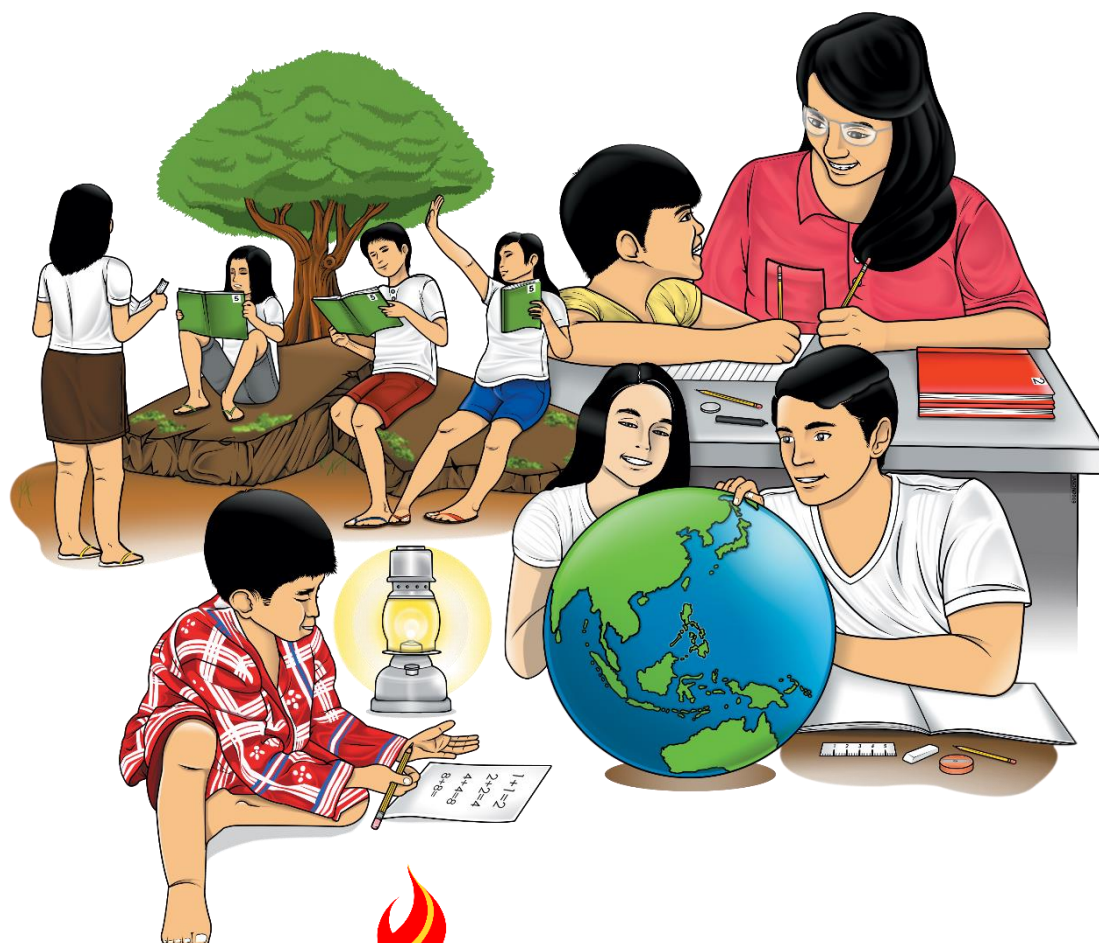


Disaster Readiness and Risk Reduction

Quarter 1 – Module 10: Hazard: Its Impact, Identification and Risk Assessment



Disaster Readiness and Risk Reduction

Alternative Delivery Mode

Quarter 1 – Module 10: Hazard: Its Impact, Identification and Risk Assessment

First Edition, 2020

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Disaster Readiness and Risk Reduction

Quarter 1 – Module 10:

**Hazard: Its Impact,
Identification and
Risk Assessment**

Introductory Message

For the facilitator:

Welcome to the Grade 11/12 Disaster Readiness and Risk Reduction (DRRR) Alternative Delivery Mode (ADM) Module on Hazard: Its Impact, Identification and Risk Assessment!

This module was collaboratively designed, developed and reviewed by educators both from public and private institutions to assist you, the teacher or facilitator in helping the learners meet the standards set by the K to 12 Curriculum while overcoming their personal, social, and economic constraints in schooling.

This learning resource hopes to engage the learners into guided and independent learning activities at their own pace and time. Furthermore, this also aims to help learners acquire the needed 21st century skills while taking into consideration their needs and circumstances.

In addition to the material in the main text, you will also see this box in the body of the module:



Notes to the Teacher

This contains helpful tips or strategies that will help you in guiding the learners.

As a facilitator you are expected to orient the learners on how to use this module. You also need to keep track of the learners' progress while allowing them to manage their own learning. Furthermore, you are expected to encourage and assist the learners as they do the tasks included in the module.

For the learner:

Welcome to the Grade 11/12 Disaster Readiness and Risk Reduction (DRRR) Alternative Delivery Mode (ADM) Module on Hazard: Its Impact, Identification and Risk Assessment!

The hand is one of the most symbolized part of the human body. It is often used to depict skill, action and purpose. Through our hands we may learn, create and accomplish. Hence, the hand in this learning resource signifies that you as a learner is capable and empowered to successfully achieve the relevant competencies and skills at your own pace and time. Your academic success lies in your own hands!

This module was designed to provide you with fun and meaningful opportunities for guided and independent learning at your own pace and time. You will be enabled to process the contents of the learning resource while being an active learner.

This module has the following parts and corresponding icons:



What I Need to Know

This will give you an idea of the skills or competencies you are expected to learn in the module.



What I Know

This part includes an activity that aims to check what you already know about the lesson to take. If you get all the answers correct (100%), you may decide to skip this module.



What's In

This is a brief drill or review to help you link the current lesson with the previous one.



What's New

In this portion, the new lesson will be introduced to you in various ways such as a story, a song, a poem, a problem opener, an activity or a situation.



What is It

This section provides a brief discussion of the lesson. This aims to help you discover and understand new concepts and skills.



What's More

This comprises activities for independent practice to solidify your understanding and skills of the topic. You may check the answers to the exercises using the Answer Key at the end of the module.



What I Have Learned

This includes questions or blank sentence/paragraph to be filled in to process what you learned from the lesson.



What I Can Do

This section provides an activity which will help you transfer your new knowledge or skill into real life situations or concerns.



Assessment

This is a task which aims to evaluate your level of mastery in achieving the learning competency.



Additional Activities

In this portion, another activity will be given to you to enrich your knowledge or skill of the lesson learned. This also tends retention of learned concepts.



Answer Key

This contains answers to all activities in the module.

At the end of this module you will also find:

References

This is a list of all sources used in developing this module.

The following are some reminders in using this module:

1. Use the module with care. Do not put unnecessary mark/s on any part of the module. Use a separate sheet of paper in answering the exercises.
2. Don't forget to answer *What I Know* before moving on to the other activities included in the module.
3. Read the instruction carefully before doing each task.
4. Observe honesty and integrity in doing the tasks and checking your answers.
5. Finish the task at hand before proceeding to the next.
6. Return this module to your teacher/facilitator once you are through with it.

If you encounter any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator. Always bear in mind that you are not alone.

We hope that through this material, you will experience meaningful learning and gain deep understanding of the relevant competencies. You can do it!



What I Need to Know

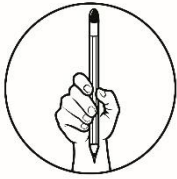
Have you heard of people who lost their job and suffered extreme depression as a result of an epidemic? What about people who were physically injured in the workplace while performing their tasks? How do concerned government agencies address an epidemic like the Covid-19 outbreak? The answers to such questions will be revealed as you progress in this module.

Your knowledge on hazards and its types from previous module is key to understanding the impacts of various hazards on different exposed elements and the method of hazard identification and risk assessment.

In this lesson, you will be acquainted with a systematic examination of a process and task being carried out at work for the purpose of identifying hazards and accompanying risks. Furthermore, you will determine which risks need to be prioritized and think of actions that need to be taken in order to manage risks, if not totally eliminate them.

Upon completion of this module, you are expected to:

1. explain the impacts of various hazards on different exposed elements;
2. classify hazard impacts;
3. perform hazard identification and risk assessment; and
4. recognize the value of being disaster-resilient.



What I Know

Write the letter of the best answer on a separate sheet of paper.

1. Aron Angelo and Peodatto are both working in the same chemical laboratory and are both exposed to same kind and amount of hazardous chemicals. Aron Angelo, though has weaker immune system than Peodatto. Between them, who is less vulnerable to develop a disease caused by chemical exposure?
 - A. Aron Angelo
 - B. Peodatto
 - C. Either Aron Angelo or Peodatto
 - D. They have same level of vulnerability.
2. People residing near the seashore are usually in greater danger of experiencing a tsunami than those residing farther from the seashore. Which of the following statements about the given scenario is correct?
 - A. The seashore is the risk.
 - B. The occurrence of a tsunami is the risk.
 - C. People residing far from the seashore are the ones exposed to the hazard.
 - D. Vulnerability is greater for people residing farther from the seashore.
3. Which impact of a hazard is psychological?
 - A. viral disease
 - B. anxiety and mental trauma
 - C. destruction of houses and buildings
 - D. retrenchment of employees in manufacturing companies

For items 4 to 6

Octopus-wiring and electrical connections might lead to fire. This is common in small houses with large number of family members, making each family member susceptible to the danger.

4. Which is the hazard in the given situation?
 - A. living in a small house
 - B. potential occurrence of fire
 - C. large number of family members in a small house
 - D. octopus-wiring and electrical connections
5. Which is the risk in the given scenario?
 - A. living in a small house
 - B. potential occurrence of fire
 - C. large number of family members in a small house

D. octopus-wiring and electrical connections

6. Which gives the information on vulnerability?
- A. living in a small house
 - B. potential occurrence of fire
 - C. large number of family members in a small house
 - D. octopus-wiring and electrical connections

For items 7 to 11,

In each given scenario, classify the hazard impact if it is (A) physical, (B) psychological, (C) socio-cultural, (D) economic, (E) environmental or (F) biological.

- 7. depression and fear
 - 8. coronavirus disease
 - 9. stoppage of industrial operations
 - 10. collapse of buildings
 - 11. body injuries (bruises, wounds)
12. It refers to knowing all the agents in a certain workplace that can cause accidents or any type of harm.
- A. hazard identification
 - B. risk assessment
 - C. safety management
 - D. SWOT analysis
13. Which of the following are given consideration in risk assessment?
- A. probability and impact
 - B. severity and type of hazard
 - C. type of hazard and impact
 - D. impact and type of damage/ harm
14. Vergel suffers from a mental depression after he lost his job when the company where he used to work retrenched many of its employees. To what type of hazard impact does Vergel's depression belong?
- A. biological
 - B. environmental
 - C. physical
 - D. psychological
15. The Amazon rainforest was thought to have 2.5 million species of insects. It used to be referred to as the "Lungs of the Planet" because it produces more than 20% of the world's oxygen. In September 18, 2019, it burned at a rate not seen in almost a decade. What type of hazard impact did this incident bring?
- A. environmental

- B. physical
- C. psychological
- D. socio-cultural

Lesson

1

Hazard: Its Impact, Identification and Risk Assessment

In any workplace or environment, safety works best if hazards and its impacts are identified. Moreover, assessment of risks accompanying hazards must also be done to ensure safety or at least minimize the impact of hazards, if not totally eradicated.

A sound safety management program must be established to avoid injuries and unpleasant events brought about by hazards and accompanying risks.



What's In

A **hazard** is defined is simply a condition or a set of circumstances that present a potential for harm. So far, you also have learned that hazards are divided into two broad categories: health hazard (can cause occupational illnesses) and safety hazard (can cause physical harm or injuries). A hazard can also be classified into six types which are biological, chemical, physical, safety, ergonomic and psychosocial.

On the other hand, **risk** refers to the potential for loss, damage or destruction a hazard can cause while **vulnerability** refers to the characteristics of a community or system that make it susceptible to the possible damaging effects of a hazard. For example, a doctor who is handling a patient infected with a virus (hazard) has a high chance of getting infected (risk) if she has poor immune system and does not wear personal protective equipment (vulnerability).



Notes to the Teacher

The teacher must ensure that the learner has taken up topics on different hazard types and how the words hazard, risk and vulnerability differ from each other prior to the use of this module.



What's New

1Pic 1Word

Instructions: Refer to the given pictures and captions to guess the word/s by arranging the jumbled letters. Write your answers on a separate sheet of paper.

1. NEXYITA _____

Too much fear and worrying after a loved-one died of COVID-19



2. FOSTER RIFE _____

The burning of Amazon rainforest in Brazil (2019) leaving many species dead and homeless



3. LSIYERPR _____

The difficulty to hold firmly or stand on something because it is smooth, wet or slimy



4. ROVOCIRUSNA _____

An invisible enemy that originated from Wuhan, China in 2019 that causes respiratory illness and is highly contagious



5. UTENMENPMOLY _____

No-work-no-pay scenario brought by economic dilemma



6. NOITMIRCISNIDA _____

In a world where one culture is not being embraced by another's culture





What is It

What are the Different Impacts of Hazards?

A hazard can bring about many impacts which can come in different types. Facilities and infrastructures are commonly the target of natural hazards. Specifically, these impacts can trigger accidents and the release of toxic substances, fires and explosions, potentially resulting in health effects, environmental pollution and economic losses.

One way to classify hazard impacts is by means of general impact themes namely:

- Danger to life which includes physical and psychological harm and diseases
- Denial of access like energy, water, communication and transport access
- Damage to the physical environment like buildings and land

For the purpose of this module, we will focus on six (6) more specific types of hazard impacts.

1. Physical impact

- Physical injuries (bone fracture, wounds, bruises)
- Destruction and loss of vital infrastructure like transportation system, roads, bridges, power lines and communication lines.
- Wide spread destruction of housing and buildings

2. Psychological impact

- Grief and psychological illness
- Marital conflict
- Depression due to loss of loved ones and properties
- Chronic anxiety

3. Socio- cultural impact

- Displacement of population
- Loss of cultural identity
- Forced of adoption of new sets of culture
- Ethnic conflicts

4. Economic impact

- Loss of job due to displacement
- Loss of harvest and livestock
- Loss of farms, fish cages and other source of food
- Loss of money and other valuables

5. Environmental impact

- Loss of forest due to forest fires
- Loss of fresh water due to salination
- Disturbance of biodiversity
- Loss of natural rivers

6. Biological impact

- Epidemic to people, flora and fauna
- Chronic and permanent illness caused by biological agents
- Proliferation of different viral diseases

Identification of Hazards and Risk Assessment

Hazard identification is the process of determining all physical and nonphysical agents in the workplace or specific environment. Most occupational health and safety problems are caused by hazards which are not eliminated or managed. In order to prevent untoward incidents in a workplace or community, elimination or controlling of hazards is crucial. In some workplaces where hazards cannot be eliminated, they must be monitored and properly managed at the least.

Risk assessment is a way to determine which hazards and risks should prioritized by taking into consideration the probability and severity of impact. Below are the steps in hazard identification and risk assessment.

1. **Identify the hazards.** Use the following methods:
 - a. Observation - use your senses of sight, hearing, smell and touch - combined with knowledge and experience.
 - b. Material Safety Data Sheets (MSDSs) - obtain them from manufacturers and suppliers. It gives information on possible harm from hazardous substances and precautions that need to be taken.
 - c. Hazard and risk surveys - interview other people about their safety concerns as far as the workplace is concerned. Utmost consideration should be given to children or visitors who could be at risk.
 - d. Discussion groups - are useful for identifying hazards and recommending solutions.
 - e. Safety audits – a committee must be assigned to periodically check safety in the area.

2. **Assess the Risk.** Once a hazard has been identified, the likelihood and possible severity of injury or harm will need to be assessed before determining how best to minimize the risk. High-risk hazards need to be addressed more urgently than low- risk ones.

Table 1. Risk Assessment Scoring Matrix

			Impact				
			Insignificant	Minor	Moderate	Major	Extreme
			Minimal if any operational impact	Noticeable but limited operational impact	Substantial operational impact	Severe loss of operational capability, highly damaging but	Complete operational failure, unsurvivable
			1	2	3	4	5
Probability	(Almost) certain	We are bound to experience incidents of this nature at least once a week.	5	10	15	20	25
	Probable	We are bound to experience incidents of this nature at least once a month.	4	8	12	16	20
	Possible	We are likely to experience incidents of this nature at least once in 3 months.	3	6	9	12	15
	Unlikely	We are likely to experience further incidents of this nature at least once in a	2	4	6	8	10
	Rare	We are likely to experience incidents of this nature at least once in 3 years.	1	2	3	4	5

Organization Threshold Priority:	Low
	Moderate
	High

Source: Gulsum Kubra Kaya, Research Gate, *Risk Level Matrix*, www.researchgate.net/profile/Gulsum

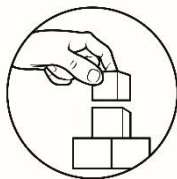
3. **Make the changes.** Once risks are assessed, the next step is to make decision for some necessary changes. These changes include removing the hazard and replacing it with something less hazardous, engineering modifications like installation of exhausts, safety barriers and safety exits, modification of procedures, etc. Combination of the risk control measures mentioned above to effectively reduce exposure to hazards can also be done.

Table 2. Risk assessment and control measures to counter risks

Risk ID	Date Raised	Risk Description	Probability	Severity	Risk Level	Action Plan	Time Frame	Status
1		hearing damage due to exposure too loud noise	4	4	16	provide PPE		Closed
		physical injury due to working at height	4	5	20	provide PPE and tools		Closed
		risks from fire incidents due to non provision of fire exits	2	5	10	provision of fire exits; orient workers		Closed
		electrocution due to poor electrical connections	1	4	4	fix electrical connections		Open
		risk from over-stocking of chemicals	2	4	8	purchasing control system		Closed

Source: Gulsum Kubra Kaya, Research Gate, *Risk Level Matrix*, www.researchgate.net/profile/Gulsum

4. **Checking the changes made.** To make sure risk has been minimized, and a further hazard has not been created, the new safety measures may need to be carefully tested before work begins again. Risk assessment doesn't end with making changes. It is essential that these changes made are monitored and checked. It must be monitored if the changes done are being followed consistently and if these changes contribute to the improvement of safety management in the workplace. This last step has to be done periodically to accurately assess the effectiveness of the entire process.



What's More

Activity 1.1: Concept Webbing

Instruction: Classify the following hazard impacts by writing them inside the appropriate boxes.

insanity

Amazon forest fire

overthinking

amputated leg

broken spine

bankruptcy

massive lay-off of workers

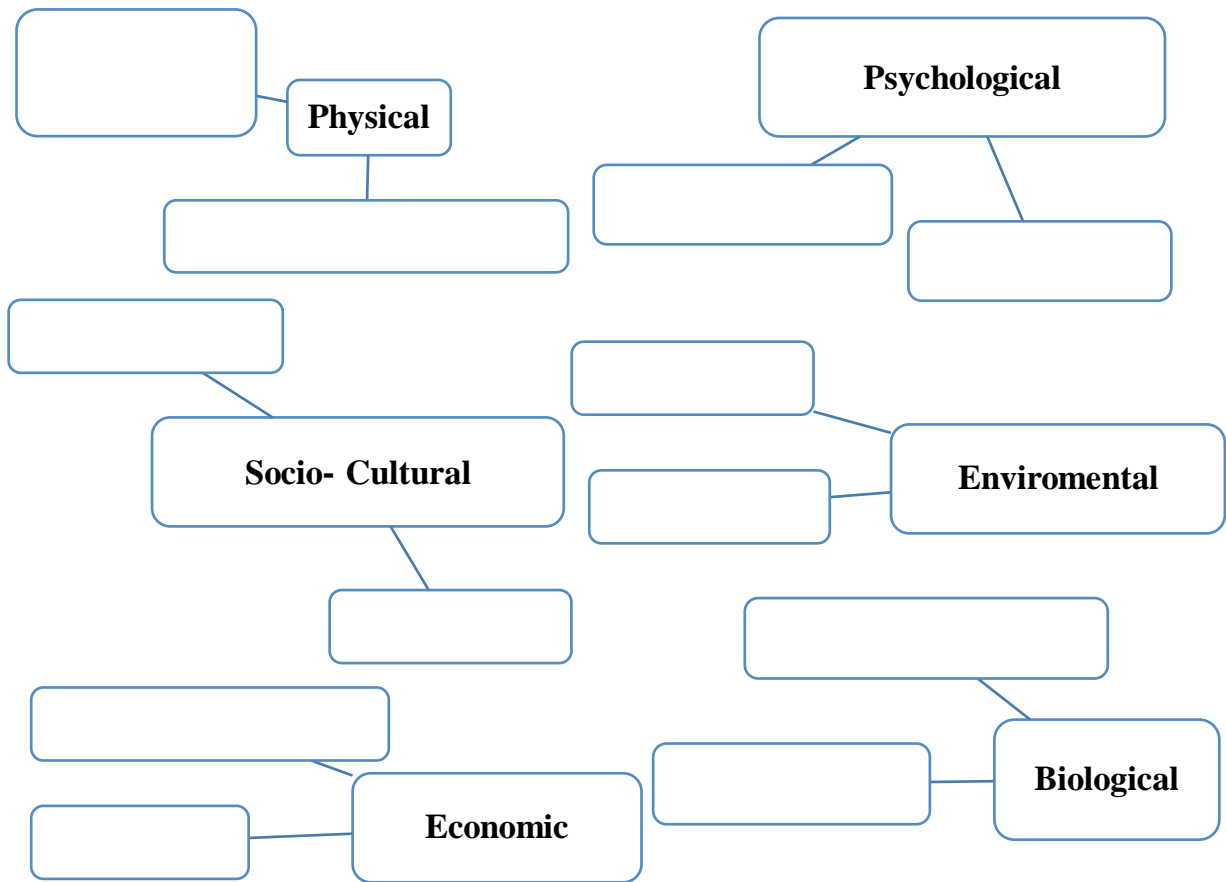
bird's flu

cultural wars

COVID-19

relocation of people

volcanic ash



From the activity above, you are able to familiarize yourself with the types of hazard impacts. Now, proceed to the next activity to enrich your understanding of Hazard Identification.

Activity 1.2: That Hazard Looks Familiar!

Instruction: Spot 5 hazards you can identify from the picture. On a photocopy of the image, encircle all the hazards you can see using a red-inked pen.



Activity 1.3: Assessment and Reduction of Risks

- Choose 5 hazards you have spotted from the picture in Activity 1.2. That Hazard Looks Familiar.
- Conduct a risk assessment with proposed changes using the table below.
- An example is provided for your reference.

Table 3. Risk Assessment from identified hazards in Activity 1.2

Hazard	Risk	Probability	Impact	Risk Level	Changes made to reduce the risk
Not wearing of PPE	Potential physical injuries	4	5	20 High	Provision of PPE's to employees

Activities 1.2 and 1.3 are components of Safety Management. Remember under all circumstances, cliché as it may sound, SAFETY FIRST must be ensured because when safety is compromised accidents might happen and quality of work suffers.

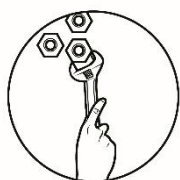


What I Have Learned

Instruction: Fill in the blanks with word/s in order to make the idea complete.

1. A _____ is any agent in a workplace, can be an object or procedure that can cause potential harm.
2. A _____ refers to the potential harm a hazard can cause.
3. _____ refers to the susceptibility of an element exposed to the risks of a hazard.
4. _____ refers to the process of determining all the agents in a workplace that can cause harm.
5. Risk Assessment takes into account the _____ of happening and the _____ of impact of a risk. It is done to determine which risks should be addressed first or prioritized.

6. The following are the steps in hazard identification and risk assessment- (a) identify the hazards, (b) _____, (c) make changes, and lastly, (d) _____.
7. Changes must be made after assessing the risks. The changes made should be _____ on a regular basis.



What I Can Do

Perform a Hazard Analysis and Risk Assessment of your house by following the steps you have learned from this module.

- List the hazards and the risks that go with each hazard.
- Know which risk to prioritize by risk assessment.
- Propose changes in order to reduce risks.

Use the table below.

Table 4. Risk assessment from identified hazards in our house

Hazard	Location in the house	Risk	Probability	Impact	Risk Level	Changes made to reduce the risk



Assessment

Write the letter of the best answer on a separate sheet of paper.

1. Which sequence is correct in hazard identification and risk assessment?
 - I. Modify procedures based on risk assessment.
 - II. Assess risks.
 - III. Monitor the modifications if followed.
 - IV. Identify hazards.

A. IV, III, I, II	C. II, I, IV, III
B. IV, II, I, III	D. II, IV, I, III
2. Which of the following is true about risk assessment?
 - A. It is done to know which risk should be addressed first.
 - B. It tells which risk is the most serious.
 - C. Risk assessment is done by taking into consideration both probability and impact.
 - D. All of the above
3. Which impact of a hazard is an economic impact of hazard?
 - A. Viral disease
 - B. Anxiety and mental trauma
 - C. Destruction of houses and buildings
 - D. Retrenchment of employees in manufacturing companies

For items 4 to 6, match the terms with their meanings.

As a construction worker, Tyrel works in height, thus is prone to fall. He is well-trained and wears protective equipment, though.

4. Which is considered as risk in this given scenario?
 - A. potential fall
 - B. being well-trained
 - C. working in height
 - D. wearing of protective equipment
5. Which is considered as the hazard?
 - A. potential fall
 - B. being well-trained
 - C. working in height
 - D. wearing of protective equipment

6. Since Tyrel is well-trained and always wears protective equipment, how will you judge his vulnerability to a fall?
- A. high
 - B. low
 - C. moderate
 - D. cannot be determined

For items 7 to 11, given the following hazard impacts, tell whether it is physical, psychological, socio-cultural, economic, environmental or biological.

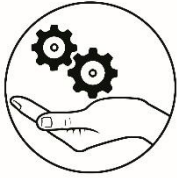
7. Pollution of oceans and rivers
- A. biological
 - B. economic
 - C. environmental
 - D. psychological
8. SARS
- A. biological
 - B. economic
 - C. environmental
 - D. psychological
9. Retrenchments/ Job loss
- A. biological
 - B. economic
 - C. environmental
 - D. socio-cultural
10. Mental trauma
- A. biological
 - B. economic
 - C. psychological
 - D. socio-cultural
11. Broken bones
- A. economic
 - B. environmental
 - C. physical
 - D. socio-cultural
12. Which is an example of socio-cultural impact?
- A. insanity
 - B. burnt skin
 - C. closing of factories
 - D. religious conflict as a result of sudden displacement of group of people
13. Which of the following should be given consideration in risk assessment?
- A. probability and impact
 - B. type of hazard and impact
 - C. severity and type of hazard
 - D. impact and type of damage/ harm
14. If the product of probability and impact is 12, what is the descriptive rating of a given risk?
- A. low
 - B. moderate
 - C. high
 - D. extreme

15. The higher the chance a risk will happen and the greater the severity

of the impact, the _____ is the priority that should be given to a risk.

- A. higher
- B. lower

- C. more uncertain
- D. less uncertain



Additional Activities

Read the lyrics of the song “Hazard” written and sung by Richard Marx. You may also listen to it on Youtube, if possible. It was released in 1991, and when he performed the song live in 2011, he admitted that a “fictional murder suspect” was the dumbest story to write about. That same year, it hit number 1 in thirteen countries. The song tells of a story which will leave you puzzled as to who/what killed Mary.

Hazard

My mother came to Hazard when I was just seven
Even then the folks in town said with prejudiced eyes
That boy's not right

Three years ago when I came in on Mary
First time someone looked beyond the rumors and the lies
Saw the man inside

[Chorus 1]

We used to walk down by the river
She loved to watch the sun go down
We used to walk along the river
And dream our way out of this town

[Verse 2]

No one understood what I felt for Mary
No one cared until the night she went out walking all alone
And never came home

Man with a badge came knocking next morning

Here I was surrounded by a thousand fingers suddenly
Pointed right at me

[Chorus 2]
I swear I left by the river
I swear I left her safe and sound
I need to make it to the river
And leave this old Nebraska town

[Bridge]
I think about my life gone by
How it's done me wrong
There's no escape for me this time
All of my recues are gone, long gone

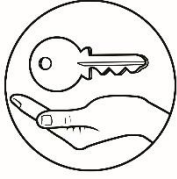
[Chorus 2]
I swear I left her by the river
I swear I left her safe and sound
I need to make it to the river
And leave this old Nebraska town

Guide Questions:

1. Who/What do you think are the possible suspects/cause for Mary's death?

2. Among your list of suspects/causes for Mary's death, who/which do you think is really the true culprit? Why do you say so?

3. How will you relate the essence of the song to your learnings from this module?



Answer Key

Assessment

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

What I Have Learned?

1. Hazard
2. Risk
3. Vulnerability
4. Hazard identification
5. Probability, severity
6. Assess the risks, check the changes made
7. monitored

What's New

1. Anxiety
2. Forest fire
3. Slippery
4. Coronavirus
5. Unemployment
6. Discrimination

What's More

Activity 1.1 -

- Physical - amputated leg,
- broken spine
- Psychological - insanity.
- Overthinking
- Socio-cultural - relocation of people, cultural wars
- Environmental - volcanic ash, Amazon forest fire
- Biological - bird's flu, covid-19
- Economic - bankruptcy - massive lay-off of workers
- Activity 1.2, 1.3 - Answers may vary

What I Know

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

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- Gulsum Kubra Kaya, Research Gate, *Risk Level Matrix*, www.researchgate.net/profile/Gulsum

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