

# Azure AI Fundamentals

## Instructor Guide



# Instructor Guide

# Overview

## Course Structure

The course is structured to learn by doing, practice the learned skill, and then apply the skills.

- Unit
  - Lesson
    - Learn Tasks
    - Practice Exercises
    - Practice Questions
  - Objective Assessment
  - Create Project

Each unit contains lessons. The lessons are introduced by lesson topics where learners can understand through doing or learning through study materials (eBook, QuickDecks or QuickClips). Each lesson concludes with a Practice Exercise that incorporates the tasks they learned throughout the lesson. Once they have completed the lessons in the unit, learners are assessed through a question-based Objective Assessment and a Create Project.

## Delivery

The course is created so it can be customized to meet the needs of the instructor and the learner.

- **Direct Instruction:** Utilize the PowerPoints Presentations to introduce each lesson topic, then have the learners review the study materials and complete the task.
- **Flipped Classroom:** Learners complete online lessons outside of class time. Learners utilize the class time to discuss learned tasks, allow learners to teach concepts, expand concepts through learning stations, and work on unit extension or unplugged activities.
- **Learner-Centered Approach:** Use the prescriptive learning model so learners can focus on new skills and skip the skills they already know. Learners can work at their own pace on their own schedule to complete the course. Instructors support learners by utilizing the answer keys to identify struggles and guide learners through the solutions.

## Differentiation

- **Study Materials:** Study materials are available in eBook, QuickDecks and QuickClips format. Each study material provides the same concepts and allows the learners to choose the modality that best fits their learning style. The eBook introduces concepts in bite-sized readings. QuickDecks display materials in a flashcard format. QuickClips provide a video and audio-based clip.


- **Course Progression:** Learners can complete the learn task to demonstrate understanding before reviewing the study materials or they can review one or all the study materials before attempting the learn tasks.
- **Grouping:** Create groups for different learning levels or styles. Customize each group setting to best meet the needs of the learners.
- Provide struggling learners with answer keys to follow step-by-step instructions to complete tasks and exercises.
- Encourage learners to showcase their newly learned skills by creating additional real-world projects, teach others how and why to use new skills, and explore beyond their learning.

## Prepare for Delivery

- Begin with the unit overview to understand the structure and flow of the unit, the topics covered, the approximate time to complete and the exam objectives reviewed.
- Review the lesson PowerPoint Presentation to give you an in-depth look at each lesson topic and the comprehensive topic notes included.
- Review the answer keys to familiarize yourself with the tasks learners will complete throughout the lesson.
- Complete the lesson.

## Instructor Resources Overview

<p><b>Instructor Resources File Structure</b></p>	<ul style="list-style-type: none"> <li>📁 Instructor Resources           <ul style="list-style-type: none"> <li>📄 Course Syllabus</li> <li>📄 Course Overview</li> <li>📄 Course Key Terms</li> <li>📄 Course Instructor Guide</li> <li>📁 Unit               <ul style="list-style-type: none"> <li>📁 Unit Assessment Answer Keys                   <ul style="list-style-type: none"> <li>📄 Create Project</li> <li>📄 Objective Assessment</li> </ul> </li> <li>📁 Lesson                   <ul style="list-style-type: none"> <li>📁 Answer Keys                       <ul style="list-style-type: none"> <li>📄 Lesson Practice Exercises</li> <li>📄 Learn Tasks</li> <li>📄 Lesson Practice Questions</li> </ul> </li> <li>📁 Study Guides                       <ul style="list-style-type: none"> <li>📄 Study Guide Complete</li> <li>📄 Study Guide Fill-In Explanation</li> <li>📄 Study Guide Fill-In Topic</li> </ul> </li> <li>📄 Lesson PowerPoint Presentations</li> </ul> </li> <li>📁 Unplugged Activities</li> <li>📄 Unit Overview</li> <li>📄 Unit Learning Plan</li> </ul> </li> </ul> </li> </ul>
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	 Unit Key Terms
<b>Unit Assessment Answer Keys</b>	<p>Each unit includes two types of assessments for learners to apply their knowledge.</p> <ul style="list-style-type: none"> <li>• <b>Create Project</b> – These are project prompts and sample solution files. Create projects also include “show me” videos for learner reference. You have the option to enable/disable this feature.</li> <li>• <b>Objective Assessment</b> – A comprehensive question and answer-based assessment for the unit. Objective Assessments include “show solution” for learner reference. You have the option to enable/disable this feature.</li> </ul>
<b>Answer Keys</b>	<p>Documents containing answers, step-by-step instructions, and correct answers for Instructor reference or to offer additional support material for learners.</p> <ul style="list-style-type: none"> <li>• <b>Learn Tasks</b> - Each lesson topic includes an opportunity to apply what they have just learned in-app or by answering questions. Learn Tasks also include “show me” videos and “show solution” for learner reference.</li> <li>• <b>Lesson Practice Exercises</b> – End of lesson in-app or scenario-based assessment. Lesson Practice Exercises also include “show me” videos for learner reference. You have the option to enable/disable this feature.</li> <li>• <b>Lesson Practice Questions</b> – End of lesson question-based assessment. Lesson Practice Questions also include “show solution” for learner reference. You have the option to enable/disable this feature.</li> </ul>
<b>Study Guides</b>	<p>Printable and customizable study guides mapped to lesson topics and exam objectives are provided in three formats.</p> <ul style="list-style-type: none"> <li>• <b>Complete</b>- This version includes the topic and the explanation.</li> <li>• <b>Fill-In Topic</b>-Learners can fill in the topics as they learn or as a review.</li> <li>• <b>Fill-In Explanation</b> – This allows learners to complete the explanation of each lesson topic in their own words and images.</li> </ul>
<b>Learning Plan</b>	<p>Customizable unit learning plan outlining the objectives and topics covered, essential questions, learning targets, methods and materials, extension activities, formative and summative assessments, mapping to STEAM, Work Readiness, 5 C’s, and Bloom’s Taxonomy Levels.</p>
<b>Lesson PowerPoint</b>	<p>A PowerPoint Presentation that complements the lesson. Each lesson topic is included in the presentation as well as comprehensive speaker notes.</p>
<b>Unplugged Activities</b>	<p>A variety of activities and necessary resources to get learners off the computers while still reinforcing unit learning objectives.</p>
<b>Unit Key Terms</b>	<p>A comprehensive list of key terms throughout the unit.</p>
<b>Unit Overview</b>	<p>A spreadsheet containing the overview of the flow of the unit that includes lesson topics, certification objectives mapping, and approximate timings for self-paced and instructor-led scenarios.</p>

# Azure AI Fundamentals

## Unit Guide



Unit	Lesson	Lesson Topic	Self Study	Instructor Led	Level	Objective Domain	Objective Description
Unit 2: Fundamentals of AI and Machine Learning							
Unit 2: Overview							
		Overview	5	5	1		
		Key Terms	5	5	1		
		<b>Total Time</b>	<b>10</b>	<b>10</b>			
Lesson 1: Common AI Workloads							
		Lesson Objectives	5	5	1		
		Anomaly Detection	5	15	1	Identify features of common AI workloads	Identify features of anomaly detection workloads
		Anomaly Detection in Azure	5	15	1	Identify features of common AI workloads	Identify features of anomaly detection workloads
		Computer Vision	5	15	1	Identify features of common AI workloads	Identify computer vision workloads
		Computer Vision in Azure	5	15	1	Identify features of common AI workloads	Identify computer vision workloads
		Natural Language Processing	5	15	1	Identify features of common AI workloads	Identify natural language processing workloads
		Natural Language Processing in Azure	5	15	1	Identify features of common AI workloads	Identify natural language processing workloads
		Knowledge Mining	5	15	1	Identify features of common AI workloads	Identify knowledge mining workloads
		Knowledge Mining in Azure	5	15	1	Identify features of common AI workloads	Identify knowledge mining workloads
		Practice Exercise	10	10	1		
		Practice Questions	20	20	1		
		<b>Total Time</b>	<b>75</b>	<b>155</b>			
Lesson 2: Core ML Concepts							
		Lesson Objectives	5	5	1		
		Dataset	5	5	1		
		Supervised Learning	5	15	1		
		Unsupervised Learning	5	15	1		
		Reinforcement Learning	5	15	1		
		Deep Learning	5	15	1		
		Practice Exercise	10	10	1		
		Practice Questions	20	20	1		
		<b>Total Time</b>	<b>60</b>	<b>100</b>			
Lesson 3: Principles of Responsible AI							
		Lesson Objectives	5	5	1		
		Fairness	5	5	1	Identify guiding principles for responsible AI	Describe considerations for fairness in an AI solution
		Reliability and Safety	5	15	1	Identify guiding principles for responsible AI	Describe considerations for reliability and safety in an AI solution
		Privacy and Security	5	15	1	Identify guiding principles for responsible AI	Describe considerations for privacy and security in an AI solution
		Inclusiveness	5	15	1	Identify guiding principles for responsible AI	Describe considerations for inclusiveness in an AI solution
		Transparency	5	15	1	Identify guiding principles for responsible AI	Describe considerations for transparency in an AI solution
		Accountability	5	15	1	Identify guiding principles for responsible AI	Describe considerations for accountability in an AI solution
		Risks and Challenges of AI	5	15	1	Identify guiding principles for responsible AI	Describe considerations for responsible AI
		Practice Exercise	10	10	1		
		Practice Questions	20	20	1		
		<b>Total Time</b>	<b>70</b>	<b>130</b>			
Unit 2: Summary							
		Summary	2	5			
		Key Terms	3	5			
		<b>Total Time</b>	<b>5</b>	<b>10</b>			
Unit 2: Assessments							
		Create Project	40	40			
		Objective Assessment	40	40			
		<b>Total Time</b>	<b>80</b>	<b>80</b>			
<b>Total Time to Complete Unit</b>							
		Minutes	300	485			
		Hours	5	8			

# Microsoft Azure AI Fundamentals Learning Plan

## Unit 2: Fundamentals of AI and Machine Learning

**Instructor:**

**Class:**

**Duration: 5 to 8 Hours**

### Unit Objectives:

Learners will be able to identify and describe various AI workloads, apply key machine learning concepts, and evaluate AI projects for ethical, social, and legal implications. Additionally, learners will be prepared to apply these principles to real-world AI scenarios, fostering responsible AI development and deployment.

### Essential Questions:

- What are the most common types of AI workloads, and how do they differ in terms of data processing and problem-solving?
- What are the fundamental concepts in machine learning, including algorithms, training data, and model evaluation?
- What are the principles of responsible AI, and why is ethical AI development critical for society and businesses?

### Learning Targets:

I will understand the foundations of common AI workloads, the fundamental principles of machine learning, and the core tenets of responsible AI.

So I can effectively identify the right AI workload for diverse applications, apply machine learning techniques with proficiency, and assess AI projects for ethical and legal implications.

I know I have succeeded when I can articulate and discuss these foundational concepts in AI.

### Methods and Materials:

- Lectures
- Reading
- Videos
- Hand-on activities
- Creating
- Analyzing
- Discussing
- Teaching

### Formative Assessments:

- Learn Tasks
- Practice Questions
- Practice Exercises

### Summative Assessments:

- Objective Assessment
- Create Project

### STEAM

- Science
- Technology
- Engineering
- Art
- Math

### Work Readiness

- Communication
- Problem-solving
- Teamwork
- Work ethic
- Empathy
- Conflict resolution
- Active listening
- Time management
- Adaptability
- Reading
- Mathematics

### 5 C's

- Critical Thinking
- Creativity
- Communication
- Collaboration
- Citizenship

### Blooms Level

- Remembering
- Understanding
- Applying
- Analyzing
- Evaluating
- Creating



# Learning Activities

Lesson	Time Allowed	Content
Lesson 1: Common AI Workloads	75-155 minutes	<ul style="list-style-type: none"><li>• Anomaly Detection</li><li>• Anomaly Detection in Azure</li><li>• Computer Vision</li><li>• Computer Vision in Azure</li><li>• Natural Language Processing</li><li>• Natural Language Processing in Azure</li><li>• Knowledge Mining</li><li>• Knowledge Mining in Azure</li></ul>
Lesson 2: Core ML Concepts	60-100 minutes	<ul style="list-style-type: none"><li>• Dataset</li><li>• Supervised Learning</li><li>• Unsupervised Learning</li><li>• Reinforcement Learning</li><li>• Deep Learning</li></ul>
Lesson 3: Principles of Responsible AI	70-130 minutes	<ul style="list-style-type: none"><li>• Fairness</li><li>• Reliability and Safety</li><li>• Privacy and Security</li><li>• Inclusiveness</li><li>• Transparency</li><li>• Accountability</li><li>• Risks and Challenges of AI</li></ul>

## Warm-Up Activities

1. Think of a real-world problem, such as improving healthcare or reducing traffic congestion. Describe which AI workload you believe would be most effective in solving it and why.
2. Research one machine learning algorithm (e.g., decision trees, neural networks) and write a brief summary of its strengths and weaknesses.
3. Locate a real-world case study about an AI project facing ethical challenges. Write a concise summary of the case and jot down any ethical considerations that stand out to you.

## Extension Activities

1. Create a portfolio for the course. Portfolios should include evidence of work, reflect on learned skills and how you can incorporate the skills in a current or future project. This is an ongoing extension activity. Continue to add to the portfolio throughout the course.
2. Select one topic learned throughout the unit then create an instructional video, tutorial, lecture, or hands-on activity to teach others about the skill.
3. AI Workload Comparison: Research and compare two different AI workloads, such as supervised learning and unsupervised learning. Create a detailed comparison chart outlining their key characteristics, use cases, and advantages.
4. Kaggle Challenge: Participate in a Kaggle competition or select a dataset from Kaggle to create your machine learning model. Practice feature engineering, model selection, and fine-tuning. Submit your results and share your experience.

# Azure AI Fundamentals Unit 2 Key Terms

Term	Definition
<b>Anomaly Detection</b>	It identifies unexpected and unusual events. Anomalies can indicate errors, fraud, or other important insights in data.
<b>Statistical Methods</b>	They are one of the most used techniques for anomaly detection. They involve analyzing the statistical properties of a dataset and identifying observations that fall outside of the expected range.
<b>Machine Learning</b>	It involves training a model on a dataset and using it to identify observations that do not fit the expected pattern.
<b>Rule-Based Methods</b>	They involve defining a set of rules for identifying anomalies in a dataset. These methods are often used in systems where the expected behavior is well-defined, and anomalies are rare.
<b>Hybrid Methods</b>	They combine two or more of the above techniques to improve accuracy and obtain better results.
<b>Azure Anomaly Detector</b>	A cloud-based service that helps to detect anomalies in your time series data.
<b>Computer Vision</b>	The science that helps the computer to “see” and “understand” the content of digital pictures such as videos and camera photos. It is also known as CV.
<b>Image Classification</b>	Identifying the main object or scene in an image, such as a cat, a car, or a landscape.
<b>Object Detection</b>	Locating and classifying multiple objects in an image, such as people, vehicles, or animals.
<b>Image Segmentation</b>	Dividing an image into multiple segments or regions based on their visual properties, such as color, texture, or motion.
<b>3D Reconstruction</b>	Creating a 3D model of an object or scene from multiple 2D images. 3D reconstruction is used in applications such as augmented reality and virtual reality.
<b>Optical Character Recognition</b>	Recognizing and extracting text from images or scanned documents.
<b>Facial Recognition</b>	Identifying and verifying a person's identity based on their facial features.

<b>Action Recognition</b>	Recognizing and classifying human actions in a video, such as walking, running, or dancing.
<b>Natural Language Processing (NLP)</b>	The subfield of Artificial Intelligence studies the relationship between the computer and human language.
<b>Knowledge Mining</b>	The process of extracting useful information and insights from large volumes of data.
<b>Dataset</b>	The collection of data that a model will use for training.
<b>Labeled Dataset</b>	A dataset where each data point is associated with a corresponding output label or category.
<b>Unlabeled Dataset</b>	A dataset where the output labels are not provided. In this case, the machine learning algorithm must find patterns and structure in the data on its own, without the aid of explicit output labels.
<b>Training Dataset</b>	It is the first collection of the data that is used to train the machine learning model.
<b>Validation Dataset</b>	It is used to evaluate the performance of the model during the training process.
<b>Testing Dataset</b>	It is used to evaluate the final performance of the machine learning model. This dataset is not used during the training process and is completely separate from the training and validation datasets.
<b>Supervised Learning</b>	A subfield of machine learning where a model is trained using a labeled dataset, which means that the data is labeled with the correct answers or outputs.
<b>Unsupervised Learning</b>	A subfield of machine learning that enables models to identify patterns and relationships in data without explicit instruction or guidance from humans.
<b>Clustering</b>	Grouping data points together based on similarities in their attributes.
<b>Reinforcement Learning</b>	A subfield of machine learning. Reinforcement learning is based on trial and error using feedback from the model actions and experiences.
<b>Deep Learning</b>	A subset of machine learning. Deep learning involves using neural networks to learn complex patterns in that data.
<b>Fairness</b>	A part of the explainable and moral considerations related to the development and deployment of artificial intelligence systems that treat all individuals and groups fairly and without discrimination.
<b>Fairlearn</b>	A Python library that provides tools for assessing and mitigating bias in machine learning models.

# Unit 2: Unplugged Activities

## Instructor Guide

### Instructions

Below are a variety of offline activities to choose from to support learning in Unit 2. Choose activities to enhance learning in the classroom.

#### Activity 1: Word Search

Distribute pages 2-4 to the learners.

**With Words** - Use this word search to reinforce the key terms in Unit 2. An answer key is provided.

**With Clues** - Use this word search to challenge learners to find key terms in Unit 2 using clues. An answer key is provided.

#### Activity 2: Crossword Puzzle

Distribute pages 2-3 to the learners.

Have learners solve the crossword puzzle by reading clues and filling in the answer with key terms from Unit 2.

An answer key is provided.

#### Activity 3: Pass the Paper

Write or print each header and each answer on a separate piece of paper. Fold each answer paper.

Hand out one header to one learner and ask them to be at one side of the room while hiding the header paper they have.

Distribute randomly the answers where each learner gets one folded definition.

Once all headers/definitions are distributed, you can ask them to START.

Learners with the headers will hold them out so that their peers can observe them, while the rest of the learners will unfold the answers and head to the learner with the header that matches that answer.

#### Activity 4: Picture This Game

Write the following 3 concepts down on 3 pieces of paper for each group. Number each card from the outside with the same number shown in the numbered list and place them face down on each table.

Divide the learners into balanced groups. Each group sits at one of the tables. Have them select one member to be the drawer.

The objective of the game is for one learner to draw the concept and have their group guess it. The learner is not allowed to say any words.



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**AI**

# Lesson 2: Core ML Concepts

Unit 2: Fundamentals AI and Machine Learning

AI-900

# Dataset

- A dataset in machine learning is an essential part
- It is collection of data that a model will use for training
- A labeled dataset is a dataset where each data point is associated with a corresponding output label or category
- An unlabeled dataset is a dataset where output labels are not provided

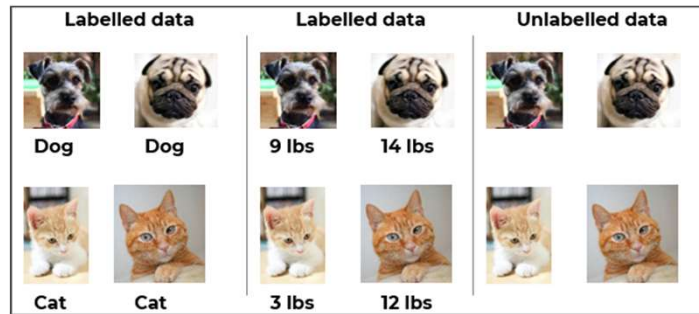
AI-900

A **dataset** in machine learning is an essential part. It is the collection of data that a model will use for training. For example, when you want to learn Spanish, you need to buy a Spanish learning book and a dictionary to give your brain the learning opportunity. Similarly, the AI models need data to learn a task.

A **labeled dataset** is a dataset where each data point is associated with a corresponding output label or category. For example, in an image recognition task, the label might indicate the object or scene depicted in the image.

On the other hand, an **unlabeled dataset** is a dataset where the output labels are not provided. In this case, the machine learning algorithm must find patterns and structure in the data on its own, without the aid of explicit output labels. There are several reasons why a dataset might be unlabeled such as labeling data can be time-consuming and expensive.

# Dataset



AI-900

The image provides an example of labeled and unlabeled datasets. The example shows two different forms of labeling the same dataset; one by labeling the object and another by labeling its weight.



# Dataset

- Most common formats of datasets are:
  - Text data
  - Image data
  - Audio data
  - Video data
  - Numeric data

AI-900

The most common formats of datasets are:

- Text data
- Image data
- Audio data
- Video data
- Numeric data

# Dataset

- When building a machine learning model, it is important to split available data into three different sets:
  - Training dataset
  - Validation dataset
  - Testing dataset

AI-900

When building a machine learning model, it is important to split the available data into three different sets: training dataset, validation dataset, and testing dataset. This is done to ensure that the model is learning in the right way.

- **Training dataset** is the first collection of the data that is used to train the machine learning model
- **Validation dataset** is used to evaluate the performance of the model during the training process
- **Testing dataset** is used to evaluate the final performance of the machine learning model. This dataset is not used during the training process and is completely separate from the training and validation datasets

## Unit 2 Lesson 2 Study Guide Complete

Topic	Explanation
<b>Dataset</b>	
Dataset	The collection of data that a model will use for training.
Labeled dataset	Dataset where each data point is associated with a corresponding output label or category.
Unlabeled dataset	<ul style="list-style-type: none"> <li>Dataset where the output labels are not provided.</li> <li>Machine learning algorithm must find patterns and structure in the data on its own, without the aid of explicit output labels.</li> </ul>
Dataset format	<ul style="list-style-type: none"> <li>Text data.</li> <li>Image data.</li> <li>Audio data.</li> <li>Video data.</li> <li>Numeric data.</li> </ul>
Training dataset	First collection of the data that is used to train the machine learning model.
Validation dataset	It is used to evaluate the performance of the model during the training process.
Testing dataset	<ul style="list-style-type: none"> <li>Used to evaluate the final performance of the machine learning mode.</li> <li>Not used during the training process and is completely separate from the training and validation datasets.</li> </ul>
<b>Supervised Learning</b>	
Supervised Learning	A subfield of machine learning where a model is trained using a labeled dataset, which means that the data is labeled with the correct answers or outputs.
Supervised Learning steps	<ul style="list-style-type: none"> <li>Collect labeled data.</li> <li>Split data.</li> <li>Train model.</li> <li>Evaluate model.</li> </ul>
<b>Unsupervised Learning</b>	
Unsupervised Learning	A subfield of machine learning that enables models to identify patterns and relationships in data without explicit instruction or guidance from humans.
Clustering	Grouping data points together based on similarities in their attributes.
Clustering algorithms	<ul style="list-style-type: none"> <li>They work by calculating the distance between each data point and all other data points in the dataset.</li> </ul>

	<ul style="list-style-type: none"> <li>Points that are closer together are grouped together into clusters.</li> </ul>
<b>Reinforcement Learning</b>	
Reinforcement Learning	<ul style="list-style-type: none"> <li>A subfield of machine learning.</li> <li>Based on trial and error using feedback from the model actions and experiences.</li> </ul>
Reinforcement Learning elements	<ul style="list-style-type: none"> <li><b>Environment:</b> Place where the model is trying to learn.</li> <li><b>State:</b> Situation of the model.</li> <li><b>Rewards:</b> Feedback from the environment.</li> <li><b>Policy:</b> Rule of how the environment gives the rewards.</li> <li><b>Value:</b> Future reward.</li> </ul>
Reward types	<ul style="list-style-type: none"> <li><b>Point:</b> Simple numeric rewards like +1 or -1.</li> <li><b>Score:</b> Similar to points but on a larger scale.</li> <li><b>Success/failure:</b> Binary rewards like +1 for success and 0 for failure.</li> </ul>
<b>Deep Learning</b>	
Deep learning	<ul style="list-style-type: none"> <li>A subset of machine learning.</li> <li>It involves using neural networks to learn complex patterns in that data.</li> </ul>
The Input Layer	The dataset enters the network.
The Hidden Layer	<ul style="list-style-type: none"> <li>The network is trying to find the patterns in the dataset.</li> <li>Also called neurons like the human brain.</li> </ul>
The Output Layer	It represents the result of the network.

# Unit 2 Lesson 2 Learn Tasks

Task Level	Objective Domain	Objective Description	Lesson Topic	Assessment Details	Answer Key
1			Dataset	The dataset has one format which is text data. a. True b. False	a. True <b>b. False</b>
1			Supervised Learning	After collecting data, it is split into: a. Training and testing sets b. Training and validation sets c. Testing and validation sets d. Training, testing and validation sets	a. Training and testing sets b. Training and validation sets c. Testing and validation sets <b>d. Training, testing and validation sets</b>
1			Unsupervised Learning	_____ is one of the most famous techniques in unsupervised learning.	<b>Clustering</b> is one of the most famous techniques in unsupervised learning.
1			Reinforcement Learning	Reinforcement learning is based on trial and error using feedback from the model actions and experiences. a. True b. False	<b>a. True</b> b. False
3			Deep Learning	Knowing that you can change the view as required, review the following terms and descriptions and match the terms to correctly identify when you would use this view. a. Input layer b. Hidden layer c. Output layer  1. The first part of the deep learning network. 2. The network is trying to find the patterns in the dataset. 3. The final part of the deep learning network.	<b>a. Input layer :</b> 1. The first part of the deep learning network. <b>b. Hidden layer :</b> 2. The network is trying to find the patterns in the dataset. <b>c. Output layer :</b> 3. The final part of the deep learning network.

## Unit 2 Lesson 2 Practice Questions

Assessment Details	Answer Key
<p>An unlabeled dataset is a dataset where the output labels are provided.</p> <ol style="list-style-type: none"> <li>True</li> <li>False</li> </ol>	<ol style="list-style-type: none"> <li>True</li> <li><b>False</b></li> </ol>
<p>You want to classify between types of shapes, the labels are:</p> <ol style="list-style-type: none"> <li>Hexagon, triangle, and square</li> <li>Images of the shapes</li> <li>Features of each shape</li> <li>Predictions made by the model</li> </ol>	<ol style="list-style-type: none"> <li><b>Hexagon, triangle, and square</b></li> <li>Images of the shapes</li> <li>Features of each shape</li> <li>Predictions made by the model</li> </ol>
<p>If you want to create an email spam filter which type of learning will you choose?</p> <ol style="list-style-type: none"> <li>Supervised learning</li> <li>Unsupervised learning</li> <li>Reinforcement learning</li> <li>Deep learning</li> </ol>	<ol style="list-style-type: none"> <li><b>Supervised learning</b></li> <li>Unsupervised learning</li> <li>Reinforcement learning</li> <li>Deep learning</li> </ol>
<p>Which of the following is a type of unsupervised learning?</p> <ol style="list-style-type: none"> <li>Clustering</li> <li>Regression</li> <li>Classification</li> </ol>	<ol style="list-style-type: none"> <li><b>Clustering</b></li> <li>Regression</li> <li>Classification</li> </ol>
<p>In which of the following fields is reinforcement learning mostly used?</p> <ol style="list-style-type: none"> <li>E-commerce</li> <li>Gaming</li> <li>Medical</li> <li>3D construction</li> </ol>	<ol style="list-style-type: none"> <li>E-commerce</li> <li><b>Gaming</b></li> <li>Medical</li> <li>3D construction</li> </ol>
<p>Which of the following is not part of a deep learning network?</p> <ol style="list-style-type: none"> <li>Input layer</li> <li>Hidden layer</li> <li>Output layer</li> <li>Human brain</li> </ol>	<ol style="list-style-type: none"> <li>Input layer</li> <li>Hidden layer</li> <li>Output layer</li> <li><b>Human brain</b></li> </ol>
<p>Neural networks are computer systems that are designed to mimic the way the human brain works.</p> <ol style="list-style-type: none"> <li>True</li> <li>False</li> </ol>	<ol style="list-style-type: none"> <li><b>True</b></li> <li>False</li> </ol>

## Unit 2 Lesson 2 Practice Exercise

Level	Exercise Number	Assessment Details	Answer Key
1	1	<p>Match the following ML concepts to the description:</p> <ol style="list-style-type: none"> <li>Supervised</li> <li>Unsupervised</li> <li>Reinforcement</li> <li>Training</li> <li>Validation</li> <li>Testing</li> </ol> <ol style="list-style-type: none"> <li>Type of machine learning where a model is trained using a labeled dataset.</li> <li>Dataset used to train the machine learning model.</li> <li>Type of machine learning that is based on trial and error using feedback from the model actions and experiences.</li> <li>Dataset used to evaluate the performance of the model during the training process.</li> <li>Type of machine learning that enables models to identify patterns and relationships in data without explicit instruction or guidance from humans.</li> <li>Dataset used to evaluate the final performance of the machine learning model.</li> </ol>	<p><b>a. Supervised</b></p> <p>1. Type of machine learning where a model is trained using a labeled dataset.</p> <p><b>b. Unsupervised</b></p> <p>2. Type of machine learning that enables models to identify patterns and relationships in data without explicit instruction or guidance from humans.</p> <p><b>c. Reinforcement</b></p> <p>3. Type of machine learning that is based on trial and error using feedback from the model actions and experiences.</p> <p><b>d. Training</b></p> <p>4. Dataset used to train the machine learning model.</p> <p><b>e. Validation</b></p> <p>5. Dataset used to evaluate the performance of the model during the training process.</p> <p><b>f. Testing</b></p> <p>6. Dataset used to evaluate the final performance of the machine learning model.</p>