaviors of humans that enable plants and animals to survive.
  - 1.L.1.2 Give examples of how the needs of different plants and animals can be met by their environments in North Carolina or different places throughout the world.
  - 1.L.1.3 Summarize ways that humans protect their environment and/or improve conditions for the growth of the plants and animals that live there (e.g., reuse or recycle products to avoid littering).

World Language Immersion

- ➢ Interpersonal communication: Students will be able to use the target language to engage in a conversation, such as greetings, instructions, directions, topics about family and friends, and so on.
- ➢ Interpretive Communication: Students will be able to understand words and concepts presented in the target language (message mainly from textbooks, signs, videos, websites presentations-live and recorded, etc.) and respond based on their interpretation.
- ➢ Presentational Communication (speaking and writing - first graders will be focusing on speaking): Students will be able to use the target language to present information to the audience such as a project involving a multimedia display.

Appendix 2: List of key terms and concepts - Chinese and English

Environment 环境	Earth 地球	Reduce 节约	Soil 土壤
Protecting the environment 保护环境	Pollution 污染	Reuse 再利用	Water 水
Tree 树木	Flower 花	Recycle 回收	Planting 种植
Grass 草	Land 土地	Trash 垃圾	Plastic 塑料
Animal 动物	Weather 天气	Air 空气	Paper 纸

Appendix 3: KWL Chart Template

K (What I Know)	W (What I Want to Know)	L (What I Learned)

Appendix 4: Links to Resource Videos

https://youtu.be/wUCbWbp1Iuc

https://youtu.be/eITb1L2w1YM

https://youtu.be/qvmfTz3H4UI

https://youtu.be/yao0KHtyBEo

https://youtu.be/r_v1cnwGiHE

Materials List

- ★ Slideshow presentation
    - PowerPoint or Google Slides presentation including daily instructions for students, images of terms and concepts discussed, videos and information written in order by day
    - Pace students and present information in digestible visual format
- ★ Whiteboard / SmartBoard
    - Projector display or flat surface
    - Showcase daily instructions, examples, list of vocabulary words and presentations
- ★ “Nature walk”
    - Outdoor area with elements of natural landscape and human alteration ex. School trail with path, trash cans, benches, etc.
    - Students examine the natural world and gather information and references for their CU learning and project
- ★ Notecards / flashcards
- ★ Plastic ziploc bags
    - 20 index cards or cardstock / paper cutouts for students, bags for containing

    - Documenting list of key terms / concepts and making visual, character connections
- ★ Pencils
- ★ Colored pencils / crayons
- ★ Scissors
- ★ Glue
- ★ Gluesticks
- ★ Construction paper
- ★ Cardboard boxes
- ★ Butcher paper
    - Materials for creating final project (alter as needed)
    - Mold into 3-D shapes, affix together, use colors to accurately represent environmental concepts and human interaction with natural world, include Chinese characters

Student Resources

- ★ Science notebook
    - Composition notebook with space for taking notes and creating graphics and illustrations
    - Recording observations made during nature walks, entries from KWL chart during warmups and responses to essential questions

Teacher Resources

- ★ North Carolina Essential Standards (Appendix 1)
    - NC Science Essential Standards list for first grade environmental science curriculum
    - Adapt teaching + lesson plans, materials to ensure standards are being met
- ★ List of key terms and concepts (Appendix 2)
    - 20 vocabulary words in English and Mandarin corresponding to CU lessons + environmental concepts
    - Students learn + incorporate in final project, connect to CU themes about American and Chinese environmental practices and landscape interaction, teachers revisit across CU lessons
- ★ KWL Chart (Appendix 3)
    - “Know”, “Want to Know”, “Learned” columns
    - Students list concepts and vocabulary words demonstrating familiarity with unit content, instructor gauges lesson efficacy and adjusts teaching style and activities (formative assessment) according to daily KWL check-in

★ Resource Videos (Appendix 4)
- "Wei Shen Me" / "Why" - video discussing environmental decay and 21st-century issues due to human interference such as pollution, air quality, deforestation
- Introduce concept of human environment interaction in target language, synthesizing with movements and vocabulary words
- "地球是我们的家" / "The Earth is Our Home" - video discussing how humans interact with Earth as our habitat
- Introduce habitat, familiar concepts of natural materials used in students' daily lives
- "保护地球" / "Protect Our Earth" - video discussing how humans play a role in protecting our environment, conservation practices in America and China such as "reduce, reuse, recycle"
- Project example in video with 2-D movable parts, student presentation demonstration with verbal movement that can be supplemented by teacher, uses target vocabulary in discussing relevant CU concepts
- "保护地球 2" / "Protect Our Earth Part 2" - video discussing how humans play a role in protecting our environment, conservation practices in America and China such as "reduce, reuse, recycle"
- Project example in video with 2-D movable parts, student presentation demonstration with verbal movement that can be supplemented by teacher, uses target vocabulary in discussing relevant CU concepts
- "保护地球 3" / "Protect Our Earth Part 3" - video discussing how humans play a role in protecting our environment, conservation practices in America and China such as "reduce, reuse, recycle"
- Project example in video with 2-D movable parts, student presentation demonstration with verbal movement that can be supplemented by teacher, uses target vocabulary in discussing relevant CU concepts

★ Georgiou, Yiannis, and Andri Ioannou. "Embodied Learning in a Digital World: A Systematic Review of Empirical Research in K-12 Education." *Smart Computing and Intelligence*, 2019, 155–77. https://doi.org/10.1007/978-981-13-8265-9_8.
- Review study examining K-12 embodied learning environments with technology enhancements, and the educational outcomes students receive with these accommodations in STEM learning
- Supports evidence-based usage of technology in embodied learning lessons such as during this CU, teachers may read to see which methods of technology-embedded education are most effective for students at the relevant age range

★ Macedonia, Manuela. "Embodied Learning: Why at School the Mind Needs the Body." *Frontiers in Psychology* 10 (2019). https://doi.org/10.3389/fpsyg.2019.02098.

- Review study examining efficacy of embodied methods implemented during learning of second languages, spatial thinking, math
- Supports evidence-based usage of embodied learning lessons such as during this CU, teachers may read to see which methods of education are most effective for Chinese students at the relevant age range.

★ OECD. “The Importance of Innovative Pedagogies.” *Educational Research and Innovation*, 2018. https://doi.org/10.1787/g272b194c2-en.
- 27 examples demonstrating efficacy of embodied learning in international classrooms using innovative pedagogies
- Use as reference for lessons synthesizing variety of teaching methods from schools learning second languages and across educational subjects

★ Skulmowski, Alexander, and Günter Daniel Rey. “Embodied Learning: Introducing a Taxonomy Based on Bodily Engagement and Task Integration.” *Cognitive Research: Principles and Implications* 3, no. 1 (2018). https://doi.org/10.1186/s41235-018-0092-9.
- Empirical study examining usefulness of embodied learning methods through bodily engagement and task integration for student retention of material
- Supports evidence-based usage of embodied learning lessons such as during this CU, teachers may read to see which methods of education are most and least effective for science and second language instruction and which embodied learning methods best align with relevant material

★ Treffinger, Donald J, Grover C Young, Edwin Selby, and Cindy Shepardson. “Assessing Creativity: A Guide for Educators,” January 2002.
- Analysis of teachers’ role in addressing and interpreting creativity in the classroom through assessments and performance of students
- Instructors may inspire and influence students’ projects and student - led creation as they begin their cumulative projects using tools and analysis materials provided

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K2S1《保护地球🌍，让我们一起努力》电子故事书📖*YouTube*, 2020. https://youtu.be/r_v1cnwGiHE.

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