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Vocabulary Learning Through Word Cards, Collaborative Activities, and Assessment Techniques

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ABSTRACT

When reading about a specialized subject, a significant proportion of the text consists of specialized vocabulary. When the SDGs Service List was created in 2023, it joined a small number of specialized vocabulary lists that learners need to know when reading about a particular subject area. Research has shown that repetition is crucial for vocabulary learning, with the number of occurrences a learner needs to encounter a particular word to have a chance of successfully learn it ranging from six to 20. Unfortunately, most EFL materials fail to adequately recycle vocabulary items, often resulting in students lacking the necessary encounters to acquire them. This paper first demonstrates strategies to overcome this gap in vocabulary recycling through the use of electronic or paper-based word cards. It introduces the 600-word SDGs Service List and shows how electronic study sets can be used to help students study specialized vocabulary. It then builds on the work of Sheridan and Markslag (2017) and presents a new word card activity using paper-

	<p>based word cards that effectively reinforces the learning of new vocabulary and prepares students for vocabulary tests. Finally, it introduces two assessment techniques that teachers can use to evaluate students' knowledge of new vocabulary items. These methods can be easily implemented in most classrooms.</p> <p>Keywords: vocabulary cards, vocabulary card activities, assessment techniques, specialized vocabulary lists, the SDGs Service List, collaborative learning</p>
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Introduction

Vocabulary is essential for second language (L2) learners' ability to understand English texts. Extensive research has established that 98% lexical coverage—meaning learners must know 98% of the running words in the materials—is necessary for adequate reading comprehension (Hu & Nation, 2000; Laufer & Ravenhorst-Kalovski, 2010; Nation, 2006; Schmitt et al., 2011; Schmitt et al., 2017). To achieve this level of comprehension, these studies estimate that learners require a vocabulary size of 8,000 to 9,000 word families. Nation (2001, 2011, 2013) suggests that when studying L2 vocabulary, learners should initially focus on high-frequency vocabulary, such as the first 3,000 word families of English found in the British National Corpus and the Corpus of Contemporary American English (BNC/COCA; Nation, 2017), which provide 95% coverage of most general texts (Nation & Anthony, 2013; Schmitt & Schmitt, 2012), before turning their attention to specialized vocabulary.

When reading about a specialized subject, a significant portion of the text contains specialized or technical vocabulary that learners unfamiliar with the subject area are unlikely to know (Chung & Nation, 2004). When the SDGs Service List was created in 2023 (Sheridan & Tanaka), it became part of a small number of specialized vocabulary lists that L2 learners need to know when reading materials related to specific fields, such as the Academic Word List (AWL; Coxhead, 2000), the Science Word List (SWL; Coxhead & Hirsh, 2007), the Business Word List (BWL2; Hsu, 2011), the Student Engineering English Corpus (SEEC; Mudraya, 2006), the Basic Engineering List (BEL; Ward, 2009), and the Medical Academic Word List (MAWL; Wang, Liang, & Ge, 2008). Since such specialized vocabulary functions as “high-frequency” within its respective context, knowledge of these words is fundamental for understanding texts within the specialized subject area (Coxhead, 2000; Hyland, 2007; Nation, 2001).

It is not only important to determine which vocabulary items L2 learners need to study, but it is also essential to consider how they should study them. Research has shown that repetition plays a critical role in vocabulary learning, with the number of occurrences needed for a learner to have a chance at successfully learning a word ranging from 6 to 20 (Elgort & Warren, 2014; Horst et al., 1998; Rott, 1999; Waring & Takaki, 2003; Webb, 2007). Unfortunately, most EFL materials fail to effectively recycle vocabulary items, resulting in students often lacking the necessary encounters to acquire new words (Alsaif & Milton, 2012; Bergström et al., 2022; Sun & Dang, 2020).

To help learners overcome this lack of repetition, researchers and educators have explored various strategies to improve vocabulary retention. Among these, the use of word cards has emerged as a particularly effective method for providing the repeated exposure necessary for learning. Lei and Reynolds's (2022) research synthesis of 32 studies on learning English vocabulary using word cards highlights these benefits. Word cards effectively promote focused and intentional learning, increase attention to unfamiliar vocabulary (e.g., Nation, 2013; Reynolds et al., 2020), and enable learners to acquire a large number of words within a relatively short period of time (e.g., Nation, 2013). They also support the development of both receptive and productive aspects of vocabulary knowledge (e.g., Nation & Webb, 2011), can lead to significantly greater vocabulary gains than other methods, such as fill-in-the-blank activities and studying word lists (e.g., Webb et al., 2020), are viewed positively by learners (e.g., Yüksel, 2020), and are even preferred over other techniques due to their convenience and ease of quick review (Kuo & Ho, 2012).

While word cards are widely recognized as effective learning tools, their efficacy can vary depending on factors such as how they are used, who creates them, and whether they are electronic or paper-based. Lei and Reynolds's (2022) review, for example, indicates that vocabulary cards—whether electronic or paper-based, student-made or pre-made—have a positive effect on vocabulary learning. However, it also identifies some inconsistencies with more studies reporting larger effects for paper-based cards compared to electronic ones and, interestingly, for pre-made cards over student-created cards. On the other hand, Pan et al. (2023) found that while pre-made electronic word cards may save time and offer convenience, creating word cards can support more active learning, which in turn strengthens memory and understanding. This is supported by Mayer's study (2009), which found that the customization and personalization of learning make the learning experience more engaging and effective, and by Yasar and Kocoglu (2025), who found that learners who created their own cards

obtained greater vocabulary gains than students who used pre-made textbook activities to recycle the vocabulary.

In addition to repetition and the method of study, collaborative learning strategies also play an important role in vocabulary acquisition. Grounded in Vygotsky's (1978) theory of social development, which views learning as a fundamentally social process, collaborative activities such as pair and group work allow learners to clarify meanings, explain concepts, and receive immediate peer feedback (Slavin, 2011). These interactions promote deeper understanding, increase motivation through shared goals, and develop key communicative skills. In the context of L2 vocabulary development, collaborative learning supports peer scaffolding and negotiation of meaning, both of which are shown to improve vocabulary retention (Long, 1996; Swain, 2000). Kim (2008) reported that learners working in pairs during vocabulary-focused tasks outperformed individuals on both immediate and delayed vocabulary post-tests. Assinder (1991) also observed that learners engaged more deeply with vocabulary during group work, attributing this to increased negotiation of meaning among peers. Similarly, studies by Yavuz and Arslan (2018) and Rad and Sahragard (2019) demonstrated significant vocabulary gains among learners engaged in collaborative and cooperative learning environments, highlighting the positive impact of peer interaction on vocabulary development.

Pedagogical Framework and Rationale

This paper builds on previous findings by presenting a practice-based approach to improving vocabulary recycling through the use of both electronic and paper-based vocabulary cards. It demonstrates how to create and maintain effective word cards and introduces electronic study sets designed to help students learn specialized vocabulary, such as the 600-word SDGs Service List. It further builds on the work of Sheridan and Markslag (2017), whose approach provides collaborative and competitive elements to increase motivation and engagement, while aligning with the principles of effective vocabulary learning by providing multiple exposures, generative use, and active engagement, as outlined by Nation (2001, 2013) and Webb (2017). A key contribution of this paper is the introduction of a new collaborative vocabulary activity, Divide and Conquer, which combines retrieval practice with test preparation, promoting deeper processing and improved retention. In addition, the paper introduces two original collaborative assessment techniques, Word Recall & Spelling Test and Testing for Speed, that educators can use to evaluate learners' vocabulary knowledge in terms of both form and fluency.

Creating and Maintaining Word Cards

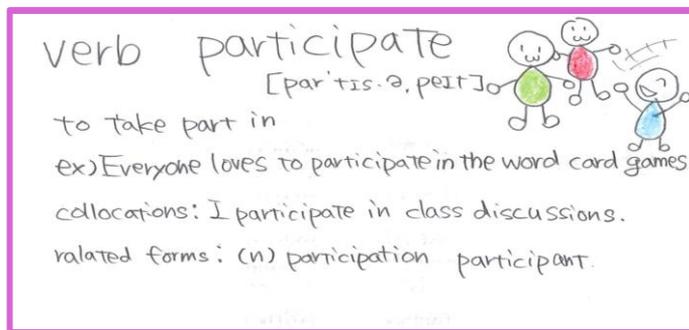
Given that knowledge of both high-frequency and specialized vocabulary is essential for reading comprehension, and that acquiring it requires repeated encounters, it is crucial to provide learners with efficient strategies for intentional vocabulary study. One widely supported technique in the literature is the use of vocabulary word cards. As outlined by Nation (2001, 2013) and Sheridan and Markslag (2014, 2017), word cards are effective tools for helping students initially learn new vocabulary, especially when they are created by the learners themselves. These cards, whether electronic or paper-based, should include essential elements related to the target word to enhance learning (see Figure 1), such as:

- **L1 translations** to promote recall, with the L2 word or phrase on one side of the card and the L1 meaning on the other.
- **An example sentence from a dictionary** to improve contextualization.
- **Relevant images**, whenever possible, to help form mental connections.
- **Related collocations, the part of speech (POS), and pronunciation guidance** to deepen the learner's understanding of the word's usage, meaning, and form.

In addition to these recommended features, research has highlighted the benefits of including morphological information—particularly **related word forms**, such as "participant" and "participation," as shown in Figure 1—on vocabulary cards. This reflects findings that attention to word formation deepens lexical processing and reinforces both form and meaning (Reynolds et al., 2020).

Figure 1

Example of a Student-made Vocabulary Card



Note. “ralated forms” is a student spelling error (related forms). The original spelling is retained for authenticity.

Spaced repetition is also an essential component of effective vocabulary learning and recycling. Expanded spaced rehearsal is relatively easy to implement, as learners can organize word cards into multiple decks, enabling more frequent review of unfamiliar or challenging items compared to those they already know well (Nakata, 2008; Nation, 2013). The combination of active recall and spaced repetition is highly effective in language learning, as research indicates that these techniques significantly enhance memory retention and recall accuracy (Dunlosky et al., 2013). By integrating word cards into a spaced repetition system, learners can systematically review vocabulary items at strategic intervals, optimizing their learning efficiency.

Paper-based vocabulary cards are arguably easier for learners to organize and customize, as they allow learners to include all of the recommended elements, especially when using larger cards, such as recipe cards (around 7.6 x 12.7 cm), which offer ample space for writing. However, as shown in Nakata's (2011) review of readily available flashcard software, several computer-based flashcard programs, such as Quizlet (2018), also enable learners to design and organize their own electronic word cards and sets. These digital flashcards can include their L1 equivalents (in 18 languages, including Thai, Japanese, Chinese, Korean, and others), various types of information (e.g., POS, definitions), images, and audio. Wilkinson (2020) found that while creating word cards can lead to notable short-term vocabulary gains, this knowledge tends to fade if not reinforced through follow-up study shortly afterward, such as through digital or paper-based vocabulary activities.

Electronic Study Sets for High-Frequency and Specialized Vocabulary

While learners must first acquire knowledge of high-frequency vocabulary, such as the first 3,000 word families from the BNC/COCA lists (Nation, 2017), they also need to study specialized vocabulary to understand texts in specific subject areas (e.g., Coxhead, 2000; Sheridan & Tanaka, 2023). Many free study sets have also been developed by educators and made available online to help learners study high-frequency and specialized vocabulary. These sets offer a time-saving alternative for learners looking to quickly study key vocabulary items without having to create the cards and sets themselves. For example, learners who want to study the most important words related to the SDGs can access electronic study sets on Quizlet (2018) for the 600-word Version 1.1 of the SDGs Service List (Sheridan & Tanaka, 2023). These sets include the definition(s), part(s) of speech, and audio for

each word. Study sets for several other specialized vocabulary lists, such as the Academic Word List (AWL; Coxhead, 2000), are also available.

Computer-based flashcard programs, such as Quizlet, are also effective in providing learners with repetition through various recognition (e.g., *Match*) and recall activities (e.g., *Spell, Write, Blocks*) that test learners' receptive and productive knowledge of vocabulary (Nakata, 2011; Platzer, 2020). Interactive, collaborative recall games (e.g., *Quizlet Live, Blast*) are also available but must be initiated by the teacher. However, despite their advantages, digital flashcard programs tend to lack opportunities for deeper semantic processing and generative use, both of which are considered essential for long-term retention. This highlights a major advantage of using paper-based word cards, which encourage learners to use vocabulary in meaningful ways.

Paper-based Word Cards for Deeper Processing and Retention

While electronic flashcards support repetition and provide convenience, research shows that deeper processing, achieved through meaningful generative use, is more effective for long-term retention. Many experts on vocabulary acquisition have identified deeper processing as a key factor in vocabulary retention (Ellis, 1994; Gu & Johnson, 1996; Hulstijn, 2001; Joe, 1995, 1998; Laufer & Hulstijn, 2001; Nation, 2001, 2013; Schmitt, 2000; Waring & Takaki, 2003; Webb, 2007). They argue that activities that encourage L2 learners to use new vocabulary in meaningful contexts, repeat words in various contexts, and engage in interactions are crucial for long-term retention. The deeper connection activities, **“Connections+”** and **“(Re) telling a Story,”** as described in Sheridan and Markslag (2017), demonstrate how, unlike computer-based flashcard activities, paper-based activities can be used to promote generative and creative use of new vocabulary.

Another advantage is that previous research has shown that writing a word by hand is one of the most effective ways to learn it. Smoker et al. (2009) found that recognition and recall of words were better among American undergraduate students when the words were handwritten rather than typed. In a subsequent study, Mangen et al. (2015) obtained similar positive results while conducting research with Norwegian college students and staff. They found that participants had significantly better recall of handwritten words compared to those that were typed. Finally, a study in Japan by Ihara et al. (2021) supported these findings, demonstrating that participants had better recall of vocabulary when the words were handwritten with ink or digital pens, as opposed to being typed.

Additionally, collaborative learning, rooted in Vygotsky's (1978) sociocultural theory, enhances motivation and supports vocabulary learning

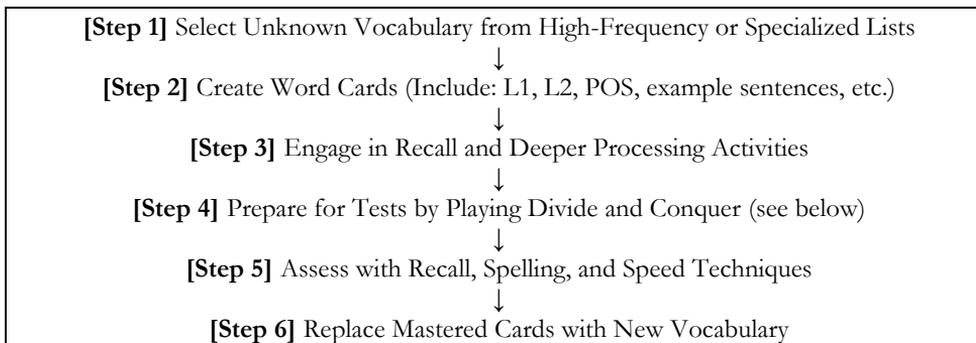
through peer interaction and scaffolding (e.g., Kim, 2008; Rad & Sahragard, 2019). Paper-based word card activities combine collaborative learning with elements of competition, which can be highly motivational (Dörnyei, 2001) and enhance learning (Slavin, 2011). Similar to computer-based flashcard programs, they are also effective in challenging learners to retrieve and reproduce words in recall activities, such as **“Slap Down”** and **“Word Card Tennis”** (Sheridan & Markslag, 2017). Learners benefit from these collaborative activities in many ways, including learning new words from each other, focusing on the forms of the written words, and being motivated to work together to achieve a goal.

The Vocabulary Learning Cycle

To help visualize how vocabulary learning can be organized through these methods using paper-based word cards, Figure 2 outlines a six-step learning cycle that integrates vocabulary selection, creation, practice, and assessment.

Figure 2

Vocabulary Learning Cycle Using Paper-based Word Cards



Collaborative Test Preparation and Vocabulary Assessment

To further support vocabulary retention and prepare students for tests, this section builds on the paper-based deeper connections and recall activities outlined in Sheridan and Markslag (2017). It first presents a new recall activity, **“Divide and Conquer,”** that not only reinforces the learning of new vocabulary through collaborative retrieval practice but also helps students prepare for vocabulary tests. It then introduces two assessment techniques, **“Word Recall & Spelling Test”** and **“Testing for Speed,”** that teachers

can use to evaluate their students' knowledge of new vocabulary in both form and fluency.

Recall Activity: Divide and Conquer

Learner English level: Beginner to advanced	Learner maturity: Junior high school and above
Activity time: 10 to 15 minutes	Materials: 50+ vocabulary cards Note: This activity is an effective way to help students prepare for upcoming vocabulary card quizzes.
Number of students: In pairs	
<p>Procedure:</p> <p>Step 1: Choose a strong student to demonstrate the activity at the front of class and explain that you will help them prepare for their upcoming word card quiz. Tell the student that you will be dividing their word cards into two piles: “known words” and “unknown words.” Next, using the student’s deck of cards, hold up a vocabulary card so that they can only see the L1 word. Ask them, “How do you say this word in English?” If they can recall the word within three seconds, place the card in the “known words” pile. However, if they cannot recall it, place the card in the “unknown words” pile. Continue this for five to 10 cards to reinforce the activity.</p> <p>Step 2: Next, put all of the students into pairs and have them exchange vocabulary cards and shuffle each other’s decks. (If there is an uneven number of students, the teacher should participate in the activity.) Explain that this is a one-player game, and have each pair play paper-rock-scissors to decide who will go first.</p> <p>Step 3: For five to seven minutes, Student A will quiz Student B. Student A holds up a word card so that Student B can only see the L1 word and asks, “How do you say this word in English?” If Student B recalls the English word within three seconds, the card will be placed in the “known words” pile. If not, the card will go in the “unknown words” pile. This continues until all the cards have been used or a set time limit has been reached.</p> <p>Step 4: At the end of Student A’s turn, pause the game to have Student A put Student B’s pile of “unknown words” at the front of the deck, the “known words” at the back, and any remaining cards in the middle. This will make it easier for students to study.</p> <p>Step 5: Now, Student B repeats Steps 3 and 4 for Student A.</p>	
Variation:	

- The above instructions are for quizzing productive knowledge. However, if the teacher wants to test students' receptive knowledge, this game can be played by showing the L1 side of the vocabulary card. When testing receptive knowledge, students would ask, "How do you say this word in (the L1)?"
- When preparing for tests that require students to spell the word in English, it is a good idea to also have the students ask each other "How do you spell (the word)?" If the student is unable to both recall and spell the word, the card should be placed in the "unknown words" pile.

Assessment Technique 1: Word Recall and Spelling Test

Learner English level: Beginner to advanced	Learner maturity: Junior high school and above
Activity time: 10 to 15 minutes	Materials: 50+ vocabulary cards Note: This activity works best as a midterm or final test; however, it can also be used as a weekly review test.
Number of students: In pairs	
<p>Procedure:</p> <p>Step 1: Randomly put the students in pairs and give each student a test paper (Appendix A). If there is an uneven number of students, it is best to form one small group of three students instead of the teacher participating, allowing the teacher to invigilate the test.</p> <p>Step 2: Have the students write their name on the line following "Your name (test taker): _____" at the top left of the test paper.</p> <p>Step 3: Have the pairs exchange their test papers and vocabulary cards, then instruct the partner to write their name on the line following "Partner's name: _____" at the top right of the test paper.</p> <p>Step 4: Instruct the students to shuffle all of their partner's vocabulary cards, then tell the students to randomly choose 10 cards from their partner's deck without looking at them. They must then write the L1 meaning of the 10 words in the "L1 meaning" column. After writing the 10 words, tell the students to place the 10 cards in a pile at the far corner of their desks with the L1 side facing up.</p> <p>Step 5: Have the pairs exchange the test papers again. Instruct the test takers to look at the L1 meaning of each word from the 10 cards their partner selected and write the corresponding English word in the "English word" column. Remind them to be careful with spelling.</p>	

<p>Step 6: After 5 minutes, have the students exchange back their test papers with their partner. The partners will now use the test takers' 10 word cards to grade their tests.</p>
<p>Grading: Write on the board and explain to the students:</p> <ul style="list-style-type: none"> • If the answer matches the word on the card exactly, award one point. • If there is a spelling mistake, award 0.5 points. • If the word is incorrect or missing, award 0 points. <p>(Correct answer = 1 point; Spelling mistake = 0.5 points; Incorrect or missing answer = 0 points).</p> <p>Have the students grade each word and write the final score out of 10 on the test paper. If a student is unsure of an answer, tell them to put a question mark (?) next to it so you, the teacher, can review it when recording the test scores.</p>
<p>Variations:</p> <ul style="list-style-type: none"> • The above instructions are for testing productive knowledge. When testing receptive knowledge, have the partners choose 10 words and write them in English. The test takers would then write their answers in their L1. <p>In small classes, the teacher could verbally assess each student individually by showing them either the L2 (to test receptive knowledge) or L1 (to test productive knowledge) side of the card and asking them to say and spell the word.</p>

Assessment Technique 2: Testing for Speed

<p>Learner English level: Beginner to advanced</p>	<p>Learner maturity: Junior high school and above</p>
<p>Activity time: 20 to 25 minutes</p>	<p>Materials: 100+ vocabulary cards, stopwatch</p>
<p>Number of students: In pairs</p>	<p>Note: The goal of this test is for the test taker to be able to recall 100 or more of their word cards in under 10 minutes (six seconds per card), so this test should be done at the end of the semester after each student has made 100 or more word cards. Students should do this activity as a practice test at least once before the actual test to ensure they clearly understand the procedure.</p>
<p>Procedure:</p>	

Step 1: Randomly put the students in pairs and give each student a test paper (Appendix B).

Step 2: Have the students write their name on the line(s) following “Your name (test taker): _____” on the test paper.

Step 3: Have the pairs exchange their test papers and vocabulary cards. After the exchange, instruct the partner to write their name on the line following “Partner’s name: _____” on the test paper.

Step 4: Instruct the students to shuffle their partner’s deck of word cards. After shuffling, explain that in each pair, students will take turns testing their partner for 10 minutes. During the test, the test taker will have a maximum of **six** seconds to recall the English word. If the test taker correctly recalls the English word within six seconds, the testing partner will place the card on the desk for a point. However, if the test taker either “passes” or cannot recall the English word within six seconds, the testing partner will place the card at the back of the deck. Remind students that the goal of the test is for the test taker to recall 100 or more of their word cards in under 10 minutes (six seconds per card) for a perfect score. So, if the test taker does not know the word, it is advantageous for them to quickly pass and answer words they know first, as they will get another opportunity to recall the words they cannot remember toward the end of the 10 minutes, time permitting. The testing partner is responsible for silently counting to six seconds when the test taker is struggling to recall a word and move on to the next word after the six seconds has expired. To determine which partner will go first, have each pair play paper-rock-scissors.

Step 5: Once the pairs have determined who will go first, begin the testing round. For 10 minutes, the testing partner will test the other using the shuffled word deck, following the procedure outlined in Step 4. The test taker will aim to recall as many English words as possible within the time limit. The testing partner should be attentive to timing and card placement. Continue until the test taker has either completed all their cards or the 10 minutes have expired.

Step 6: The students will now switch roles and repeat **Step 5**.

Step 7: After both students have completed the test, have the testing partner count the number of word cards the test taker got correct and write the total on the test paper next to “Total number of correct answers: _____.”

Grading: Write on the board and explain to the students:

- 100 or more cards = 10 points (a perfect score)
- 90 or more cards = 9 points
- 80 or more cards = 8 points

- 70 or more cards = 7 points
 - ... 10 or more cards = 1 point.
- Have the students write their partner's final score out of 10 on the test paper to the right of "Score: _____."

Variations:

- The above instructions are for testing productive knowledge. When testing receptive knowledge, the testing partners would show the English side of the card, and the test takers would say the meaning of the word in their L1.
- In small classes, the teacher could assign an activity, such as one of the deeper connections word card activities Connections + or (Re)Telling a Story, and take turns assessing each student individually while the other students work to complete the assignment.

Conclusion

Sufficient vocabulary knowledge is crucial for L2 learners' ability to comprehend English texts. This paper demonstrates that both electronic and paper-based word cards are effective tools for helping learners initially acquire important high-frequency and specialized vocabulary to give them adequate coverage of texts. Additionally, recall activities provide the necessary repetitions to overcome the lack of recycling of words in most EFL materials. The paper also argues that the customizability, opportunities for deeper processing and collaboration, and handwritten nature of paper-based word cards may make them a superior method for studying vocabulary compared to electronic ones. Finally, the activities and assessment techniques presented, "**Divide and Conquer**," "**Word Recall & Spelling Test**," and "**Testing for Speed**," build on the work of Sheridan and Markslag (2017) to provide additional practical, collaborative activities for reinforcing vocabulary knowledge, preparing learners for tests, and assessing their progress.

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Appendix A

Word Recall & Spelling Test

Your name (test taker): _____ **Partner's name:** _____

Word Card Test

1. Partner: Shuffle all of your partner's vocabulary cards and then randomly choose ten cards. After choosing the 10 cards, write the Japanese meanings of the 10 words in the "Japanese meaning" column.

2. Test taker: Look at the Japanese meaning of each word of the 10 cards your partner chose. Write the English word for each one in the "English word" column. Be careful with spelling.

Japanese meaning English word Japanese meaning English word

1. _____ _____ 6. _____ _____

2. _____ _____ 7. _____ _____

3. _____ 8. _____

4. _____ 9. _____

5. _____ 10. _____

Appendix B
Testing For Speed

Word Card Test

Your name (test taker): _____

Partner's name: _____

Total number of correct answers: _____

Score: _____