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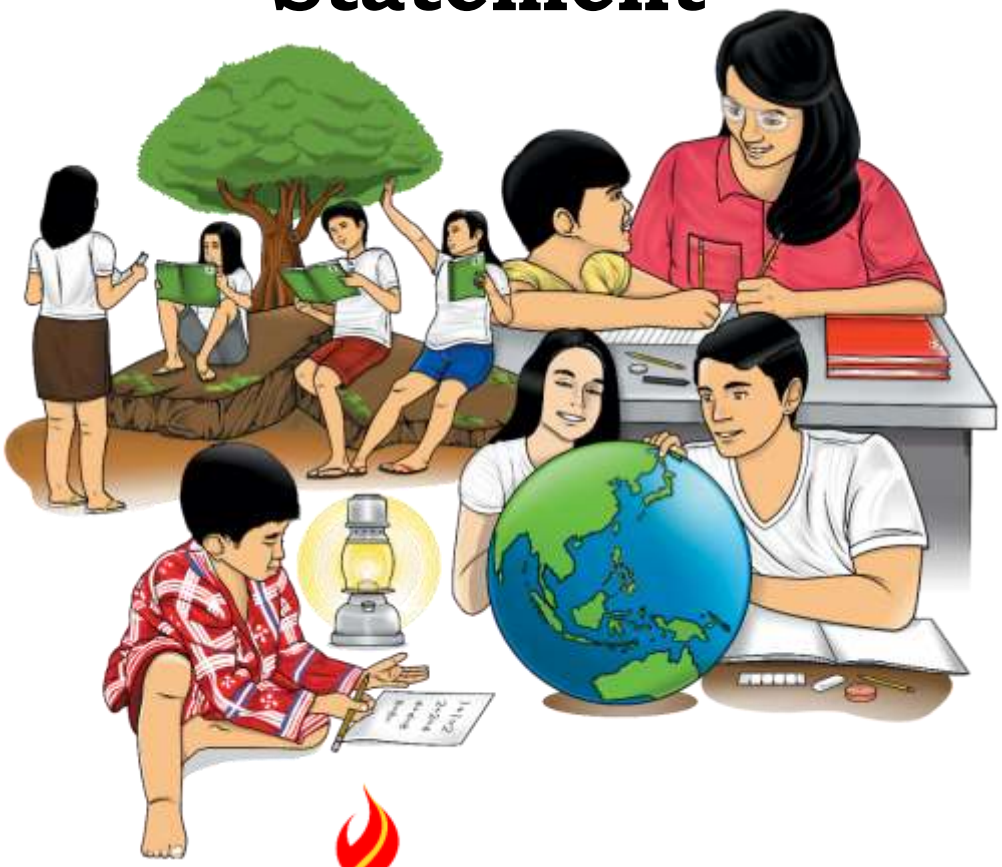
Mathematics

Quarter 2 – Module 10: "Transforming a Statement into an Equivalent If-then Statement"



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Mathematics

Quarter 2 – Module 10: "Transforming a Statement into an Equivalent If-then Statement"

DepED
DEPARTMENT OF EDUCATION

Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

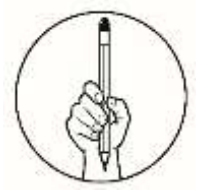
This module was designed and written with you in mind. It is here to help you deepen your understanding in translating a conditional statement into an if-then statement. The scope of this module permits it to be used in many different learning situations. The lesson is arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

This module contains:

Lesson 1: Transforming a statement into an equivalent if-then statement.

After going through this module, you are expected to:

1. determine the hypothesis and the conclusion of the conditional statements not in if-then form;
2. convert conditional statement into an equivalent if-then form; and
3. appreciate the importance of a good if-then statement in real life arguments.



What I Know

Directions: Choose the letter of the correct answer. Write the chosen letter on a separate sheet of paper.

1. Which of the following is a conditional statement?
   A. Roger and Robert play basketball together
   B. Roger plays a volleyball or Robert plays basketball.
   C. Robert plays basketball when Roger plays volleyball.
   D. If Roger plays volleyball, then Robert plays basketball.

2. In the given statement, “Cheese contains calcium”, what is the hypothesis?
   A. calcium
   B. cheese
   C. contains
   D. contains calcium

3. In the statement, “You are in a band and you play drums”, what is the conclusion?

A. band
B. drums
C. you are in a band
D. you play drums

4. *If <u>you kick a soccer ball</u>, then it will bounce*. What do you call the underlined part of the conditional statement?
   A. argument
   B. conclusion
   C. converse
   D. hypothesis

5. *If an angle measures 37°, then <u>it is an acute angle</u>.* What do you call the underlined portion of the statement?
   A. argument
   B. conclusion
   C. converse
   D. hypothesis

6. Convert the statement into an if-then form. *"Do your homework and you will get candy."*
   A. Do your homework then you will get candy.
   B. If you do your homework, then you will get candy.
   C. If you do your homework and then you will get candy.
   D. If you do your homework and you will get candy.

7. The if-then form of the statement, *"Parallel lines never intersect,"* is:
   A. If two lines are parallel, then they never intersect.
   B. If two lines are not parallel, then they intersect.
   C. If two lines intersect, then they are not parallel.
   D. If two lines intersect, then they are parallel.

8. Convert the statement into an if-then form, *"Join this fitness program and you will lose weight".*
   A. If you join this fitness program, then you will lose weight.
   B. If you join this fitness program, you will lose weight.
   C. Join this fitness program and you will lose weight.
   D. You join this fitness program, then you will lose weight.

9. What is the if-then form of the statement, *"Every segment has exactly one midpoint"?*
   A. If it is a segment, then it has exactly one midpoint.
   B. If a midpoint exists, then it is a segment.
   C. If a point is on a segment, then it is a midpoint.
   D. If a segment has a midpoint, then it is a figure.

10. If 2 (x+ 5) = 12, then _____.
   A. x = 4
   B. x = 3
   C. x = 2
   D. x = 1

11. In the statement, *"A right angle is an angle with a measure of* 90°*"*, *the conclusion is.*
    A. an angle is right
    B. an angle measures 90°
    C. an angle measures right angle.
    D. If an angle is right, then its measure is not 90°.

12. Write the if-then statement, "3x – 5 = 25 because x = 10".
    A. If 3x – 5, then x = 10.
    B. If x = 10, then 3x – 5.
    C. If x = 10, then 3x – 5 = 25.
    D. If 3x – 10 = 10, then x = 5.

13. *If the weather is nice, then <u>I will play outside</u>.* What do you call the underlined portion in this conditional statement?
    A. conclusion
    B. converse
    C. hypothesis
    D. inverse

14. Convert the given hypothesis and conclusion into an if-then statement:

    Hypothesis: you work two hours overtime on your job
    Conclusion: you will earn time-and-a-half on your paycheck

    A. If you will earn time-and-a half on your paycheck, then you work two hours overtime on your job.
    B. If you work two hours overtime on your job, then you will earn time-and-a half on your paycheck.
    C. You will earn time-and-a half on your paycheck, then you work two hours overtime on your job.
    D. You work two hours overtime on your job, then you will earn time-and-a-half on your paycheck

Use the situation below to answer item number 15.

The water on earth is constantly changing through a process called the water cycle. As runoff, water flows into bodies of water. Plants return water to the air through transpiration. Water bodies return water to the air through evaporation.

15. In the statement, "as runoff, water flows into bodies of water", which of the statements below is the correct transformation into an if-then form?

    A. If the water runs off, then it flows into the bodies of water.
    B. Water runs off, then it will flow to the bodies of water.
    C. If water flows into the bodies of water, so it runs off.
    D. A body of water will always runoff.

Lesson 1 Transforming a Statement into an Equivalent If-then Statement

In the previous module, you learned how to identify the hypothesis and conclusion of a given conditional statement. But not all conditional statements are written in if-then form where the hypothesis-conclusion can be easily identified. In some conditional statements, conclusions are written before the hypothesis. Will you be able to tell correctly which one is the hypothesis and which one is the conclusion? Will you be able to correctly transform a conditional statement into its equivalent if-then form?

Let us find out by first activating your prior knowledge in identifying hypothesis and conclusion of a given conditional statement written in if-then form.

What's In

Activating Prior Knowledge

Directions: Identify the hypothesis and the conclusion of the statement.

1. If an animal is a bird, then it has feathers.
   Hypothesis: _____
   Conclusion: _____
2. If today is Friday, then tomorrow is weekend.
   Hypothesis: _____
   Conclusion: _____
3. If a number is even, then it is divisible by 2.
   Hypothesis: _____
   Conclusion: _____
4. If two angles are right angles then they are congruent.
   Hypothesis: _____
   Conclusion: _____
5. If a polygon has five sides, then it is a pentagon.
   Hypothesis: _____
   Conclusion: _____

What's New

Activity: Identify Me!

Directions: In your first activity, you already identified the hypothesis and the conclusion of each conditional statement stated in if-then form. Now, try to identify the hypothesis and conclusion of each statement below not written in if-then form.

1. All prime numbers are odd.
2. A triangle is a polygon with three sides.
3. $4x + 5 = 29$ when $x = 6$.
4. Ana will bring umbrella when it is raining.
5. You are safe if you stay at home.
6. I will pass the course if I pass the exam.

Guide Questions:

1. What is the hypothesis and conclusion of each statement?
2. Have you correctly identified the hypothesis and conclusion of each statement? If yes, how did you do it? If no, why?

What is It

Let us recall that in Module 9, you learned how to identify the hypothesis and the conclusion of a given conditional statement. The **if**-statement is the ***hypothesis***, and the **then**-statement is the ***conclusion***.

Furthermore, you also learned that in the conditional statement written in if-then form, the part of the conditional statement that follows the ***if-clause*** is the hypothesis and the part of the conditional statement that follows the ***then-clause*** is the conclusion. For example, in the statement "***If a polygon is a triangle, then it has three sides***", the hypothesis is "**a polygon is a triangle**", while the conclusion is "**it has three sides**".

If we are going to rewrite the above statement in this way "*A triangle is a polygon with three sides*" this statement is also considered a conditional statement. However, it is not written in if-then form.

So let us take note that not all conditional statements are written in if-then form. These are the kinds of conditional statements that need to be converted to *if-then* form. We may reword the hypothesis and conclusion depending on how it is being stated.

For us to easily transform the conditional statements into if-then form, let us master first how to identify the hypothesis and conclusion of the given statements, using the statements presented in the "What's New" part.

Examples:

Conditional Statement	Hypothesis	Conclusion
1. All prime numbers are odd.	All prime numbers	are odd.
2. A triangle is a polygon with three sides	A triangle is a polygon	with three sides
3. $4x + 5 = 29$ when $x = 6$	$4x + 5 = 29$	$x = 6$
4. Ana will bring umbrella when it is raining	when it is raining	Ana will bring umbrella
5. You are safe if you stay at home.	you stay at home	you are safe
6. I will pass the course if I pass the exam.	I pass the exam	I will pass the course

Notice that in examples 1 to 3, you can easily identify the hypothesis and conclusion of each given statement. Hypothesis is found in the first part of the conditional statement, while conclusion is in the second part of the statement. However, in examples 4 to 6, hypothesis is found on the last part, while conclusion is found on the first part of the conditional statement.

Therefore, we can conclude that a hypothesis is not always found in the first part of the statement. Sometimes, we have to interpret the statement to determine the hypothesis and conclusion first before we can rewrite the statement in if-then form.

Using the hypothesis and conclusions identified in the previous exercise, let us convert each statement to *if-then* form.

1. Conditional statement: All prime numbers are odd.
   Hypothesis: All prime numbers
   Conclusion: are odd.
   If-then form: If all numbers are prime, then they are odd.

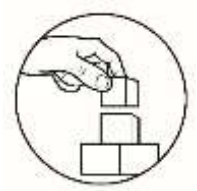
2. Conditional statement: A triangle is a polygon with three sides.
   Hypothesis: A triangle is a polygon
   Conclusion: three sides
   If-then form: If a polygon is a triangle, then it has three sides.

3. Conditional statement: $4x + 5 = 29$ when $x = 6$
   Hypothesis: $4x + 5 = 29$
   Conclusion: when $x = 6$
   If-then form: If $4x + 5 = 29$, then $x = 6$.

4. Conditional statement: Ana will bring umbrella when it is raining.
   Hypothesis: it is raining
   Conclusion: Ana will bring umbrella
   If-then form: If it is raining, then Ana will bring umbrella.

5. Conditional statement: You are safe if you stay at home.
   Hypothesis: you stay at home
   Conclusion: you are safe
   If-then form: If you stay at home, then you are safe.

6. Conditional statement: I will pass the course if I pass the exam.
   Hypothesis: I pass the exam
   Conclusion: I will pass the course
   If-then form: If I pass the exam, then I will pass the course.



What's More

Activity 1: Put me in the Box!

Direction: Determine the hypothesis and the conclusion of the given statement. Put the hypothesis in Box A and the conclusion in Box B.

1. Vertical angles are congruent.
2. Bats are mammals that can fly.
3. You are a good citizen when you obey rules and regulations.
4. A number is divisible by 10 if its last digit is a 0.
5. $3x + 6 = 21$, because $x = 5$.

BOX A *(Hypothesis)*	**BOX B** *(Conclusion)*
1.	
2.	
3.	
4.	
5.	

Guide questions:

a. How did you determine the hypothesis and the conclusion of the given statements?
b. Did you find it difficult to determine the hypothesis and conclusion of each statement? Why?

Activity 2: Complete me!

Directions: Convert each conditional statement into if-then form.

1. All squares are rectangle.

   If _____, then _____.

2. A polygon with nine sides is a nonagon.

   If _____, then _____.

3. Collinear points lie on the same line.

   If _____, then _____.

4. Come here and you will get a reward.

   If _____, then _____.

5. Equilateral triangles are equiangular.

   If _____, then _____.

Guide questions:

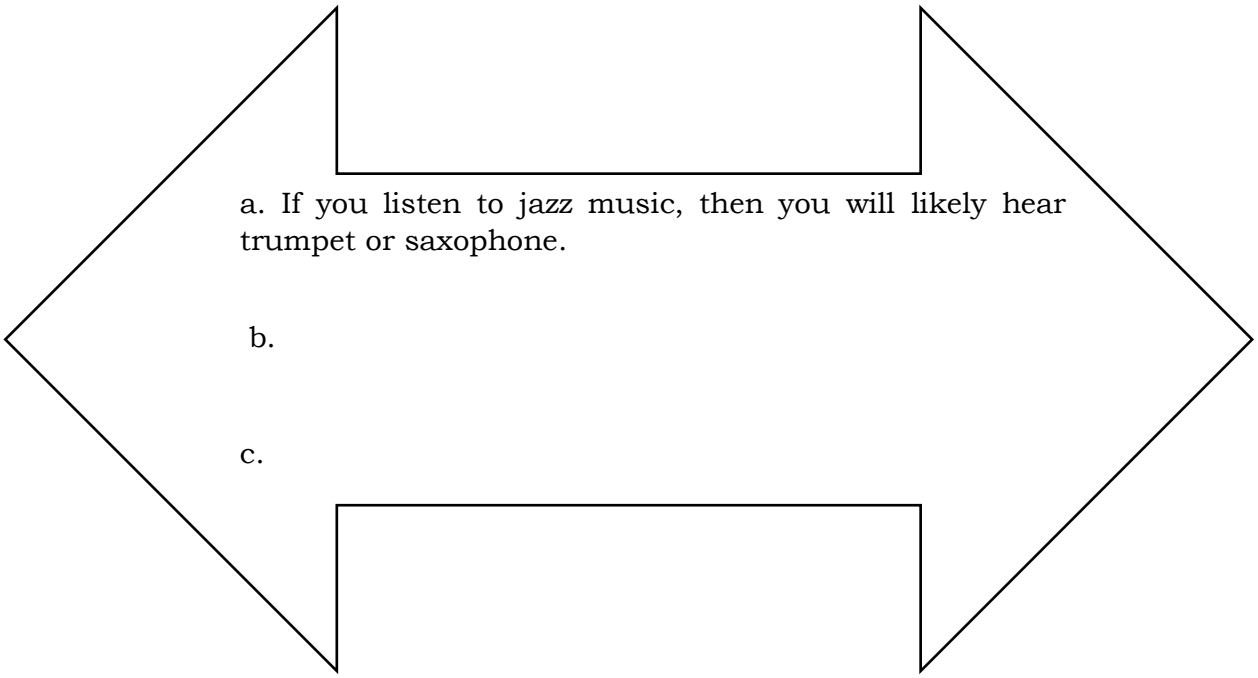
1. How did you identify the hypothesis and the conclusion of the given statement?

2. Does identifying the hypothesis and conclusion will help you in converting the statement to if-then form? Why?

Activity 3: Rewrite me!

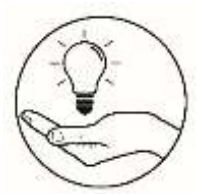
Directions: From the situation below, write at least 3 conditional statements into an if-then form and write your answers inside the given figure. Number 1 has been done for you.

1. "The theme is about **MUSIC**. Different instruments are emphasized in different types of music like.
   - ✓ Jazz music often incorporates trumpet or saxophone.
   - ✓ Rocks music emphasizes guitars and drums.
   - ✓ In Hip-hop music, the bass is featured.



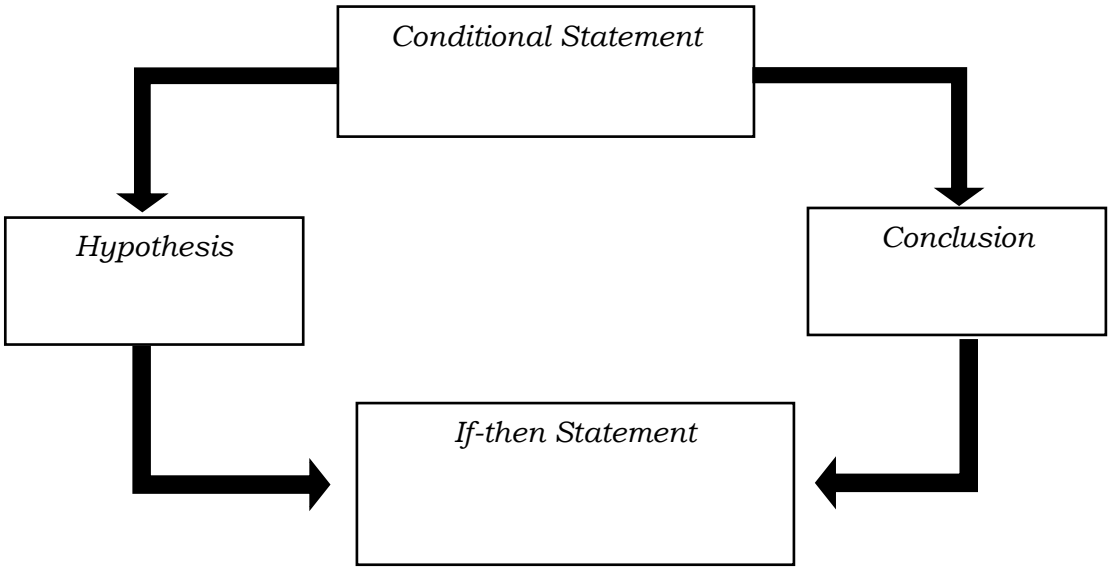
Guide Questions:

a. How would you determine the hypothesis and the conclusion?
b. Is it easy to convert the conditional statement into if-then form?
c. Why is there a need to convert statements into if-then form?



What I Have Learned

Directions: Using the diagram below, create your own conditional statement that is not an if-then form, then determine its corresponding hypothesis and conclusion then convert it into if-then form.



What I Can Do

Directions: Find at least two advertisements from the television, a magazine or newspaper that contain conditional statements, then answer the following questions:

1. Determine the hypothesis and conclusion of each statement.

2. If the conditional statements found are not written in if-then form, convert the statements into if-then form.

Assessment

Directions: Choose the letter of the correct answer. Write the chosen letter on a separate sheet of paper.

1. In a conditional statement, "A prime number has 1 and itself as factors." What is the conclusion?
   A. factors
   B. number
   C. prime Number
   D. has 1 and itself factors

2. Given the conditional statement, "You do your homework and you can watch TV." What is the hypothesis?
   A. TV
   B. homework
   C. you can watch a TV
   D. you do your homework

3. Given the statement, *"I'll bring an umbrella if it rains tomorrow"*. What do you call the underlined portion of the statement?
   A. Generalization
   B. Conclusion
   C. Hypothesis
   D. Reason

4. *"Call your parents if you are running late,"* what do you call the underlined portion of the statement?
   A. Conclusion
   B. Generalization
   C. Hypothesis
   D. Reason

5. Complete the If-then statement; "If I don't study, then _____."
   A. I will go to jail.
   B. I will fail the exam.
   C. I will receive a reward.
   D. My mom will be happy.

6. *"If Maria is a professor, then she must have a graduate degree."* What is the conclusion in this conditional statement?
   A. Maria is a professor

B. If Maria is a professor
C. she must have a graduate degree
D. then she must have a graduate degree

7. *"John does his chores, then he will get a big scoop of strawberry ice cream."* Which of the following represents the hypothesis in the above conditional statement?
   A. John does his chores.
   B. If John does his chores.
   C. he will get a big scoop of strawberry ice cream.
   D. then he will get a big scoop of strawberry ice cream.

8. Identify the hypothesis and conclusion of the given statement, *"If I pass the entrance test for teachers, then I will get admission permit in the College of Teachers Education".*
   A. Hypothesis: If I pass the entrance test for teachers.
      Conclusion: Then I will get admission permit in the College of Teachers Education.
   B. Hypothesis: If I will get admission permit in the College of Teachers Education.
      Conclusion: I pass the entrance test for teachers.
   C. Hypothesis: I pass the entrance test for teachers.
      Conclusion: I will get admission permit in the College of Teachers Education.
   D. Hypothesis: I will get admission permit in the College of Teachers Education.
      Conclusion: I pass the entrance test for teachers.

9. In the statement, "*If you are a Filipino, then you are hospitable."*, the conclusion is _____.
   A. you are a Filipino
   B. if you are a Filipino
   C. you are hospitable
   D. then you are hospitable

10. *"If Anna tells Joy what to buy, then Joy will go to store*." Find the statement that represents the hypothesis in the above conditional statement.
   A. Joy will go to store
   B. if Anna tells what to buy
   C. then she will go to store
   D. Anna tells Joy what to buy

11. Convert the statement into if-then form, *"Squares have right angles".*
   A. If the shape is a square, it has right angles.
   B. The shape is a square, then it has right angles.
   C. If the shape is a square, then it has right angles.

D. if all shapes have right angles, then it is a square.

12. Convert the statement into if-then form, *"All students have a math class".*
    A. If you are a student, you have a math class.
    B. You are a student, and you have math class.
    C. You are a student, then you have math class.
    D. If you are a student, then you have a math class.

13. Convert the statement into *if-then* form, *"A number is divisible by 4 if it is divisible by 8."*
    A. If it is a number, then it is divisible by 4 and 8.
    B. If it is divisible by 4 and 8, then it is a number.
    C. If a number is divisible by 4, then it is divisible by 8.
    D. If a number is divisible by 8, then it is divisible by 4.

For item 14, refer to the situation below.

The water on earth is constantly changing through a process called the water cycle. As runoff, water flows into bodies of water. Plants return water to the air through transpiration. Water bodies return water to the air through evaporation.

14. How would you convert the statement, "Plants return water to the air through transpiration," into an If-then form?
    A. If it transpires, then it returns the water.
    B. If the water returns to the air, then it will transpire.
    C. If the plants return water to the air, then the water went through transpiration.
    D. If the plants will return water to the air, it is through transpiration.

15. Study the passage from Lewis Carrol then select the statement that is equivalent to "If I put my fingers into glue or squeeze a right-hand foot into a left-hand shoe or drop a heavy weight upon my toe, then I weep."
    "A passage from Lewis Carroll: *"And now, if ever by chance I put My fingers into glue, Or madly squeeze a right-hand foot Into a left-hand shoe, Or if I drop upon my toe A very heavy weight, I weep, for it reminds me so Of that old man I used to know ..."*

    A. If I don't weep, then I don't put my fingers into glue or squeeze a right-hand foot into a left-hand shoe or drop a heavy weight upon my toe.
    B. I put my fingers into glue or squeeze a right-hand foot into a left-hand shoe or drop a heavy weight upon my toe and I don't weep.
    C. I don't put my fingers into glue, and I don't squeeze a right-hand foot into a left-hand shoe, and I don't drop a heavy weight upon my toe, or I weep.
    D. If I weep, then I put my fingers into glue or squeeze a right-hand foot into a left-hand shoe or drop a heavy weight upon my toe.

Additional Activities

Direction: Use the diagram below to do what is asked. Write your answers in the boxes.

REAL NUMBER SYSTEM

Using the given theme and its description, formulate three conditional statements not written in if-then form

- 1. _____
- 2. _____
- 3. _____

Convert the three conditional statements into if-then form

- 1. _____
- 2. _____
- 3. _____

Answer Key

Assessment

1. D
2. D
3. C
4. A
5. B
6. C
7. A
8. C
9. C
10. D
11. C
12. D
13. D
14. C
15. D

What's More

Activity # 1

Box A	Box B
1. Vertical angles	Congruent
2. Bats	Mammals that can fly
3. you obey rules and regulations	you are a good citizen
4. last digit is zero	number is divisible by 10
5. 3x + 6 = 21	X=5

Activity # 2

1. If a figure is a square, then it is a rectangle.
2. If a polygon has nine sides, then it is nonagon.
3. If points are collinear, then they lie on the same line.
4. If you come here, then you will get a reward.
5. If a triangle is equilateral, then it is equiangular.

Activity # 3

1. a. If you listen to jazz music, then you will likely hear trumpet or saxophone.
   b. If you listen to mock music, then you will likely hear guitar or drums.
   c. If you listen to hip-hop music, then you will likely hear a bass.

What I Have Learned

1. Answers may vary

What I Can Do

1. Answers may vary

What I Know

1. D
2. B
3. D
4. D
5. B
6. B
7. A
8. A
9. A
10. D
11. B
12. C
13. A
14. B
15. A

References

Abuzo,E.P., Bryant,M.L., Cabrella,J.B., Caldez,B.P., Callanta,M.M., Castro,A.I., Halabaso,A.R., et.al (2013). *Mathematics 8 – Learner's Module*. Department of Education, Pasig City, Philippines, pp. 317 – 328

Conditional Statement/If-then Statement. Retrieved from: https://www.slideshare.net/sheisirenebkm/conditional-statements-ifthen-statements

Conditional Statement/Math Goodies.Retrieved from: https://www.mathgoodies.com/lessons/vol9/conditional

Diaz,Z.B., Mojica,M.P., Manalo,C.B., Suzara,J.L., Mercado,J.P., Esparrago,M.S., et.al (2017).*Next Century Mathematics 8.* Philippines.Phoenix Publishing House,Inc., pp. 404-412.

If-then Statement.CK-12 Foundation. Retrieved from: https://flexbooks.ck12.org/cbook/ck-12-precalculus-concepts-2.0/section/16.2/primary/lesson/if-then-statements-pcalc

If-then Statement Geometry. CK-12 Foundation. Retrieved from: https://www.ck12.org/geometry/if-then-statements/lesson/If-Then-Statements-BSC-GEOM/

2-3_Conditional_Statements.pdf. Retrieved from: https://www.brewtoncityschools.org/cms/lib/AL01901380/Centricity/Domain/133/2-3_Conditional_Statements.pdf

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