

# Should we Teach Vocabulary as Semantically Related or Unrelated Sets?

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## Abstract

This study sheds light on vocabulary teaching to EFL represented by Al-Ahsa College of Technology in Saudi Arabia with an investigation of the optimal methodology for presenting words in semantically-related or unrelated sets. The purpose of the research is to measure the efficiency of two methods. A group of forty two male learners at Al-Ahsa College of Technology in Saudi Arabia constituted the sample for training phase on pedagogies and subsequent tests. The paired *t*-test was used to compare the mean difference. The results showed that teaching sets of semantically unrelated words is more efficient than presenting them in semantically related sets. However, performance of semantically-related words was reasonable and reached a level of acceptance.

**Keywords:** semantic relation, Meronymy, vocabulary learning, paired *t* test

## 1. Background of the Topic

This study aims at comparing the efficiency of implementing semantically related versus unrelated sets of vocabulary to 42 male Saudi learners at Al Al-Ahsa College of Technology. Results are considerably relevant and valuable to two fields: The pedagogical arena and the EFL curriculum design.

Teaching vocabulary has been on the focus as a major element by which linguistic components of L2 can be acquired. This study addresses the significance of teaching vocabulary as described by Wilkins (1972): "Without grammar very little can be conveyed, without vocabulary nothing can be conveyed" (p.111-112). This paramount importance of vocabulary guides teachers, curriculum designers and researchers to an intriguing speculation of how words in L2 are learned efficiently. Undoubtedly, the best way of vocabulary learning is through the natural flow of communication. Thus, in a curriculum vocabulary should be arranged as authentically as possible. Brown (2007) states that a communicative syllabus should consist of structurally arranged components and one of which is "A sequential list of grammatical, lexical, and phonological forms to be taught matched to the sequence of functions" (p.157). The functions of linguistic use must be sequenced as natural communication to simulate acquisition of L1. However, in the literature, there is a disparity and controversial results which will be discussed.

## 1.1 The semantic relation (Meronymy)

Selection of vocabulary to be taught represents an integral part of TESOL, which is lexical constituent which overlaps and penetrates all components of language including the four domains: listening, speaking, reading and writing. Vocabulary is a cumulative process through receptive skills, such as listening and reading, as well as it is a constructional process through productive skills, such as speaking and writing. The EFL textbooks taught in Saudi Arabia and other EFL countries are from well-known publishers, such as Oxford University Press, Macmillan and Longman. The textbooks are primarily organized into thematic lessons and implement vocabulary exercises in a particular semantic relation, such as antonymy or synonymy. Therefore, this study investigates the effectiveness of this methodology, specifically a set of words in meronymous relation. Curzan and Adams (2009) define meronymy as “a hierarchical semantic relation which figures in the relation of whole to part: *tail, whiskers, paw, ears and snout* all represent parts of a dog” (p. 227). Meronymy is applied here as a part of the entire semantic relation methodology.

## 2. Literature Review

Teaching vocabulary in semantically-related versus semantically unrelated sets has been painstakingly studied with controversial views and implications. Gairns and Redman (1986), in *Working with Words*, argued that introducing words in semantic groups by meaning “can provide greater precision in guiding students towards meaning and in helping them to define the boundaries that separate lexical items” (p 32). Gairns and Redman advocated using semantic relations in pedagogical practices to facilitate learning processes. Presenting words in semantic groups is beneficial because it is easier for learners to recognize and identify meaning. Penny Ur (2007), *A Course in Language Teaching*, also recommended “linking items with each other or with ones already known, through meaning and to avoid teaching words by themselves” (p. 67). However, she stated that words should be integrated in lessons and are learned better if they can be taught briefly at the beginning of the lesson. Ur supported the use of linguistic association to reach favorable linguistic transfer to facilitate learning vocabulary. Seals (1991) similarly puts forwards a view that learning words in semantic sets facilitates learning and retention.

In contrast, there is widespread support for teaching vocabulary in unrelated sets. Al-Shaikhi (2011) examined three categories and their effectiveness in helping Arab-speaking learners recall and acquire vocabulary. The categories are semantically related, semantically unrelated and thematically related words. Each set contained 15 words. An end-of-class test and a delayed test were given. Fifty-eight Arab-speaking learners were divided into three groups and assigned to a set. Results showed that there was no significant difference among the performance of the three groups in the end-of-class test. However, the week-late delayed test showed a significant difference in favor of semantically related and semantically unrelated over the thematic clustering. Al-Shaikhi explained that clustering words together thematically is the least effective methodology for teaching vocabulary. His findings contradicted many current curriculum designers who cluster thematically-related words in one lesson, such as family members, fruit, occupations and other thematically-related words. This explicit disagreement between researchers and curriculum developers requires more intensive research to improve curriculum in its efficiency and accuracy.

Paul Nation (2000) revealed that interference between related words throughout the learning process can be dangerous since it can make learning more difficult. He asserted that “words should occur in normal communication situations, not in contrived, language-focused activities” (p. 5). His research showed that learning related words at the same time makes learning them more difficult.

This learning difficulty can be avoided if related words are learned separately, as they are when learning from normal language use.

Finkbeiner and Nicol (2003) also investigated semantic category effects in second language word learning. The scholars assumed that teaching method that presents new second language vocabulary in semantically grouped sets would be effective. They presented 32 new L2 labels for concepts from four different semantic categories. A translation was used as an assessment tool, and Finkbeiner and Nicol's results showed that "translation times were significantly slower for words learned in semantic sets versus in random order" (p. 376). They asserted that presenting semantically grouped L2 words to learners has a deleterious effect on learning.

Although several studies have examined teaching vocabulary in semantic groups or in semantically-unrelated sets, more studies that investigate other semantic relations more broadly are needed. In other words, if previous research found that a particular semantic relation of vocabulary sets would be an effective pedagogy, other semantic relations may work to form an optimal, pedagogical practice in the vocabulary teaching realm. Therefore, meronymy is the semantic relation applied in this study. This selection adds a wider spectrum to the research field. Gairns and Redman (1986), Penny Ur (2007) and Seals (1991) advocated presenting semantically related sets of words together in English as a Second Language (ESL) curriculum. However, Al-Shaikhi (2011), Finkbeiner and Nicol (2003) and Paul Nation (2000) asserted that vocabulary should be introduced in more situational arrangement. This disparity encouraged us to dip further into the curriculum presentation of vocabulary. Therefore, the following questions guided this study:

1. Should words be presented in semantically related meronymous sets for EFL learners?
2. Is it more effective to present words in semantically unrelated groups for EFL learners?

The answers to these questions provide insight into the difference between L1 acquisition and L2 learning in which L1 is acquired in a natural social interaction limited to early age while L2 learning is confined to formal settings associated with restricted linguistic exposure especially in EFL environments.

### **3. Methodology Hypothesis**

H0: The mean of learners' grades will be the same after the learners are taught vocabulary in semantically unrelated sets or semantically related sets.

H1: The mean of learners' grades will not be the same after the learners are taught words in semantically unrelated or semantically related sets.

#### **3.1 Participants**

In this study, the sample included 42 male EFL learners at Al-Ahsa College of Technology, Saudi Arabia, who participated in vocabulary training and a test. The learners are representative of the adult Saudi EFL learners, since the college is a regular bridge for students who come from governmental education to receive vocational training. The study participants were enrolled in the intake course called English 4106 in October 2014. This is considered beginner level course. The participants' age ranged from 18 to 30 since they had graduated from secondary school and enrolled at the technical college. These students were assigned by the department to three groups; each group consisted of 14 students. This course is a prerequisite for pursuing English for specific purposes

course (ESP). The ESP courses could be English for Computing Science, English for Hydraulics or English for Vehicles.

### 3.2 Data Collection and Procedure

Data were collected during the first semester of the 2014 academic year, as the learners are usually enthusiastic and invigorated by summer vacation. Each group attended two physical sessions per week and one session online (blackboard) for home practice. Each physical session lasts for 90 minutes.

Twenty words were categorized into two sets: 10 words were semantically related, and 10 words were semantically unrelated (as listed in table 1). The words were selected and classified equally based on their length (syllables), semantic relations and the abstract-concrete dichotomy. The number of words was chosen based on Cobb and Horst (as cited in Nation's book 2001) who stated that "using a concordance-based deliberate learning approach occupying an hour a week, gains of around 70-90 words a month would be reasonable (p 159). According to Cobb and Horst, an average of 20 words can be presented in an hour. Therefore, 20 semantically related and unrelated words were presented to the learners. Table 1 shows the lengths and semantic category of the presented words.

**Table 1**

*The semantically-related and unrelated used in the study*

	Semantically-related words	Semantically-unrelated words	Number of syllables
1	Rudder	Driller	2 syllables
2	Funnel	Rubber	2 syllables
3	Gunwale	Stomach	2 syllables
4	Hawser	Helmet	2 syllables
5	Mast	Shop	1 syllable
6	Boom	Tilt	1 syllable
7	Stern	Crate	1 syllable
8	Sail	Pound	1 syllable
9	Bow	Truck	1 syllable
10	Hatch	Hole	1 syllable

Concerning the length of the words, there were two categories; each contained six single-syllable words and four two-syllable words. There was an oral, quick pilot test for these words. Learners were asked if they had ever heard the words before to ensure that words were unfamiliar to the

learners while known words were replaced. This pilot testing aimed to avoid the frequency factor influence. As shown above in table 1, meronymy was the semantic relation used for one set of words while the other set was semantically unrelated words.

During data collection, researchers created identical pedagogical and appraisal conditions to get reliable results. There was a training phase and an assessment phase for each vocabulary set. Training came first for 30 min followed immediately by a 10-min testing phase. Semantically related words were taught and assessed during a class period while the semantically unrelated words were taught and assessed a week later in a similar controlled manner in terms of time and pedagogy to ensure equal exposure conditions for every set. For example, in all classes, the words were taught at 9:30 a.m. to 11:10 a.m. At this period of the day, learners are already warmed up and fully active and had a high level of learning readiness. For each group, effort was exerted to provide an equal number of drills, gestures, mimes and time allocated for learning words. Figure 1 illustrates the framework under which the training phase applied.

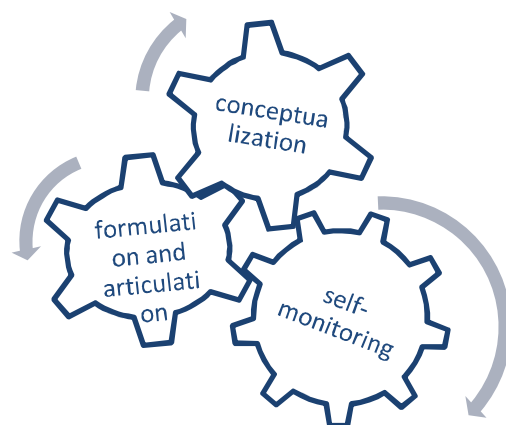


Figure 1. Levelt's model of language production used in the classroom

The methodology used in the training phase of the study corresponds to Levelt's model for language production as illustrated in Figure 1. "Levelt (as cited in Nunan and Carter 2004) has posited a model for language production comprising four sequential stages: conceptualization, formulation, articulation and self-monitoring (p 82).

### 3.3 Training and Assessment Phases

#### **Conceptualization.**

#### **Warm up.**

**Flash cards and drills.** These drills were used because the learners were beginners. Carter and Nunan (2004) stated, "At beginning levels, strategies of rote learning, bilingual translation and glossing can be valuable in learning" (p. 45).

**Visual presentation.** A PowerPoint presentation containing the pictures was used to elicit the labels. This was used as an initial practice as well as reinforcement.

### Formulation and articulation

**Find the match activity.** Learners were divided into two groups and the teacher passed out picture cards to one group while the other group took flash cards containing labels. A group leader distributed a card to each member. Then each learner walked around to find the picture that matched his label.

**Group work.** The group leader used cards to ask each member to name a picture. This activity was used to integrate formulation and articulation.

### Self-monitoring

**Crossword with pictures (pair work).** A pair of students was handed a worksheet that contained a crossword exercise stimulated by pictures of the words taught. The students completed the exercise to practice spelling. This was the beginning of productive stage in vocabulary learning. Then they checked their answers.

**Fill in the blank.** Learners were given a worksheet of target words and sentences to fill in the blanks in the sentences using the words given. This exercise functioned as self-assessment leading to learning reinforcement.

**Test administration.** This was the direct tool of data collection in the form of a written test. This phase took place immediately after the training phase. The tests, as can be seen in Appendices B and C, contained pictures and the learners were asked to write labels of the pictures based on the 30-minute training phase. This phase represented the output by which the study shows results of the learners.

## 4. Results

The methodology used in this study was the paired *t*-test. The learner's grades, shown in Appendix A, were input as data into Minitab software and a paired *t*-test was implemented to show the impact of the independent variables (semantically related and unrelated sets of words) on the dependent variable (learners' grades). Paired *t*-test was appropriate methodology, because the dependent variable (learners' grades) was continuous. Moreover, independent variable consists of two related samples that were compared. They are related, because the same group of learners was tested twice with different pedagogies.

**Table 2**

**Paired T-test results for Semantically Unrelated vs. Semantically Related Word Sets**

	N	Mean	StDev	SE Mean
Semantically unrelated	42	86.90	1.880	0.290
Semantically related	42	69.52	2.479	0.382
Difference	42	17.38	2.430	0.375
<i>t</i> value	4.64			
<i>p</i> value	0.000			

As can be seen in Table 2, the results highlight the output in order to determine the relationship between variables. Results in Table 2 include  $N$  (number of samples) who participated in the study. *Mean* stands for the average of learners' grades for each category of vocabulary implemented. A mean difference emerged between the two groups. The mean difference was  $> 0$ . The mean difference was 17.38%, which indicates a statistical significance. The  $p$  value was  $< 0.05$ ; a value of 0.000 confirms the level of statistical significance. The mean of results for the semantically unrelated test is 86.90, which is larger than the mean for semantically related results (69.52).

The null hypothesis was rejected and the alternative hypothesis was accepted, because the mean difference was statistically significant between the two training phases. Therefore, the mean difference between the performance of learners with semantically related and unrelated did not equal 0. The values that demonstrate the assumption are  $t = 4.64$  &  $p < 0.000$ .

**Table 3**

***Statistical Information about Learners' Grades***

	Semantically-related	Semantically-unrelated
Mean	6.952	8.690
Range	90	70
Minimum	10	30
Maximum	100	100
Sum	2920	3650

Table 3 shows details of the learners' assessment. The range of grades for semantically unrelated test was smaller (70) than the range of semantically related (90). This range is important when identifying the minimum score of 10 in the first column while the minimum in the second column is 30. This explains that no one scored lower than 30 % with the unrelated sets of words. However, there is a low grade of 10 % with the related set. Both sums were not low and learners performed well in both pedagogies. However, with semantically unrelated words, learners performed outstandingly.

## **5. Discussion**

The results of this study show that those who were exposed to semantically unrelated sets of words performed better than those exposed to semantically related sets. Several views explain why words presented in semantically unrelated sets were retained more effectively than their counterpart. There are several issues: mental restructuring, learning vs. acquisition, long-term vs. short-term learning and others will be addressed in this discussion.

The mental restructuring for linguistic input arranges units in parallel stores and is related to the interference that occurs in retrieving the lexical items. This is explained by the best-known connectionist approach with parallel distribution processing (PDP). Troike (2006) stated that "processing takes place in a network of nodes (or "units") in the brain that is connected by pathways". As learners are exposed to repeated linguistic input represented in patterns of units, they extract regularities in the patterns; probabilistic associations are formed and strengthened. These associations between nodes are called connection strengths or patterns of activation" (p. 80). The "regularities in the pattern" should match the regularities in the real-world situations to facilitate the "association" to be formed and strengthened. This soothes the interference impact when words are

not related in a way overlapping concepts come together simultaneously. When related words appear together, coactivated lemmas compete together to retrieve the target items while this affects the speed of retrieval, and a possible interference occurs. Lemma as presented by Garrett (1975) and Levelt (1989) contain the semantic and syntactic aspects of a word. In word recognition, the lexical entries are activated simultaneously for recognition and retrievals, which leads to interference not only in recognition but also in later retrieval. This creates susceptibility to interference and ultimately to learning difficulty as Nation asserted in the literature. Furthermore, Skehan (1998) affirmed that fluency is attained in production through the use of automatized rule-based systems and through memory-based chunks and are “retrieved and used as wholes” but not as smaller units (p. 75). Therefore, this supports the notion of unrelated words to be presented because words in thematic or semantic relations cannot be used in chunks or uttered together in meaningful situations. For example, we cannot use the synonymous words *old* and *new* together in a chunk or in a single phrase because the structure of their relationship is horizontal. However, unrelated words can inevitably constitute infinite number of chunks that can be spoken and practiced as wholes in situations. Learning in chunks represents the horizontal paradigm. In other words, it is difficult to combine learning-related words and use them in chunks. There is no structural harmony between these two strategies.

Unrelated words have an advantage over related words in which the former simulates acquisition while the later takes the form of formal learning. The results of this study support Finkbeiner and Nicole's findings in which the connection between L2 words and their corresponding concepts develops over time. This assertion supports language acquisition over formal learning because acquisition is attained over time in natural environment. Therefore, unrelated words occur more naturally than an arranged set of semantically related words that are rarely used in a single situation in real world. Presenting unrelated words creates situations that are more authentic and facilitate learning. The tapestry approach embrace this view (Scarcella and Oxford's, 1992) which reflects the work of Vygotsky who emphasizes that learning occurs in interaction with other people. Interaction cannot be sustained by related words. For example, when a learner learns fruit and colors words in 2 weeks, he or she most likely uses limited alternatives of the same set in a single situation in Wal-Mart. However, in some cases, 50 to 70 % of random, unrelated words can be utilized in a single situation because natural interactions are not arranged and pre-set as learning.

This is the explanation for current research on the relationship between learners' comprehension of content because of context. Real context requires words according to the moment of communication. Richek (2005) suggested impression strategy in prereading strategy as he implements sequential steps. The first step is to “write the words on the whiteboard in the order they are found in the story” (p. 154). Richek's initial step emphasizes the natural flow of vocabulary as meaningful and situational rather than put in thematic patterns or categories.

This natural flow facilitates not only retrieval of words but also the collocation aspects of lexicon. Collocation among words is crucial for integration within learning not as a separate component. Presenting words that collocate usually represents unrelated words in meaning and in semantic relations but connection can be in the horizontal structuring as collocation appropriateness as Scrivener (2009) observed, “It is usually most useful when the lexical items presented are connected in some way” (p 234). The connection of words Scrivener mentions can be the connection that brings logical relationships among words in communication and conversations. In conversational situations, an interlocutor requires vertical and horizontal linguistic structures. However, a beginner speaker requires vertical chunks of language more frequently than horizontal alternative forms to



carry on a conversation. Vertical structures of language represent fluency while horizontal represents accuracy.

There is a relationship to be considered among information processing (IP) adapted by Skehan(1998): Noticing and interference when they are concerned with vocabulary learning. Stages of IP adapted by Skehan are:“controlled-automatic processing, declarative-procedural knowledge and restructuring” (p. 74). Controlled-automatic processing is highlighted here, because the stage of initial reception of input is a priority in this study. During this stage, *noticing* is very crucial and empowers learners’ attention to the form and later usage. Noticing linguistic input is a condition of IP and this entails a potential communicative capability. Richard Schmidt’s study (as cited in Troike 2009) listed factors affecting noticing and awareness of input; one factor was the “perceptual saliency of items” (p 75). Figure 2 illustrates the integration of these three concepts, and this is related to interference.

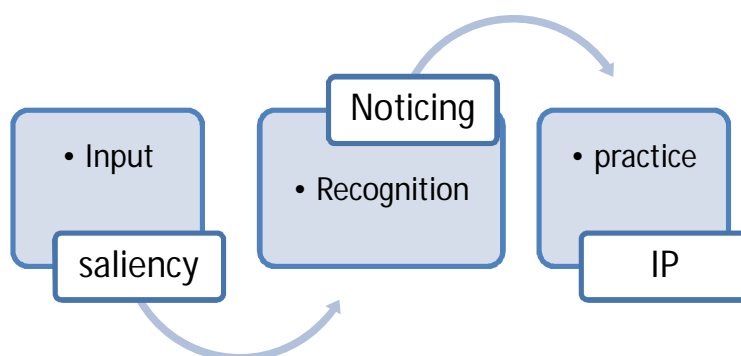


Figure 2 .Conceptual framework of pre information processing adapted by AlShaks &Albaqshi

Figure 2, shows that IP requires noticing the input that is observed when it is salient. The meaning of unrelated words is more salient than words in a thematic relation. The meaning of unrelated words can be distinguished by their connections and concepts, which make the words more salient. Therefore, dealing with words that are more noticed more likely avoids interference, which is not preferable in learning vocabulary. Communicative method adheres to saliency theoretical view in which it uses context and situational communications. Herrell and Jordan (2012) suggested steps for implementing vocabulary role-play. They emphasized selecting words based on the situation as well as connecting words to past experiences(p. 98). Focusing on the practice and using words in context refer to the importance of saliency and noticing to help learners to move from controlled-automatic processing into the next stage by indulging in more communicative competency.

## 6. Conclusion and Implications

The objective of this study was to show whether teaching EFL learners with sets of related words or unrelated counterparts is best. The results indicate the presenting unrelated words was better than words that were related (meronymy). There was a significant difference in learners’ performance for both pedagogies. The results also demonstrated presenting related words together was appropriate. The means of the learners’ performance for the assessments of related and unrelated words were 69% and 86% respectively. Thus, curriculum designers and EFL teachers should consider certain arrangements of vocabulary sets for learners. The methodology for teaching vocabulary must match the learning principles and strategies.

Although this study was limited to small group of male Saudi EFL learners, the results indicate an effective method for teaching vocabulary simulating real-life situations and informality. These results can be generalized to adult male Saudi learners and those whose educational systems are similar to Saudi Arabia's.

This study sheds light on the pedagogical priority of a particular semantic relation (meronymy) versus unrelated words. Therefore, the outcomes of this study are a preliminary indicator of semantic relations, such as polysymy and hyponymy. Furthermore, there is a demand for exploring whether presenting words that have been sorted syntactically is more effective than unsorted words.

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## Appendix A

### Learners' grades in semantically-related and unrelated sets of words


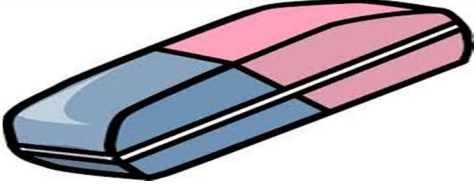



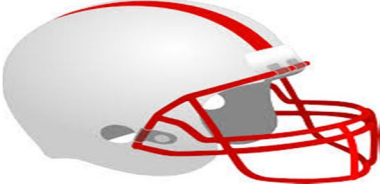
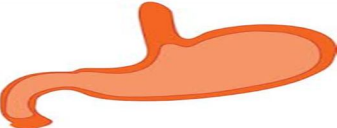

Serial	Unrelated	Related	Serial	Unrelated	Related	Serial	Unrelated	Related
1	100	10	15	100	80	29	90	50
2	80	40	16	90	90	30	70	40
3	30	60	17	90	70	31	100	70
4	70	40	18	100	90	32	100	100
5	100	100	19	100	80	33	100	80
6	80	80	20	100	70	34	100	50
7	100	80	21	100	100	35	90	100
8	80	80	22	30	50	36	60	30
9	90	100	23	80	60	37	100	100
10	100	40	24	60	60	38	100	60
11	100	90	25	100	90	39	100	100
12	100	60	26	50	70	40	100	100
13	70	10	27	90	90	41	100	50
14	70	60	28	80	50	42	100	90

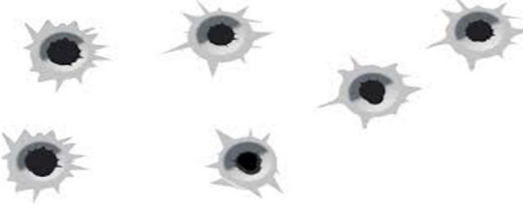

### Appendix B Unrelated Vocabulary Test

Group:	Number:	Name: (optional)
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Name the following pictures:

Time: 10 minutes

	
1.....	2.....
	
3.....	4.....
	
5.....	6.....
	
7.....	8.....

	
<p>9.....</p>	<p>10.....</p>

Good Luck


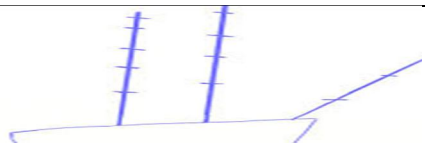

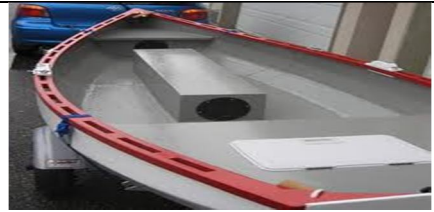
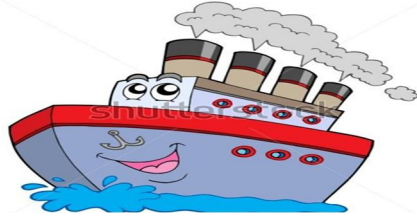

### Appendix C


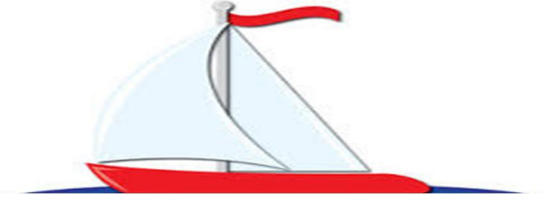

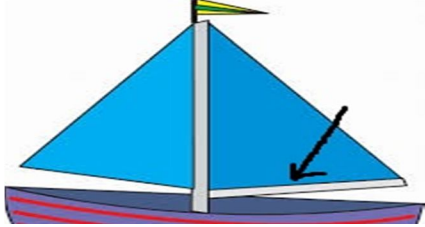
#### Related Vocabulary Test

Group:	Number:	Name: (optional)
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Name the following pictures:

Time: 10 minutes

	
<p>1.....</p>	<p>2.....</p>
	
<p>3.....</p>	<p>4.....</p>
	
<p>5.....</p>	<p>6.....</p>

	
<p>7.....</p>	<p>8.....</p>
	
<p>9.....</p>	<p>10.....</p>

Good Luck