ENGLISH FOR GEODETIC ENGINEERING

Higher Education

Oleh :
Nurfitriah

2019

English for Geodetic Engineering

UU No 28 tahun 2014 tentang Hak Cipta

Fungsi dan sifat hak cipta Pasal 4

Hak Cipta sebagaimana dimaksud dalam Pasal 3 huruf a merupakan hak eksklusif yang terdiri atas hak moral dan hak ekonomi.

Pembatasan Pelindungan Pasal 26

Ketentuan sebagaimana dimaksud dalam Pasal 23, Pasal 24, dan Pasal 25 tidak berlaku terhadap:

i.   penggunaan kutipan singkat Ciptaan dan/atau produk Hak Terkait untuk pelaporan peristiwa aktual yang ditujukan hanya untuk keperluan penyediaan informasi aktual;

ii. Penggandaan Ciptaan dan/atau produk Hak Terkait hanya untuk kepentingan penelitian ilmu pengetahuan;

iii. Penggandaan Ciptaan dan/atau produk Hak Terkait hanya untuk keperluan pengajaran, kecuali pertunjukan dan Fonogram yang telah dilakukan Pengumuman sebagai bahan ajar; dan

iv. penggunaan untuk kepentingan pendidikan dan pengembangan ilmu pengetahuan yang memungkinkan suatu Ciptaan dan/atau produk Hak Terkait dapat digunakan tanpa izin Pelaku Pertunjukan, Produser Fonogram, atau Lembaga Penyiaran.

Sanksi Pelanggaran Pasal 113

1. Setiap Orang yang dengan tanpa hak melakukan pelanggaran hak ekonomi sebagaimana dimaksud dalam Pasal 9 ayat (1) huruf i untuk Penggunaan Secara Komersial dipidana dengan pidana penjara paling lama 1 (satu) tahun dan/atau pidana denda paling banyak Rp100.000.000 (seratus juta rupiah).

2. Setiap Orang yang dengan tanpa hak dan/atau tanpa izin Pencipta atau pemegang Hak Cipta melakukan pelanggaran hak ekonomi Pencipta sebagaimana dimaksud dalam Pasal 9 ayat (1) huruf c, huruf d, huruf f, dan/atau huruf h untuk Penggunaan Secara Komersial dipidana dengan pidana penjara paling lama 3 (tiga) tahun dan/atau pidana denda paling banyak Rp500.000.000,00 (lima ratus juta rupiah).

English for Geodetic Engineering

Nurfitriah

ENGLISH FOR GEODETIC ENGINEERING

Poliban Press

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Penerbit Deepublish

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Foreword

Praise the presence of Allah SWT for its abundance of grace and so that the 2019 English for Geodetic Engineering Book can be completed. This book is specially designed for Geodetic Engineering Study Program students of Banjarmasin State Polytechnic.

Thank you to Joni Riadi S.ST., MT as Director of the Banjarmasin State Polytechnic and Nurmahaludin, ST, MT as Chair of the Research and Community Service Center along with their secretaries and staff. Thank you also to Faris Ade Irawan, Reza Fauzan, Eko Sabar Prihatin and Rahma Indera who have contributed to the editing and the entire Poliban Press team and all those who have helped in the completion of this book.

We realize that there are still shortcomings in this book for that criticism and suggestions for improving this book are highly expected. Hopefully this book can provide benefits for Polytechnic students in particular and for all those who need it.

Banjarmasin, August 2019

Chief of the Poliban Press

Preface

English for Geodetic Engineering is specially designed for Geodetic Engineering Study Program students of Banjarmasin State Polytechnic. The materials compiled are from various sources including the internet to give update and real-life use of English in the related field. In attempt of boosting students' general as well as specific knowledge, the book discusses specific issues on geodetic engineering as well as general knowledge considered needed for the target students regarding numbers, shapes and angles and safety.

This book consists of six chapters namely "Talking about Numbers", "Using the Numbers", "Describing Shapes and Angles", "Identifying Sign and Symbols", "Using Safety Precautions" and "Reading Texts about Geodetic Engineering". Those chapters deal with general knowledge to equip the students' knowledge and specific vocabularies that they need in carrying out their jobs. Each chapter consists of theories, examples and exercises to hone the students four skills in English namely listening, speaking, reading and writing and it is expected that the lessons will help them in understanding geodetic engineering world in specific and work world in general and assist them in their career in the near future.

Banjarmasin, June 2019

Nurfitriah

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CHAPTER 1
TALKING ABOUT NUMBERS

General Instructional Objective

By the end of the lesson, students are able to use number and mathematical expression.

Specific Instructional Objectives

After studying Lesson 1, students are able to:
1. Identify cardinal number and ordinal number correctly
2. Say mathematical problem in English correctly
3. Use cardinal and ordinal number correctly
4. Answer the question from reading passage

Skill Focus
- Reading

Vocabulary Learned
- Noun   :   addition; division; multiplication; subtraction
- Verb   :   add; subtract; multiply; divide; measure;
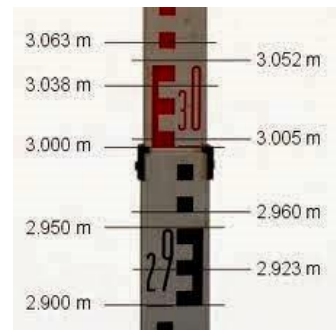
| **Picture A** | **Picture B** |

| **Picture C** | **Picture D** |

A.   GETTING READY

Activity A.1.

Look at the above pictures and answer the questions!

1. What is in Picture A?
2. What information you can get from the picture?
3. What is in Picture B?
4. Where do you usually find the picture similar with Picture B?
5. What do you see in Picture C?
6. What is the jersey number?
7. What do you see in Picture D?
8. Do you know what is in Picture D?

B.   NUMBERS AND MATHEMATICAL EXPRESSIONS

Numbers

Everywhere you look, you will see numbers around you, at home, at campus, at school, on the road, at the mall and other places. From the time you open your eyes in the morning until you go to bed and close your eyes to sleep, you usually see numbers, you see numbers in the clock, watch or hand phone to check the time every now and then during the day. It means they are very important for our daily life. Numbers are also important for working, in the office or at the workshop. The sizes of the woods, the circumference of a circle are some examples of how we use numbers at the workshop.

Different things using numbers are given in the list below. Discuss with your friends about other things in the workshop that have numbers, then add them to the list.

- spanner size
- water pass
- ………………
- ………………
- ………………
- ………………

- theodolite
- gearshift
- ruler
- ………………
- ………………
- ………………

1. Cardinals

Look at the following numbers. They are called cardinal numbers. Now practice saying them!

One to ninety-nine

7	seven	13	thirteen	19	nineteen	70	seventy	54	fifty-four
8	eight	14	fourteen	20	twenty	80	eighty	65	sixty-five
9	nine	15	fifteen	30	thirty	90	ninety	76	seventy-six
10	ten	16	sixteen	40	forty	21	twenty-one	87	eighty-seven
11	eleven	17	seventeen	50	fifty	32	thirty-two	98	ninety-eight
12	twelve	18	eighteen	60	sixty	43	forty-three	99	ninety-nine

Idioms

a couple = 2   a dozen = 12   a score of = 20   a gross = 144

Activity B. 1

Say these numbers.

1. 11, 13, 14, 8, 23
2. 30, 50, 70, 90
3. 78, 4, 54, 21,32
4. 31, 13, 42, 24, 89

Hundreds

100	a/ one hundred
400	four hundred
700	seven hundred
856	eight hundred (and) fifty-six
435	four hundred (and) thirty-five
300	three hundred
600	six hundred
900	nine hundred
807	eight hundred (and) seven
210	two hundred (and) ten

Activity B. 2

Practice these numbers

1. 500, 230 , 404, 912, 550
2. 123, 576, 941, 432, 709

Activity B. 3

Fill in the blanks with the correct numbers a according to their patterns.

1. 560, 570, 580, 590, ...
2. 120, ..., 320, 420, 520
3. ..., 363, 383, 403, 423
4. 911, 961, 811, ..., 711

Thousands

1,000	a thousand
100,000	a hundred thousand
2,000	two thousand
200,000	two hundred thousand
3,000	three thousand
300,000	three hundred thousand
30.000	thirty thousand
1.000,000	one million
40,000	forty thousand
20,000,000	twenty million

How do you say 879,321,609? It's easy if you think of the figure in groups, with three numbers in each group. After the first number in the group, you say *hundred and*, and at the comma you say *thousand or million.*

879,321,609   Eight hundred (and) seventy-nine million, three hundred (and) twenty-one thousand, six hundred (and) nine.

Activity B. 4

Practice these numbers.

1. 23,976
2. 481,098,376
3. 55,952,777
4. 357,205,731
5. 211,900,701
6. 808,080,080

Do you know how to say these numbers?
Diameter of the earth at the equator is 12,756 kilometers.
Distance from the North Pole to the South pole is 12,713 kilometers.
Highest point is on the earth is 8,848 meters
Deepest point in the sea is 11,033 meters.

Notes:
1. In Britain, we use a comma (,) for thousand and million. This is different from the system in some other countries, included in our country, Indonesia.
2. A billion in British English = 1,000,000,000,000, but in America English = 1,000,000,000. The American Billon (1,000,000,000) is more common than the British one.
3. The numbers 1100, 1200,1400, 1500,1900 are sometimes said as eleven hundred, twelve hundred, etc.
4. Don't confuse 'a thousand' and 'a dozen'; they sound similar, but have a different meaning.

2. Ordinal Numbers

Besides cardinal numbers we also know ordinal numbers. They are used to show order or position in series. We use ordinal numbers often, such as first, second, third, etc. Some examples of how ordinal numbers are used are:

a. The mapping design contest has three winners. The first winner is Sasmalini, the second is Aziz and the third is Rio.
b. The surveying laboratory in on the third floor of Geodetic Building.
c. English course for Geodetic Engineering students is given in the second semester.

Pay attention to how to write the ordinal numbers and practice to pronounce them correctly.

1st	first	11th	eleventh	21st	twenty first
2nd	second	12th	twelfth	22nd	twenty second
3rd	third	13th	thirteenth	23rd	twenty third
4th	forth	14th	fourteenth	24th	twenty fourth
5th	fifth	15th	fifteenth	25th	twenty fifth
6th	sixth	16th	sixteenth	26th	twenty sixth
7th	seventh	17th	seventeenth	27th	twenty seventh
8th	eighth	18th	eighteenth	28th	twenty eighth
9th	ninth	19th	nineteenth	29th	twenty ninth
10th	tenth	20th	twentieth	30th	thirtieth

Read the following passage.

Mount Everest is the highest mountain in the world. People have been trying to climb it since 1920, but the *first* to second were Tenzing Norgay and Edmund Hillary. Their expedition was the eleventh attempt to climb Everest. They succeeded on the *29th* May 1953. The *fifteenth* expedition, a Japanese one in 1970, was the first to include a woman.

Notes:

Some ways to write dates:

1. (In Britain) in numbers only; day/month/year. So 5/1/2020 = 5th January 2020, not May 1st 2020. (American usage is opposites)
2. In numbers and words: day/moth/year = 9th November 2021 or Month/day/year = November 9th 2021.
3. When we say the dates, 9/11/20 can be the ninth of November 2020 or November the ninth 2020.

Activity B.5
Practice saying the following dates.

1. 7/3/80
2. 2/12/98
3. 31/4/2000
4. 1/1/2003
5. 17/8/45
6. 8/9/45
7. 14/2/2021
8. December 3rd, 2001
9. 23/3/99
10. April 3rd, 2010

Do you know how to say these numbers?

Alexander Graham Bell, a teacher of the deaf and inventor, made a great contribution to science. Born in Edinburgh in 1847, he immigrated to Canada in 1870 and to the United States in 1871. For this invention, the Academie Francaise bestowed on the Bell the Volta Prize of 50,000 Francs. He died in 1922 at Baddeck, Nava Scotia, Canada, where the Canadian government maintains a museum in which many of his inventions are displayed.

3. Fraction

We use fraction when the numbers are not even. To say fraction numbers, we use the cardinals as the **numerator** and ordinals as the **denominator.**

Look at the fractions number and try to say them correctly.

½	a half/one half	2/3	two-thirds
1/3	a third/one third	¾	three-quarters
1/5	a fifth	4/5	four-fifth
1/6	a sixth	5/6	five-sixth
1/10	a tenth	5 ¾	five-and –three- quarters
1/100	a hundredth	7 ½	seven-and- a-half

Do you know how to say these numbers?

Winning the GIS competition, the team got $ 4,800. It was divided among the four members of the team. David received 1/8 of the money, Jon had ¼, Ronny received 1/3 and Dicky got 7/24.

Notes:

1. Another way of saying fractions is to say A over B. For example, 7/5 can be 7 over 5, 8/5 can be eight over five. This is useful for the large digits, for example 876/982 is usually said 876 over 982. When the top digit is larger than the bottom digit (e.g. 5/2, 12/7), we always say A over B. therefore, 5/2 is five over two.
2. 5 ½ hours is five-and-a-half hours, not "five hours and a half".
3. We express fraction in the smallest digits possible: we generally don't say 4/16, we say ¼; we don't say 8/16, we say ½, etc.

4. Decimal Fractions

If we don't use fractions in vulgar ways, we can make it to be decimal. In decimal fraction an "0" has two names. If it comes <u>before</u> the decimal point. It's called **"NOUGHT"**, <u>after </u>the point, it is pronounced **"OH".**

Look at the numbers below and try read them correctly:

0.1	nought-point-one
0.01	nought-point-oh-one

0.001	nought-point-oh-oh-one
1.1	one-point-one
1.123	one-point-one-two-three
3.7⃛	three-point-seven-recurring (3.777777– infinity)
5.6 million	five-point-six-million (5,600,000)
9.5 thousand	nine-point-five thousand (9,500)

We use decimal fraction for large numbers when we want to give the approximate figure (number). Therefore, we say 4,218,937 = 4.2 million, 4,200,000 is lesser than 4,218,937 but here the difference is not very important. If the number is more than 4,250,000, we say it 4.3 million.

This process is called "rounding down" (making the figure smaller to the nearest convenient unit) or "rounding up" (making the figure larger to the nearest convenient unit).

Do you know how to say these numbers?

It is estimated that 53 % of the American voters voted in the 1980 Presidential election. About 155,000,000 people could have voted. As a percentage of this figure, 27.03 % voted for Mr. Reagan, 21.77 % voted for Mr. Carter, and 3.5 % voted for Mr. Anderson, 0,64 % of the voting population voted for the other two candidates (Ed. Clark and Barry Commoner).

Notes:
1. We use a point (.) for decimal fractions, not a comma (,)
2. Numbers before the decimal point are said normally (one, ten, twenty-three, six hundred, etc.). After the point, we say each number by itself (digit by digit): we don't say hundred, thousand, million etc. Therefore, 22.22 is twenty-point-two-two.
3. Sometimes the "0" is called zero before and after the point, for example 0,06 can be zero-point-zero-six. This zero is often used in scientific English.

Mathematical Expressions

1. Addition

Do you know how to say "1 + 1 = 2" or "321 + 123 = 444"? In small additions, we usually say "**and**" for +, and "**is or are**" for =
- one and one are two
- five and four is nine
- What's four and three?

In larger addition, (and in more formal style) we use **"plus"** for +, and "**equals or is**" for =

So, the addition "321 + 123 = 444" we say "Three hundred twenty-one plus a hundred twenty-three is/equals four hundred and forty-four".

2. Subtractions

Do you know how to say "8 - 3 = 5" or "519 – 328"? In conversational style, dealing with small numbers, people say:
- Three **from** eight **leaves/is** five
- Eight **take away** three **leaves/is** five

In more formal style, dealing with larger numbers, **minus and equals** are used.

So, for the subtraction "519 – 328 = 191" we say "Five hundred and nineteen minus three hundred and twenty-eight equals a hundred and ninety-one".

3. Multiplication

Do you know how to say "3 x 4 =12, or "17 x 381 =6,477"? In small calculation, the most common approach is to say three fours, six sevens, etc., and to use "**are**" for =
- Three fours are twelve
- Six seven are forty-two

In larger calculation, there are several possibilities. One way is to say "**times**" for **X**, and "**is or makes**" for =

So, for the multiplication "17 X 381 = 6,477" we say "Seventeen times three hundred and eighty-one is/makes six thousand, four hundred and seventy –seven".

In more formal style, we say "**multiplied by and equals.**" 17 multiplied by 381 equals 6,477

4. Division

Do you know how to say "9 : 3 = 3" or "261 : 9 = 29" The simplest way to use "**divided by and equals**." So, for the division "261 : 9 = 29" we say "Two hundred and sixty-one divided by nine equals twenty – nine". But in smaller calculation like 9 : 3 = 3, people might say, for example, *three into nine goes three (times).*

Practice saying the following expressions!
1. 732 x 23 = 4215
2. 45,111 – 872 = 28,990
3. 34,010 : 5 = 2336
4. 456 + 980 = 471
5. 508,543 – 654 = 36,776

EXERCISES
Activity B.6
Recognizing different ways of saying cardinal numbers.

Look at the numbers and the spelling below. Match each number with its spelling. The first has been done for you.

1.	Apt.#23	(c)	a.	Nine-twenty A.M. (in the morning)
2.	87%	( )	b.	Nineteen ninety-nine
3.	25 kg	( )	c.	Apartment number twenty-three
4.	$ 38,50	( )	d.	Eight hundred square meters
5.	9:20 A.M	( )	e.	Twenty-four degrees Celsius
6.	24º C	( )	f.	Eighty-seven percent
7.	1999	( )	g.	Thirty-eight dollars and fifty cents
8.	829-5671	( )	h.	One hundred ten miles per hour
9.	800 m2	( )	i.	Twenty-five kilogram
10.	110 mph	( )	j.	Eight two nine, five six seven one.

Activity B.7

Listen to these sets of numbers and write them down on the space provided.

1. _____
2. _____
3. _____
4. _____

Activity B.8

Complete the blanks spaces in the sentences using words for cardinal numbers

1. There are _____ days in a week.
2. There are _____ days in the month January.
3. There are _____ Wednesday in this month.
4. Dylan is going to have surveying camp _____ times this year.
5. There are _____ days in August.

Answer the question for A, B, and C below. Write your answer together with the process.

A. Maria's English Club has 16 girls. There are 12 more boys than girls in that club.
   1. How many boys are there in the English Club?
   2. How many students are there altogether in the English Club?

B. The English Club has $67 to spend on items. Reading books cost $13, listening tools cost $18, speaker costs $24, and some pens and pencils cost $23.
   1. How much will the reading books, listening tools, speaker and pens and pencils cost altogether?
   2. Do they have enough money to buy everything?
   3. The students spent $55. What items did they buy?

C. Each week, the students in Maria's English Club compete in speech. There are six teams. Look at the following total scores for each team.

	Team 1	Team 2	Team 3	Team 4	Team 5	Team 6
Week 1	13,246	12,499	5,294	10,324	8,02	10,244
Week 2	11,597	13,006	13,107	9,261	14,768	11,724
Week 3	12,698	5,772	13,624	14,92	6,492	12,324
Week 4	7,339	11,977	9,021	6,792	12,931	6,549

1. How many points did Team 3 score altogether in Weeks 1,2,3, and 4? _____
2. Look at Week 1. Which team scored the most points? _____
3. How many points did Team 2 score for the first two weeks? _____
4. Which team scored more points altogether- Team 5 or Team 6? _____
5. Which team scored more points in Weeks 2 and 3 combined- Team 2 or Team 6? _____

Answer the question below. Write your answer on the lines.

The Image Association Team played eight in the urban and rural mapping design competition last year. Look at the chart with their scores. Then answer the question.

Game	Image Association's Scores	Opponent's Scores
1	57	48
2	65	73
3	42	48
4	75	60
5	39	64
6	52	45
7	60	51
8	58	32

1. Which games did Image Association win? _____
2. Which games did Image Association lose? _____

3. In which game was Image Association's score the highest? _____

4. In which game was Image Association's score the lowest? _____

5. Look at Game 2. What is the point difference between Image Association and opponent? _____

6. Look at Game 3. What is the point difference between Image Association and opponent? _____

7. Look at Game 5. What is the point difference between Image Association and opponent? _____

8. In which game (Game 2,3, or 5) is the point difference between Image Association and the opponent the greatest? _____

9. In which game (Game 2,3, or 5) is the point difference between Image Association and the opponent the least? _____

10. Look at the scores for the five games that Image Association won. What is the sum of those scores? _____

11. Look at the scores for the five games that the opponent won. What is the sum of those scores? _____

12. How many points did Image Association make for those five games? _____

13. Compare game 5 and 8. In which game is the point difference greater? _____

14. Compare game 4 and 6. In which game is the point difference greater? _____

15. Look at all the games. Which two games have equal point differences? _____

C. READING COMPREHENSION

Alexander Graham Bell

Alexander Graham Bell, a teacher of the deaf and inventor, made a great **contribution** to science. Born in Edinburgh in 1847, he immigrated to Canada in 1870 and to the United States in 1871. His **interests** in teaching the deaf directed him to the idea of **transforming** speech. His experiments with a multiple telegraph led

him to his many **inventions**, one of which was the telephone – the most famous. For this invention, the Academie Francaise bestowed on the Bell the Volta Prize of 50,000 francs. Others include the photophone, which transmits speech by light rays; the audiometer, which is used to **measure** acuity in hearing; the induction balance, which is used to locate metal objects in human bodies; the first wax recording cylinder and the flat wax disc, which **formed** the basis of the modern phonograph. As his interests turned to aeronautics in 1895, Bell, together with his associates, **developed** new concepts that led to important inventions. Among these were the aileron, a moveable of an 1) machine that controls roll; the tricycle landing **gear**, which permitted takeoff and landing on a flying field; the hydrodome – a hydrofoil boat, which travels above the water at high speed. Bell's continuing studies on the causes and heredity of deafness brought him to **experiment** in eugenics, including sheep breeding, and to his book Duration of Life and Conditions Associated with Longevity. He died in 1922 at Baddeck, Nava Scotia, Canada, where the Canadian government **maintains** a museum in which many of his inventions are displayed.

Adapted from http://encarta.msn.com

Exploring Vocabulary
Activity C.1

These sentences are about the reading. Complete them with the words and phrases in the box.

contribution	interests	transforming	invention	measure
formed	developed	gear	experiment	maintains

1. Alexander made inventions. He has given great _____ to people.
2. Alexander did not always work alone. With his friends, he _____ the aileron.
3. To _____ acuity in hearing, he invented the audiometer.
4. Alexander's interest in deafness has led him to _____ in eugenics.

5. Being very interested in teaching the deaf, he got the idea of _____ speech.
6. The first wax recording cylinder and the flat wax disc were then _____ into modern phonograph.
7. The idea of transforming speech emerged because of his _____ in teaching the deaf.
8. The government of Canada _____ a museum to honor Alexander.
9. His many _____ were mostly born from his experiments with a multiple telegraph.
10. Because of Alexander' invention, the tricycle landing _____, now it is possible to take off and land on a flying field.

Activity C.2
These sentences use the target words and phrases in new contexts. Complete them with the words and phrases in the box.

contribution	interests	transforming	invention	measure
formed	developed	gear	experiment	maintains

1. He tried to _____ a new concept in starting a motorcycle, unfortunately he failed.
2. His _____ which can start an engine using water as fuel got an award.
3. If you _____ the engine of your car, it will always be in good condition.
4. The groups have been _____, but the equipment is not ready yet.
5. John gave a great _____ in the maintenance competition. Because of him the team won five awards.
6. _____ a mechanical bike into an electrical bike is not difficult.
7. The students are doing _____ with the diesel engine.
8. In boosting mechanical department students' _____ in learning English, the lecturer to act them to act as mechanics and customers.

9. Speedometer is used to _____ how fast a motorcycle or a car is.
10. The shift _____ is stuck. You have to go to a garage to fix it.

Reading for Details
Activity C.3
    Read these sentences. Say T (true) if it is correct and F (false) if it is incorrect.
1. Alexander was born in Canada.
2. In 1895 Alexander got interested in aeronautics.
3. Before being an inventor Alexander was a teacher.
4. Audiometer is used to transmit speech by light rays.
5. Alexander was always working alone when inventing new inventions.

Activity C.4
Answer these questions based on the passage above.
1. How long did Alexander live in Edinburg?
2. How much did Alexander get from the Academie Francaise for inventing the telephone?
3. In year did Alexander got interested in aeronautics?
4. How old was Alexander when he died?
5. How did Alexander invent the telephone?

Sharing Opinions
Talk about these questions in a small group.
1. Technology is always good for our life
2. If you were an inventor, what would you invent? Why?
3. What recent technology do you think is the most useful for people's life? Why?

Glossary

addition(n)	: 1. an adding; 2. part added
contribution(n)	: 1. giving, esp. a common fund
develop(v)	: 1. grow, improve, expand, etc; 2. work out by degrees
division(n)	: 1. a dividing; 2. segment, group,etc
experiment(v,n)	: 1. test to discover or prove something
form(v)	: 1. to shape; 2. develop; 3. constitute
interests(n)	: 1. feeling of curiousity; 2. thing causing feeling; 3. share in something
gear(n)	: 1. equipment; 2. toothed wheel that meshes with others
invention(n)	: 1. an inventing; 2. power of inventing; 3. something invented
maintain(v)	: 1. keep up; 2. keep in working condition; 3. declare
measure(v)	: 1. find out the extent, dimension, etc. of; 2. marked off (a certain amount); 3. be a thing for measuring
multiplication(n)	1. increase in number, degree, etc; 2. the product (of) by adding a certain number of times
transform(v)	: 1. change the form or condition of
subtraction(n)	: 1. taking away, as one number from another

CHAPTER 2
USING THE NUMBERS

General Instructional Objective

By the end of the lesson, students are able to identify number and mathematical expression.

Specific Instructional Objectives

After studying Lesson 1, students are able to:
1. Use cardinal number and ordinal number
2. Answer the questions from reading passage

Skill Focus
- Reading

Vocabulary Learned
- Noun : addition; division; multiplication; subtraction
- Verb : develop; experiment; form; maintain; measure; transform

A. VOLUME/WEIGHTS

Activity A.1

Before you read the passage, talk about these questions.

1. Mention some common units of volume?
2. Mention some common units of weight?

Power Shovel for Sale

A leading mining company is selling a used **power shovel**. The power shovel is a great machine that will last for another decade. The **operating weight** is 8,055 tons (8,852 metric tons). The capacity of its bucket is 2835 **cubic feet** (about 80 cubic meters). The power shovel able to remove up to 300 **cubic feet per ton** (0.009 m^3/kg) per day*. This is the same as 11.1 **yd^3/ton** (9.4m^3/tons). It also able to remove 10 **bank cubic meters** of each ton of coal. For more information about the item or for the price, please call 021-511-52282-770.

*Depends on the type of material

Adopted from: Career Paths: Mining

Activity A.2

Read the advertisement. Then, mark the following statements as true (T) or false (F).

1. __ The power shovel functions well.
2. __ The power shovel weighs over 9,000 metric tons.
3. __ The power shovel can move is 300 cubic feet per ton for most material.

Activity A.3

Put the words or phrases from the word bank under the correct headings.

WORD BANK

bank cubic meter	ton	cubic meter	yd3/ton
cubic feet per ton	cubic feet	m3/ton	

Units of Volume	Unit of Weight	Volume to Wight Ratio

Activity A.4

Write a word or phrase that is similar in meaning to the underlined part.

1. The vehicle's <u>maximum allowable amount</u> is 600 pounds.
   _ a _ a c _ _ y

2. The mining division bought a used <u>machine for removing earth and rock</u>.
   _ o w _ _   s h _ _ _ l

3. Bryan called to ask about the machine's <u>weight while it is in use</u>.
   _ p e _ a t _ n _   w _ _ g h _

B.   DISTANCE/DEPTH

Activity B.1

Before you read the passage, talk about these questions.

1. What are some units of measurement for distances or depth?
2. When do miners talk about distances or depth?

Core Sample Report
Andy Prospecting

Researchers **examined** two **core samples** from the proposed mine site two days ago. Each core sample has a **diameter** of one hundred **millimeters** (three point nine **inches** or ten **centimeters**). The researchers got these samples from **depths** of over nine hundred fourteen **meters** (three thousand **feet**). The mine is two **miles**, or three point two **kilometer** deep. Scientists looked at the samples and found layers of mud, rocks, and minerals. The researchers will drill for more core samples tomorrow. They are going to look for more minerals in the rock.

Adopted from: Career Paths: Mining

Activity B.2

Choose the correct answer based on the report!

1. What is the report mainly about?
    A. contrast of two samples
    B. details of core samples found in a mine
    C. how to dig a sample from the ground
    D. when a researcher needs core samples

2. What is not true about the core samples?
    A. They contain layers of rocks.
    B. They were recovered from depths of 300 feet.
    C. They have a diameter of 3.9 inches.
    D. They contain layers of sand.

3. What happened two days ago?
    A. Researchers drilled in the two core samples.
    B. Miners examined at the core samples.
    C. Researchers mined for minerals.
    D. The researchers drilled for more core samples.

Activity B.3

Match the words (1-7) with the definitions (A-G).

1. __ miles
2. __ kilometers
3. __ inches
4. __ meters
5. __ centimeters
6. __ millimeters
7. __ feet

A   a unit of distance that is the same as 0.62 miles
B   a unit of length that is the same as 3.28 feet
C   a unit of length that is the same as 2.54 centimeters
D   a unit of length that is the same as 0.3 meters
E   a unit of length that is the same as 0.1 centimeters
F   a unit of distance that is the same as 1.6 kilometers
G   a unit of length that is the same as 10 millimeters

Activity B.4

Read the sentence pairs. Choose which word or phrase best fits each blank.

1. **examine / depth**
   A   Researchers _____ core samples from the mine.
   B   The mine has a _____ of one miles.

2. **core sample / diameter**
   A   The circle has a _____ of six inches.
   B   This _____ has three layers of mud.

C.   MATH SYMBOLS

Activity C.1

Discuss these questions before reading the passage?
1. Mention some different types of numbers and math symbols?
2. When do surveyor use numbers and math symbols?

	What you see	What you say	Example
Fraction	X/Y	X over Y or X-Y ths	$\Rightarrow$ "three over eight" or "three-eighths"
Ratio	X:Y	X to Y	2:5 => "two to five"
Decimal	X.Y	X point Y	4.6 => "four point six"
Percent	X%	X Percent	600% => "sixty percent"
Degree*	X^0	X degrees	80° => "eighty degrees"
*Degrees are often used to refer to angles and temperatures.			

Adapted from: Career Paths: Mining

Activity C.2

Choose the correct answer based on the information from the chart!
1. What is the main purpose of the chart?
   A. to explain simple math to work
   B. to give examples of important surveying calculations
   C. to describe how to talk about common math symbols
   D. to show the conversions between different types of number

2. Which is an example of a ratio?
   A. one point four
   B. one fourths
   C. one to four
   D. one over four

3. Three point one is an example of _____.
   A. a ratio   C. a percent
   B. a fraction   D. a decimal

Activity C.3

Match the words or phrases (1-6) with the definitions (A-F).

1. __ X-Yths   4. __ degree
2. __ ratio   5. __ fraction
3. __ angle   6. __ X point Y

A a part of a whole amount
B the way to read a decimal
C unit of measurement for an angle
D the space between two lines that meet
E a relationship between the sizes or quantities of two values
F a representation of a fraction, where X and Y are both numbers

Activity C.4

Read the sentence pairs. Choose which word or phrase best fits each blank.

1. **X to Y / X over Y**
   A You read a ratio as _____.
   B You read a fraction as _____.

2. **percent / decimal**
   A You read a ratio as _____.
   B You read a fraction as _____.

CHAPTER 3
DESCRIBING SHAPES AND ANGLES

General Instructional Objective
By the end of the lesson, students are able to identify and say shapes in English.

Specific Instructional Objectives
After studying Lesson 5, students are able to:
1. Identify and say one and two-dimensional shapes in English.
2. Identify and say three-dimensional shapes in English
3. Answers the questions in the reading passage.
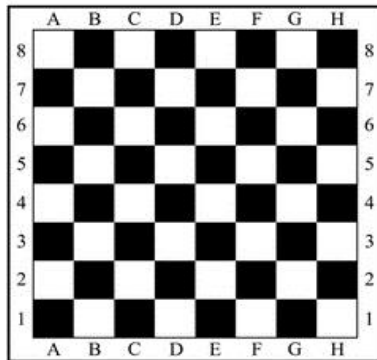
Skill Focus
- Reading

Vocabulary Learned
- Noun   :   dome; gate; symmetry
- Adjective :   elaborate
- Verb   :   counterbalance

Source: m.economictimes.com Source: inquenta.ca

Picture A   **Picture B**

Source: 123rf.com   *Source: Samsung.com*

Picture C   **Picture D**

A.   GETTING READY

Activity A.1

Answer the questions based on picture above.

1. Look at picture A. What is it?
2. What shape does it have?
3. Look picture B. What is it?
4. What shape does it have?
5. Look at picture C. What is it?
6. What shape does it have?
7. What the difference between picture A and C?

8. Look at picture D. What is it?
9. What three-dimensional shape does it look like?

B. ONE-DIMENSIONAL, TWO-DIMENSIONAL AND THREE-DIMENSIONAL SHAPES

Shapes, angles and material are often used in workshop activities. Shapes are used to identify some workshop's hand tools when one does not know the name. They can also be used to illustrate the intended design of something. Angles are also useful in workshop activities. Angles are used to have precise shapes. So, shapes and angles are closely related.

One Dimensional and two dimensional shapes

All of the shapes made from a point (.). Does point have dimension? Of course not. It has only a position. By connecting a lot of points we will make shapes. The shapes may be one dimension, two dimensions or even three dimensions.

If we make only one-dimensional shapes, we call them lines. There are two kinds of shapes if we view from the shapes. There are Straight Lines and Curved Lines. And there are three kinds of lines if we view from the position; Vertical Lines, Horizontal lines and Diagonal Lines.
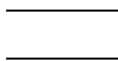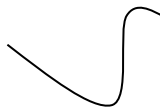Look at these:
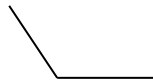
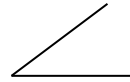| a point	a vertical line	a horizontal line
a parallel line	diagonal lines	a curved line

obtuse angle right angle acute angle

When two lines meet at one end, they make an angle. There are three kinds of angles: Obtuse angles, Right angle and Acute angle.

Activity B.1

Read this and answer the questions:

The letter "E" has one vertical line and three horizontal lines. It also has four angles.

Which of these letters are described below?

D, M, C, H, F, L, Z, B

1. A letter with 2 horizontal lines and 1 vertical line.
2. A letter with 1 curved line and no straight line.
3. A letter with 2 curved lines and 1 vertical line.
4. A letter with 2 parallel vertical lines, 1 horizontal line and 4 angle.
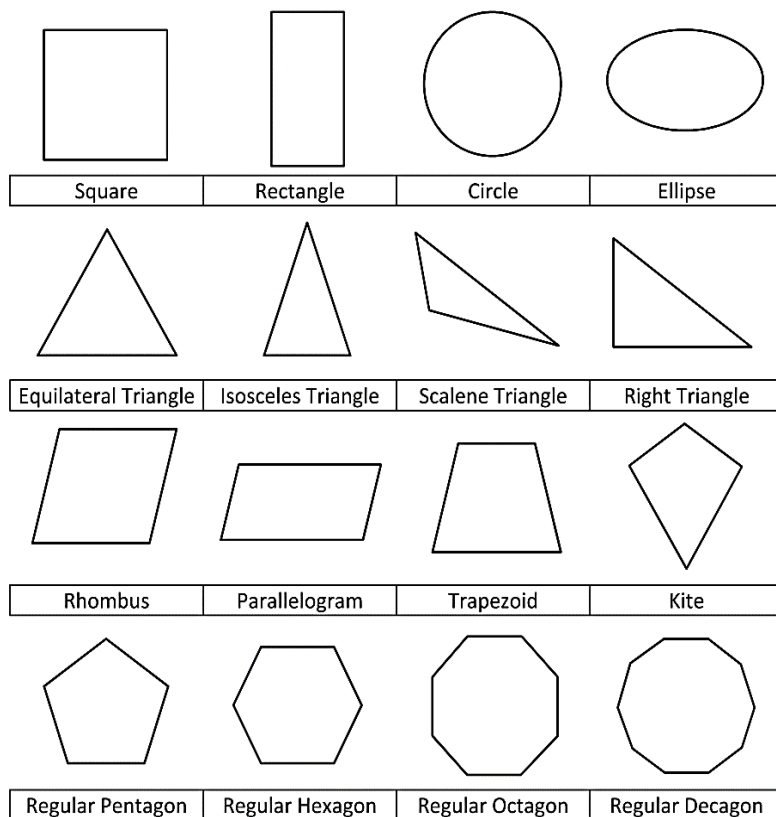5. A letter with 2 vertical lines and two diagonal lines.

Activity B.2

Describe these signs:
1. Plus sign
2. Minus sign
3. Multiplication sign
4. Division sign

There are some regular shapes in geometry field. For the two-dimensional shapes are mentioned figure. It is usually used to describe a plan of a house, a structure of machine or a site-plan of city.

Activity B. 3

Look at these figures and answer the questions!

Square	Rectangle	Circle	Ellipse

Equilateral Triangle	Isosceles Triangle	Scalene Triangle	Right Triangle

Rhombus	Parallelogram	Trapezoid	Kite

Regular Pentagon	Regular Hexagon	Regular Octagon	Regular Decagon

Source: pinterest.com

1. Which figure is curved?
2. Which figures have parallel sides?
3. Which figure always has equal sides?
4. Which figure may have equal sides?
5. Which figure has 3 angles?
6. Which figure has a curved side and a straight side?

Notes:

If the sides are more than 4 sides, they are said in Greek number with "gon" ending, such as pentagon for five sides shape, hexagon, saptagon, octagon, nonagon, and decagon. If there are a lot of sides we can say it "Polygon".

A triangle is only a figure. It is not an object. If something is like a triangle, we can say: it is triangular in shapes. For example: "A parking sign is triangular in shape", or " A parking sign is shaped like a triangle".

The two dimensional shapes have length and a width or even a height (all of them can be said as sides). From those two dimensions we can find an area.

Three-dimensional shapes

The three dimensional shapes are usually called Solids. The three dimensions are length, width, height or thickness. From those we'll know the volume of an object. One field of a solid is called a surface or a field, and the sides of the figure are named the edges. The joined angles among the surfaces are said corner. Look at these solids:
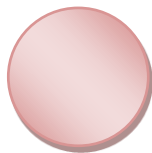
| a sphere | a hemisphere | a rectangular prism | a cube |
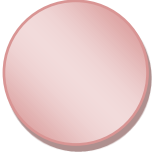
Activity B.5

Identify the shape. Complete the sentence. The first one has been done as an example.

	Noun	Complete the sentence
	triangle	it's a triangle ....
	....	....
	....	....
	....	....
	....	....

	Noun	Complete the sentence
	....	....

C. READING COMPREHENSION

Taj Mahal

The Taj Mahal, a mausoleum in Agra, India, was built by the Mughal emporer Shah Johan in memory of his wife, Arjumand Banu Bagam, known as Mumtaz Mahal. It is regarded as one of the most beautiful buildings in the world because of its **elaborate** structure.

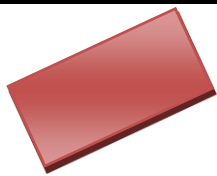As visitors pass through an imposing red sandstone **gate**, decorated with inscriptions from the Koran, they see a sprawling garden going all the way up to the Taj. The garden covering 300 m by 300 m of a total area of 580 m by 300 m, is divided into four equal parts by canals flowing from the raised pool in the center. Each part of the garden has been sub-divided into 16 flowerbeds, making a total of 64. All of the trees, either cypress trees (a symbol of death) or fruit trees (a symbol of life), were planted to present **symmetry.**

At the end of this superb garden rises the Taj Mahal, the mighty white marble mausoleum, flanked by two red sandstone buildings. The one to the west is a mosque, facing towards Mecca and it is used for prayers. On the east side of the mausoleum stands the twin of the mosque, referred to as the Jawab (Answer), purely architectural to **counterbalance** the mosque and preserve symmetry. The Taj Mahal is raised on a square pedestal with a minaret at each corner. The marble mausoleum is composed of four identical facades, each containing a large central arch of 33 m high. A large bulb-shaped **dome**, over 73 m tall rises over the center of the mausoleum with four smaller domes surrounding it.

Exploring Vocabulary
Activity C.1

These sentences are about the reading. Complete them with the words and phrases in the box.

elaborate	gate	symmetry	counterbalance	dome

1. There is a big _____ on the center of the mausoleum.
2. The trees were planted to show _____.
3. Taj Mahal is famous because of its _____ structure.
4. The Jawab was built to _____ the mosque.
5. The _____ is decorated with inscriptions from the Koran.

Activity C.2

These sentences use the target words and phrases in new contexts. Complete them with the words and phrases in the box.

elaborate	gate	symmetry	counterbalance	dome

1. The _____ on the roof was destroyed by the tornado.
2. He got an A for his seminar because of his _____ explanation.
3. He got suspicious because the _____ of his house was open wide.
4. Trying to _____ the decoration, she put a big centerpiece in the middle of the room.
5. The big mango tree has made the garden lose its _____.

Reading for Details
Activity C.3

Read these sentences. Say T (true) if it is correct and F (false) if it is incorrect.
1. Taj Mahal was built to show the wealth of the king.
2. There are 16 flowerbeds in the garden altogether.
3. The main function the Jawab is to make the place look symmetric.

4. There are four domes on the mausoleum.
6. Mumtaz Mahal was the name of the king's wife.

Activity C.4
Answer these questions based on the passage above.
1. What can be seen as visitors entering the gate of Taj Mahal.?
2. What is Taj Mahal made of?
3. What is shape of the garden? How do you know that?
4. What is the shape of the domes?
5. What kinds of trees are planted to present symmetry?

Sharing Opinion
Answer these questions in a small group.
1. Color blind people should not be allowed to study geodetic engineering.
2. In drawing a map, we have to make the shape as simple as possible.
3. When you buy a map, what is your priority: the image or the function? Why?

D. IT'S SHAPED LIKE A CIRCLE

Picture A   **Picture B**

Picture C

E. GETTING READY

Activity D.1

Answer these questions based on the picture

1. What one and two dimensional shapes do you see in picture A?
2. What do you call the object in picture B?
4. What shape does it look like?
5. What do you call the object in picture C?
6. What shape does it look like?

Activity D.2

Practice these dialogs with your friends.

1. Situation: John is at the workshop. He is talking to Andy, a new student.

    Andy : The manual says check the alternator.
    John : OK. Why don't you do it?
    Andy : How does an alternator look?
    John : It's circle. There is a semispherical shape in the middle of it.
    Andy : I think I've found it.

2. Situation: David is checking his motorcycle. James is approaching him

    David : I can't close this cap.

James : It says use a machine screw.
David : How does a machine screw look like?
James : It's circle. There is a hole in the middle.
David : You mean this one.
James : Yup, you're right.

F.   EXPRESSION FOR DESCRIBING OBJECT

Expressions for asking an object description

How	do	machine screws	look like?
How	does	an alternator	look like?
How	does	an E	look like?

			a tool box?
What	is	the shape of	a cupboard?
			door?

Expressions for describing an object

It	is	shaped	like	a circle.
It	is	circle		

They	are	shaped	like	circles.
They	are	square.		
It	has	three horizontal lines and one vertical line.		
They	have	three horizontal lines and one vertical line.		

G.   PRACTICES

Activity C.1

Find the most suitable answer for each of the question below.

1. How does a scraper look like?
2. How do nuts look like?
3. How does an A look like?
4. How does a bit look like?
5. How do hoses look like?
6. How does a tool box look like?
7. How does a disc brake look

a. It's circle with many small holes around it.
b. It's shaped like parallelogram. It has a short wooden handle.
c. They look like pipe. They are made of plastic.
d. It's shaped like a long cylinder

like?

8. How does a light bulb look like?

with a spiral line on its edge.

e. It's shaped like sphere. It is made of glass.

f. They are hexagon. They have a hole in the middle.

g. It has two diagonal lines and one horizontal line.

h. It's shaped like a rectangular prism. There's a handle on it.

Activity C.2

Complete the dialog with the words or phrases that you have learned. Look at the example. Practice the dialog with your friends.

1. A : How does an H look like?
   B : _____.

2. A : How does a saw look like?
   B : _____.

3. A : How does a STOP sign look like?
   B : _____.

4. A : How do NO PARKING signs look like?
   B : _____.

5. A : How do buses look like?
   B : _____.

6. A : How does a steering wheel look like?
   B : _____.

7. A : How do air bags look like?
   B : _____.

8. A : How does a rearview mirror look like?
   B : _____.

9. A : How does a lug wrench look like?
   B : _____.

10. A : How does a car battery look like?
    B : _____.

Activity C.3

　　Practice asking question and answering question based on the information below. Use the expression that you have learned.

1. The door _____
2. The wheel _____
3. The traffic sign _____
4. The roof _____
5. The speedometer _____
6. The license plate _____
7. The air conditioner _____
8. The DO NOT ENTER sign _____

Activity C.4

Work in pairs. Make a dialog based on the following situation.

1. You are a senior student. A junior student is asking you about the shape some tools in the workshop.
2. Your lecturer asks you to draw some tools using one and two dimensional shapes. You are confused how to do that. You discuss it with your friend.

H.　WORKING ON GRAMMAR

Simple Present Tense

I do/work/like etc.

Source: pngkey.com

Source: 123rf.com

They're looking at their book.　　He's eating an ice cream.
They love to read.　　　　　　　　He loves ice cream.

We **study** / he **writes** / **I go** *etc.* = the *present simple:*

I/we/you/they	**walk**	**sing**	**eat**	**stop**	**study**	**do**	**have**
he/she/it	walks	sings	eats	stops	studies	does	has

Remember:

he walks/**she** sings/**it** stops *etc.*

- **I go** to a market. **My sister goes** to a post office. (*not* 'My sister go)
- **Alicia stays** in New York. **Her friends stay** in Ohio.
- **It rains** a lot lately.

I have→he/she/it **has**:

- **Richard has** several appointments every day.

Spelling

- **-es** after **-s / -sh / -ch** :   loss   → losses   crash → crashes
                                        catch → catch**es**
- **-y→-ies**   :   study → studi**es**   fly   → flies
- *Also*   :   do   → do**es**   go   → go**es**

We use the present simple for things that are true in general, or for things that happen sometimes or all the time:

- **I love** watching movies.
- The plays **start** at 8 o'clock and **finish** at 10.30.
- Amanda **studies** very hard. She **begins** at 8.30 and **finishes** at 8 o'clock in the evening.
- The sun sets in the west.
- We **do** a lot of different things in our free time.
- It **needs** a lot of money to buy a luxury house.

always/never/often/sometimes/usually + present simple

- Lisa **always sends a birthday card for her best friends.** (*not* 'Lisa sends always')
- I **usually watch** TV before going to sleep. (not 'I watch usually')
- Harry **never runs** in the morning.
- Anita **sings** beautifully. We **often ask** her to sing for us.

Activity D.1

Write these verbs + **-s** or **–es**.

1. (drink) she _____
2. (swim) he _____
3. (run) it _____
4. (cook) he _____
5. (have) he _____
6. (start) it _____

Activity D.2

Complete these sentences about the people in the pictures. Use these verbs:

eat   go   live   play   sleep

Activity D.3

Complete the sentences. Use these verbs:

boil   close   cost   cost   like   like
meet   open   speak   tech   wash

1. Diana _____ four languages.
2. In London the banks usually _____ at 9.30 in the morning.
3. The City Museum _____ at 5 o'clock in the evening.
4. Samantha is a teacher. She _____ mathematics to young children.
5. My job is very interesting. I _____ a lot of people.
6. Robert _____ his hair twice a week.

7. Food is expensive. It _____ a lot of money.
8. Shoes are expensive. They _____ a lot of money.
9. Water _____ at 100 degrees Celsius.
10. Marsha and I are good friends. I _____ her and she _____ me.

Activity D.4

Write sentences from these words. Put the verb in the right form (arrive or arrives etc.)
1. (often/late/Allen/sleep) _____
2. (sports/I/watch/seldom) I_____
3. (study/Chris/hard/usually)_____
4. (Frank/always/expensive book/buy)_____
5. (breakfast/they/have/never/at 7.00) _____
6. (theatre/Tom/watch/never) _____
7. (cry/a lot/babies/usually) _____
8. (Roy/games/enjoy/always)_____

Activity D.5

Write sentences about yourself. Use always/never/often/ sometimes/usually.
1. (listen to music) _____
2. (ride a motorbike) I _____
3. (sleep after 12 o'clock) _____
4. (walk to work/school) _____
5. (eat cakes) _____

I don't …. (present simple negative)

The present simple negative is don't/doesn't+verb:
Positive   negative
- I drink coffee but I don't drink tea.
- Sue drinks tea but she doesn't drink coffee.
- You don't work very hard.
- We don't watch television very often.
- The weather is usually nice. It doesn't rain very often.
- Gerry and Linda don't know many people.

Remember:

I/we/you/they	don't	* I don't like football.
he/she/it	doesn't	* He doesn't like football.

- I don't like Fred and Fred doesn't like me. (not'Fred don't like')
- My car doesn't use much petrol. (not 'My car don't use')
- Sometimes he is late but it doesn't happen very often.

We use don't/doesn't+infinitive(don't like/doesn't speak/doesn't do etc.):
- I don't like washing the car. I don't do it very often.
- Sandra speaks Spanish but she doesn't speak Italian. (not 'doesn't speaks')
- Bill doesn't do his job very well. (not'Bill doesn't his job')
- Paula doesn't usually have breakfast. (not 'doesn't....has')

Activity D.6
Write the negative.
1. I play the piano very well.

   _____

2. Jane plays the piano very well.

   _____

3. They know my phone number.

   _____

4. We work very hard.

   _____

5. He has a bath every day.

   _____

6. You do the same thing every day.

   _____

Activity D.7
Study the information and write sentences with like.

Activity D.8
Write about yourself. Use: I never ....or I often ....or I don't .....
very often.
1. (watch TV) _____
2. (go to the theatre) _____
3. (ride a bicycle) _____
4. (eat in restaurants) _____
5. (travel by train) _____

Activity D.9
Complete the sentences. All of them are negative. Use don't /
doesn't + one of these verbs:

   cost   go   know   read   see   use   wear

1. I buy a newspaper everyday but sometimes _____ it.
2. Paul has a car but he _____ it very often.
3. They like films but they _____ to the cinema very often.
4. Amanda is married but she _____ a ring.
5. I _____ much about politics. I'm not interested in it.
6. It's not an expensive hotel. It _____ much to stay there.
7. Brian lives near us but we _____ him very often.

Activity D.10
Put the verb into the correct form, positive or negative.
1. Margaret _____ four languages-English, French, German and
    Spanish. (speak)
2. _____ my job. It's very boring. (like)
3. 'Where's Martin?' 'I'm sorry. I _____' (know)
4. Sue is a very quiet person. She _____ very much. (talk)
5. Jim _____ a lot of tea. It's his favourite drink. (drink)
6. It's not true! I _____ it! (believe)

43

7. That's very beautiful picture. I _____ it very much. (like)
8. Mark is a vegetarian. He _____ meat. (eat)

Do you….?
(present simple questions)

We use do/does in present simple questions:
Positive   Question

Study the word order:
do/does + subject + infinitive

Question with always/usually/often:
What do you do? = What's your job?:
- What do you do? 'I work in a bank.'

Remember:
Do   I/we/you/they ….   * Do they like music?
does   he/she/it ….   * Does he like music?

Short answers
- 'Do you play tennis?' 'No I don't'
- 'Do your parents speak English?' 'Yes, they do'
- 'Does George work hard?' 'Yes, he does.'
- 'Does your sister live in London.' 'No, she doesn't.'

Activity D.11
Write question with Do ….? and Does ….?
1. I like chocolate. And you?

   _____

2. I play tennis. And you?
   _____ you _____

3. Tom plays tennis. And Ann?
   _____ Ann _____

4. You live near here. And your friends?

   _____

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5. You speak English. And your brother?

    _____

6. I do exercises every morning. And you?

    _____

7. Sue often goes away. And Paul?

    _____

8. I want to be famous. And you?

    _____

9. You work hard. And Linda?

    _____

Activity D.12
Write questions. Use the words in the brackets (....) + do/does.
Put the words in the right order.
1. (where/live/your parents?)

    _____

2. (you/early/always/get up?)

    _____

3. (how often/TV/you/watch?)

    _____

4. (you/want/what/for dinner?)

    _____

5. (like/you/football?)

    _____

6. (your brother/like/football?)

    _____

7. (what/you/do/in the evening?)

    _____

8. (your sister/work/where?)

    _____

9. (to the cinema/often/you/go?)

   _____

10. (what/mean/this word?)

    _____

11. (often/snow/it/here?)

    _____

12. (go/usually/to bed/what time/you?)

    _____

13. (how much/to phone New York/it/cost?)

    _____

14. (you/for breakfast/have/usually what?)

    _____

Activity D.13
Complete the questions. Use these verbs:

do	do	enjoy	go	like	start	teach	work

1. A : What _____?
   B : I work in a bookshop.

2. A : _____ it?
   B : It's OK.

3. A : What time _____ in the morning?
   B : At 9 o'clock.

4. A : _____ on Saturdays?
   B : Sometimes.

5. A : How _____ to work?
   B : Usually by bus.

6. A : And your husband. What _____?
   B : He's a teacher.

7. A : What _____?
   B : Science.

8. A : _____ job?
   B : Yes, he loves it.

Activity D.14

Write short answers (Yes, he does./No, I don't. etc.).
1. Do you watch TV a lot? _____
2. Do you live in a big city? _____
3. Do you often ride a bicycle? _____
4. Does it rain a lot where you live? _____
5. Do you play the piano? _____

Glossary

counterbalance *(v)*	1. to balance; 2. to compare
dome *(n)*	1. a round shape structure on top of a roof
elaborate *(adj)*	1. complicated; 2. decorated; 3. detailed
gate *(n)*	1. the opening and closing part of a fence
symmetry *(n)*	1. balance; 2. evennes; 3. proportion

CHAPTER 4
IDENTIFYING SIGNS AND SYMBOLS

General Instructional Objective
By the end of the lesson, students are able to talk about the meaning of signs and symbols.

Specific Instructional Objectives
After studying Lesson 3, students are able to:
1. Ask question about the meaning of signs and symbols.
2. Explain the meaning of signs and symbols.

Skill Focus
- Speaking

Expression Learned
- What does the _____ mean?
- It's poisonous.
- It's inflammable.
- It's dangerous.

Grammar
- Imperative

A. GETTING READY

Activity A.1

What the symbols on the picture above mean?

14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____

Activity A.2

Practice this dialog with your friend.

Situation : Danny and Charlie are working at the workshop.
Danny : Hey, Charlie. What's up? You look confused.
Charlie : I don't understand this symbol. What does it mean?
Danny : What is it like?
Charlie : There's a picture of fire here.
Danny : Be careful, Charlie. It means that the stuff is inflammable. It get burned easily.
Charlie : Really? Thanks for telling me, pal.

B.   EXPRESSIONS FOR ASKING SYMBOL AND SIGNS

Expression for asking symbol and sign

What does	that symbol that sign this picture	mean?

Responses

1.   It means it is poisonous. 2.   This area is dangerous. 3.   Be careful. The stuff is inflammable.

C.   PRACTICES

Activity C.1
What do the following road signs mean?

1.   _____
2.   _____
3.   _____

4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____
23. _____
24. _____
25. _____
26. _____

Activity C.2

Make a dialog based on the picture.

a.   b.   c.

d.   e.   f.
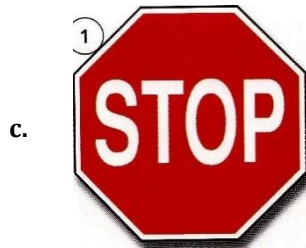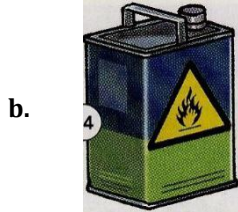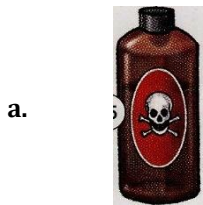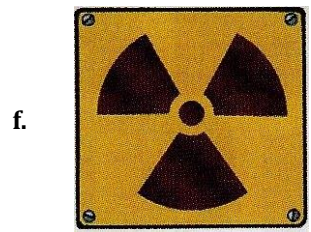
a.   1. _____
     2. _____

b.   1. _____
     2. _____

c.   1. _____
     2. _____

d.   1. _____
     2. _____

e.   1. _____
     2. _____

f.   1. _____
     2. _____

Activity C.3

Work in pairs. Choose one of the pictures below. Talk about the meaning of the symbol or sign with your friend.

a.   b.   c.

d.   e.

D.   WORKING ON GRAMMAR

Imperative

When giving instructions, we use imperative sentences. For example:
- →   Do not twist or wring.
- →   Fold and crease diagonally.
- →   Push the red button.

A sentence using the imperative does not take a *subject*, because the *subject* in the sentence is already understood.

For example:

Do not twist or wiring   (You do not twist or wiring)

Imperatives take *infinitives* as verb.

For example:
1. *Fold* and *crease* diagonally.
2. *Push* the red button*.*
3. *Do not use* bleach.

Activity D.1

Using the imperative in giving instructions

Write down instructions on how to operate a tape recorder and an Automatic Teller Machine (ATM). Use the imperative and put the instructions in the correct order. The first instruction for each action is given.

(***Note :*** The nouns and verbs in the word bank may be of use to you.)

How to operate a tape recorder

----------> Push the OPEN / EJECT button.

----------> _____ .

----------> _____ .

----------> _____ .

----------> _____ .

----------> _____ .

Word Bank			
push	insert	eject	switch on
turn on/off	tune up		adjust
cassete	button	lid	volume
treble		bass	speaker

How to operate an ATM

----------> Insert your ATM card.

----------> _____ .

----------> _____ .

----------> _____ .

----------> _____ .

----------> _____ .

Word Bank			
push	insert	choose	select
take out	withdraw		read
PIN	card	monitor	sign
sum		button	machine

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CHAPTER 5
UNDERSTANDING SAFETY PRECAUTIONS

General Instructional Objective
By the end of the lesson, students are able to identify safety equipment and understand warnings.

Specific Instructional Objectives
After studying Lesson 9, students are able to:
1. Mention safety equipment in English.
2. Identify safety rules.
3. Answer questions based on the reading passage.

Skill Focus
- Reading

Vocabulary Learned
- Noun   : concrete; electric shock; rubber; spark
- Verb   : burned; locked; touch
- Adjective : oily
- Adverb   : backwards

Picture A
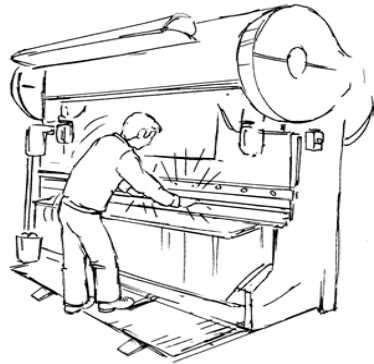
Picture B

A. GETTING READY

Activity A.1

Answer these questions based on the picture above.

1. What do you see in picture A?
2. What happens to the man?
2. What can cause this accident?
3. What do you see in picture B?
4. What happen to the man?
5. What can cause the accident?

B. SAFETY

Safety is the state of being "safe" (from French *sauf*), the condition of being protected against physical, social, spiritual, financial, political, emotional, occupational, psychological, educational or other types or consequences of failure, damage, error, accidents, harm or any other event which could be considered non-desirable. This can take the form of being protected from the event or from exposure to something that causes health or economical losses. It can include protection of people or of possessions.

Meanings

There also are two slightly different meanings of *safety*. For example, *home safety* may indicate a building's ability to protect against external harm events (such as weather, home invasion, etc), or may indicate that its internal installations (such as appliances, stairs, etc) are safe (not dangerous or harmful) for its habitants.

Safety Equipment

Dust Mask

Safety Vest and Helmet

Earmuff, gloves, mask, and goggles.

Fire Equipment

EARPLUGS: $3.25
Actual Cost: $.13

BUMP CAP: $8.00
Actual Cost:
$5-8.00

HAIR NET: $1.00
Actual Cost: $.03

SAFETY
GOGGLES: $5.00
Actual Cost: $2.00

BEARD NET: $.05
Actual Cost: $.02

APRON: $4.24
Actual Cost:
$1.11

ARM GUARDS:
$5.00
Actual Cost:
$2.25

SLEEVES: $2.50
Actual Cost: $.51

LATEX GLOVES: $1.45
Actual Cost: $.12

MESH GLOVES:
$60-85.00
Actual Cost:
$30-60.00

BOOTS: $12-20.00
Actual Cost: $17.50

■ Employers
Charge
Workers

■ Catalog
Price

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Things we need to be careful of

1 hard hat/helmet	8 safety earmuffs	14 flammable	20 biohazard
2 earplugs	9 hairnet	15 poisonous	21 electrical hazard
3 goggles	10 mask	16 corrosive	22 first-aid kit
4 safety vest	11 latex gloves	17 radioactive	23 fire extinguisher
5 safety boots	12 respirator	18 dangerous	24 defibrillator
6 toe guard	13 safety glasses	19 hazardous	25 emergency exit
7 back support			

Activity B.1

Are these instructions safe or unsafe? If it is UNSAFE change it into a SAFE instruction.

Examples:

Repair the tape recorder before you switch it off. UNSAFE

Change it into

Switch off the tape recorder before you repair it. SAFE

1. Switch off the mains before you take the back of the television.
2. Grind the chisel before you put the guard down.
3. Operate the drilling machine before you put on your goggles.
4. Check the brakes before you drive the car.
5. Walk on the floor before you clean up the oil on it.
6. Light the match before you close the petrol can.

C.   READING COMPREHENSION

Welding – Safety Rules

Caution: Welding can be dangerous. Any of these accidents might happen to you: (a) you could be blinded by **sparks**; (b) you could get an **electric shock**; (c) your face, body, arms, legs or feet or feet could be **burned**; (d) there could be a fire in the workshop.

Protective Clothing
1. A mask or helmet must be worn in electric arc welding. (In gas welding, goggles can be used.)
2. Clothes must be kept dry and clean.
3. Thick, heavy boots must be worn. These must be made of some insulating material such as **rubber**.
4. Gloves, and apron and a cap must be worn.
5. Overalls must have long sleeves and no pockets or cuffs.

Workshop
6. The floor must be must of **concrete**
7. There must be a metal container on the floor for the spark.

Exploring Vocabulary
Activity C.1
These sentences are about the reading. Complete them with the words and phrases in the box.

sparks	electric	shock	burned	rubber	concrete

1. To avoid slippery floor, it must be made of _____.
2. _____ can make you blind.
3. If we are not careful when welding, our body may get _____.

4. The booth we are wearing when welding must be of _____.
5. If we do not wear insulating material, we may get _____.

Activity C.2

These sentences use the target words and phrases in new contexts. Complete them with the words and phrases in the box.

sparks	electric	shock	burned	rubber	concrete

1. Don't get too close to the fire. The _____ may hurt you.
2. Now that the shoulder of the street is made of _____, it is safer for street users.
3. He got _____ when trying to fix the lamp.
4. You may stretch the band because it is made of _____.
5. Do you smell that? I think something is _____.

Reading for Details
Activity C.3

Read these sentences. Say T (true) if it is correct and F (false) if it is incorrect.
1. Welding can cause blindness.
2. It is alright to wear wet clothes when welding.
3. Welding can cause fire.
4. When welding you should wear thick booth made of metal.
5. Wooden floor is suggested when welding.

Activity C.4

Answer these questions based on the passage above.
1. Why must we wear a mask or a helmet?
2. Why do we have to wear rubber boat?
3. Why must the floor be made of concrete?
4. Why do we need a metal container on the floor?
5. What accident may happen when welding?

Use of Ladder – Safety Rules

Caution: A ladder can be a very dangerous tool. Any of these accidents could happen to YOU. (a) The ladder could slip on an **oily** floor and you could fall off; (b) the top could fall backwards: (c) a door could open and push the ladder **backwards** or to the side; (d) a metal ladder could **touch** an electric wire and give you an electric shock; (e) a ladder could fall off boxes or drums.

Follow these rules

1. Metal ladders or **wooden** ones with metal wires must never be used for electrical work.
2. Wet or oily floors must be cleaned before a ladder is lifted.
3. When the ladder is near a door, the door must be **locked** closed, or the door must be blocked open, or there must be a man at the bottom.
4. The foot of the ladder must be fixed.
5. The ladder must NEVER be placed on drums, boxes, etc.
6. The top must be fixed. It should be tied to poles, etc, using hooks, chains, ropes or a strap.

Exploring Vocabulary
Activity C.1

These sentences are about the reading. Complete them with the words and phrases in the box.

oily	backwards	touch	wooden	locked

1. _____ ladder with metal wires attached on it cannot be used for electrical work.
2. The ladder may be pushed _____ when the door is open.
3. _____ floor must be avoided when using ladder.
4. You may electric shock if the metal ladder _____ an electric wire.
5. An accident may happen because the door is not _____.

Activity C.2

These sentences use the target words and phrases in new contexts. Complete them with the words and phrases in the box.

oily	backwards	touch	wooden	locked

1. Don't _____ the wire! It is not insulated.
2. Being in front of fire for an hour, now his face becomes _____.
3. It is safer for the children to run around his house because the house has _____ floor.
4. His car was stolen because it was not _____.
5. If you move the car _____, it will hit the wall.

Reading for Details

Activity C.3

Read these sentences. Say T (true) if it is correct and F (false) if it is incorrect.
1. We must lock closed the door to avoid accident.
2. It is not allowed to use metal ladder when dealing with electricity.
3. It is okay to put a ladder on a drum.
4. Hook is used to tie the top of the ladder.
5. You may fall off if the floor is oily.

Activity C.4

Answer these questions based on the passage above.
1. Why do doors have to be locked closed?
2. Why must ladders not be placed on boxes?
3. What must be done when we are using the ladder near a door?
4. Why must metal ladder not be used?
5. Why must oily floor be cleaned?

Sharing Opinion

Answer these questions in a small group.

1. What do you think about job safety in Indonesia?
2. Must all workers be covered by insurance?
3. What must the government do to protect Indonesian workers?

Glossary

backwards (adv.)	1. into the past; 2. shy, 3. slow or retarded
burned (v)	1. be or set on fire, 2. be hurt by acid, 3. be excited
concrete (n)	1. real; 2. actual; 3. hard material made of cement; 4. sand and gravel
electric (a)	1. charged with; 2. work by electricity
locked (v)	1. fasten with a lock; 2. jam or link together
oily (v)	1. lubricate with oil
rubber (n)	1. elastic substance; 2. over shoe
shock (n)	1. sudden emotional upset; 2. bundle of grain; 3. thick mass of hair
sparks (n)	1. small glowing piece from a fire; 2. a trace; 3. flash from electrical tools
touch (v)	1. put the hand; 2. bring, handle
wooden (n)	1. hard substance under a tree's bark

CHAPTER 6
READING TEXTS ABOUT
GEODETIC ENGINEERING

General Instructional Objective
By the end of the lesson, students are able to find out the main idea and specific information from reading texts about geodetic.

Specific Instructional Objectives
After studying Lesson 6, students are able to:
1. Scan and skim information from the reading texts.
2. Find out the main idea and specific information from the texts.
3. Answer the questions from reading texts.

Skill Focus
- Reading

Vocabulary Learned
- Noun : hazard; surface mining; ilnesses; hearing loss; strain; fracture; breaks; HAVS
- Verb : treat; sure; prevent; maintain; experience; transform

A.   GEODESY

Activity A.1

Before you read the passage, talk about these questions.

1.   Have you ever heard about GPS?
2.   What do you think is it for?

What is Geodesy?

Geodesy is the science of accurately measuring and understanding three fundamentals properties of the earth: its geometric shape, its gravity field, and its orientation in space, as well as the changes of these properties with time. By using GPS, geodesist can monitor the movement of a site 24 hours a day, seven days a week.

Many organizations use geodesy to map their countries shoreline, determine land boundaries, and improve transportation and navigation safety. To measure points on the Earth's surface, geodesists assign coordinates (similar to a unique address) to points all over the Earth. In the past, geodesists determined the coordinates of points by using Earth-based surveying tools to measure the distances between points. Today, geodesists use space-based tools like the Global Positioning System (GPS) to measure points on the Earth's surface.

Adopted from: geodesy.noaa.gov

Activity A.2

Read this text about geodesy. Then choose the correct answers.

1.   What is the text about?
    A. The earth's properties.
    B. The use of a GPS.
    C. Geodesists works.
    D. Geodesy's related information.

2.   Which is NOT included in the properties of the Earth measured and understood in geodesy?
    A. The geometric shape.
    B. The gravity fields.

C. The orientation in land.

D. The orientation in space.

3. What can you infer about the geodesist?

   A. They are good at measuring the points on the Earth.

   B. They can monitor the movement of site only once in a while.

   C. They use GPS in the past.

   D. They are mot up to date.

Activity A. 3

Match the words (1-8) with the definitions (A-H).

1. __ point   5. __ navigation
2. __ properties   6. __ site
3. __ positioning   7. __ coordinate
4. __ shoreline   8. __ distance

A. An amount of space between two things or people.

B. Put or arrange (someone or something) in a particular place or way.

C. A location. It has no width, no length and no depth.

D. Things belonging to something or someone

E. The process or activity of accurately ascertaining one's position and planning and following a route.

F. The line along which a large body of water meets the land.

G. An area of ground on which a town, building, or monument is constructed.

H. A group of numbers used to indicate the position of a point, line or plane.

Activity A.4

Use the words from the word bank to fill in the blanks.

WORD BANK

coordinates	point
site	position

1. The engineers are still trying to find out the exact _____ of the ancient ruins
2. The _____ of the furniture in the hall needs to be rearranged.
3. The use of the heavy machinery has damaged the historical _____.
4. The highest _____ on the Earth is located in Mount Everest.

B. THEODOLITE

Activity B.1

Before you read the passage, talk about these questions.
1. Do you know a theodolite?
2. What kind of tool is a theodolite?

All About Theodolites

A theodolite is a surveying instrument with a rotating telescope for measuring horizontal and vertical angles. The theodolite helps us a good within the engineering field. This instrument plays a major role in measurement horizontal angles, vertical angles, bearing, etc. To use a theodolite, it is necessary to know about types of theodolite, a theodolite parts, and how to use it in the field.

Types of Theodolites

There are two different kinds of theodolites: digital dan non digital. Non digital theodolites are rarely used anymore. Digital theodolites consist of a telescope, that is mounted on a base, as well as an electronic read out screen that is used to display horizontal and vertical angles. Digital theodolites are convenient because the digital read outs take the place of the traditional graduated circles and this creates more accurate readings.
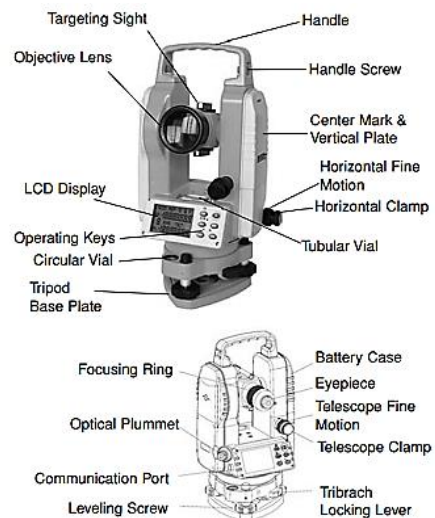
Part of Theodolites

Like other levelling instruments, a theodolite consists of a telescope mounted on a base. The telescope has a sight on the top of it that is used to align the target. The instrument has a focusing knob that is used to make the object clear. The telescope contains an eye piece. The objective lens is used to sight the object, and with the help of the mirrors inside the telescope, allows the object to be magnified. The theodolite's base is threaded for easy mounting on a tripod.

How does a theodolite work?

A theodolite works by combining optical plummets (or plum bobs), a spirit (bubble level) and graduated circles to find vertical and horizontal angles in surveying. An optical plummet ensures the theodolite is placed as close to exactly vertical above the survey point. The internal spirit level makes sure the device is level to the horizon. The graduated circles, one vertical and one horizontal allow the user to actually survey for angles.

Source: johnsonlevel.com

Activity B.2

Read the text about theodolite above. Then, mark the statements as true (T) of false (F).

1. ___ The non digital theodolite is no longer used.
2. ___ The focusing knob is for magnifying the object.
3. ___ To make the theodolite level to the horizon a an optical plummet is used.

Activity B.3

Match the words (1-6) with the definitions (A-F).

1. ___ telescope   4. ___ plummet
2. ___ circle   5. ___ instrument
3. ___ level   6. ___ angles

A. A measuring device used to gauge the level, position, speed, etc. of something.
B. An optical instrument designed to make distant objects appear nearer, containing an arrangement of lenses by which rays of

light are collected and focused and the resulting image magnified.

C. The space (usually measured in degrees) between two intersecting lines or surfaces at or close to the point where they meet.

D. A plumb or plumb line.

E. A round plane figure which boundary (the circumference) consists of points equidistant from a fixed point (the center)

F. Parallel with the plane of the horizon.

C. HOW TO USE A THEODOLITE

Activity C.1

Before you read the passage, talk about these questions.

1. Have you ever used a theodolite?
2. What do you think important to consider when using a theodolite?

How To Use A Theodolite

1. Mark the point at which the theodolite will be set up with a surveyor's nail or a stake. This point is the basis for measuring angles and distance.

2. Set up the tripod. Make sure the height of the tripod allows the instrument (the theodolite) to be eye-level. The centered hole of the mounting plate should be over the nail or stake.

3. Drive the tripod legs into the ground using the brackets on the side of each leg.

4. Mount the theodolite by placing it atop of the tripod, and screw it in place with the mounting knob.

5. Measure the height between the ground and the instrument. This will be used a reference to other stations.

6. Level the theodolite by adjusting the tripod legs and using the bulls-eye level. You can make slight tuning with the levelling knob to get it just right.
7. Adjust the small sight (the vertical plummet) found on the bottom of the theodolite. The vertical plummet allows you to do and ensure the instrument remains over the nail or stake. Adjust the plummet using the knob on the bottom.
8. Aim the crosshairs in the main scope at the point to be measured. Used the locking knobs on the side of the theodolite to keep it aimed on the point. Record the horizontal and vertical angles using the viewing scope found on the theodolite's side.

Source: johnsonlevel.com

Activity C.2
Read the handbook excerpt. Then, choose the correct answers.
1. What is NOT true about using the theodolite?
   A. A surveyor's nail can be used to mark the point where the theodolite will be set up.
   B. The viewing scope is on the top of a theodolite.
   C. The mounting knob is used to screw the theodolite in place.
   D. The vertical plummet is at the bottom of a theodolite.

2. What is the reference for other stations?
   A. The theodolite.
   B. The surveyor.
   C. The marker.
   D. The height between the theodolite and the instrument.

3. What can be used to drive the tripod legs into the ground?
   A. point   C. plummet hats
   B. locking knobs   D. brackets

Activity C.3

Make a group of three of four. Discuss the answer to the questions below with your group.

1. Find parts of theodolite and tools mentioned in the text above and write their functions.

   Example:

   Surveyor's nail : The function is to mark the point where the theodolite will be set up.

2. What will happen if you do not follow the instruction for using the theodolite correctly?

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Nurfitriah dilahirkan di Banjarmasin pada tanggal 16 Agustus 1979. Menyelesaikan Pendidikan Sarjana S-1 di Fakultas Keguruan dan Ilmu Pendidikan di Universitas Lambung Mangkurat, Program Studi Pendidikan Bahasa Inggris tahun 2003, dan sarjana S-2 Master of Linguistics (MA) dari Radboud University Nijmegen, The Netherlands tahun 2009. Sejak tahun 2005 sampai saat ini Nurfitriah bekerja sebagai dosen Bahasa Igggris di Jurusan Teknik Sipil Politeknik Negeri Banjarmasin. Aktif dalam berbagai pertemuan ilmiah nasional maupun internasional khususnya yang terkait dengan pengajaran bahasa baik sebagai peserta maupun pemakalah. Buku ini adalah buku keduanya yang diterbitkan.

English for Geodetic Engineering is specially designed for Geodetic Engineering Study Program students. This book consists of six chapters namely "Talking about Numbers", "Using the Numbers", "Describing Shapes and Angles", "Identifying Sign and Symbols", "Using Safety Precautions" and "Reading Texts about Mining". Those chapters deal with general knowledge to equip the students' knowledge and specific vocabularies that they need in carrying out their jobs. Each chapter consists of theories, examples and exercises to hone the students four skills in English namely listening, speaking, reading and writing and it is expected that the lessons will help them in understanding geodetic world in specific and work world in general and assist them in their career in the near future.

ENGLISH FOR GEODETIC ENGINEERING
Nurfitriah

English for Geodetic Engineering is specially designed for Geodetic Engineering Study Program students of Banjarmasin State Polytechnic. In attempt of boosting students' general as well as specific knowledge, the book discusses specific issues on geodetic engineering as well as general knowledge considered needed for the target students regarding numbers, shapes and angles and safety.

This book consists of six chapters namely "Talking about Numbers", "Using the Numbers", "Describing Shapes and Angles", "Identifying Sign and Symbols", "Using Safety Precautions" and "Reading Texts about Geodetic Engineering". Those chapters deal with general knowledge to equip the students' knowledge and specific vocabularies that they need in carrying out their jobs. Each chapter consists of theories, examples and exercises to hone the students four skills in English namely listening, speaking, reading and writing and it is expected that the lessons will help them in understanding geodetic engineering world in specific and work world in general and assist them in their career in the near future.