

# CHAPTER SEVEN

## INQUIRY BASED TEACHING AND LEARNING



Inquiry-based learning is a teaching method that encourages students to ask questions and explore real-world problems across various subjects. The approach has numerous benefits, such as preparing the brain for learning, cultivating versatile skills, promoting curiosity, deepening understanding, enhancing critical thinking, and fostering ownership and engagement.

It works effectively in all disciplines and instills a lifelong love of learning.

# TYPES OF INQUIRY BASED APPROACH

There are four types of inquiry based approaches:

## **1. Structured Inquiry Approach:**

Sequential process guiding students through investigating problems using the scientific method.

## **2. Open-Ended Inquiry Approach:**

Allows students to explore their interests and question topics freely, often seen in humanities classes.

## **3. Problem-Based Inquiry Approach:**

Focuses on solving real-world problems, frequently used in math and engineering classes.

## **4 Guided Inquiry Approach:**

Teacher-led process that supports students in asking questions and finding solutions, often found in elementary and middle school settings

# TIPS FOR IMPLEMENTING INQUIRY-BASED TEACHING

There are tips to guide you as you explore this concept in your classroom.

- 1. Begin with a Question:** Start the lesson with a thought-provoking question to engage students and stimulate their curiosity.
- 2. Foster Exploration:** Allow students to independently explore the topic, promoting a deeper understanding of the material.
- 3. Encourage Discussion:** Facilitate group discussions among students to share ideas and enhance comprehension.
- 4. Provide Resources:** Offer students relevant resources, including online platforms, to aid their exploration and understanding.
- 5. Summarize Learning:** Conclude the lesson with a summary of key takeaways to reinforce students' memory and learning.



# INQUIRY BASED TEACHING MODEL

There are various teaching models that helps guide your class activities for improved learning outcomes.

- **The Question Model:** Involves asking students questions to encourage critical thinking about the subject matter.
- **The Problem-Based Learning Model:** Challenges students with a problem to solve, promoting critical thinking and solution finding.
- **The Project-Based Learning Model:** Assigns students a project related to the topic for in-depth exploration and learning.
- **The Inquiry Cycle Model:** Allows students to ask questions, investigate a topic, and share their findings, fostering in-depth exploration and knowledge sharing.

# TYPES OF INQUIRY BASED APPROACHES

O1

## Structured Inquiry Approach

Sequential process guiding students through investigating problems using the scientific method.

O2

## Open-Ended Inquiry Approach

Allows students to explore their interests and question topics freely, often seen in humanities classes.

O3

## Problem-Based Inquiry Approach

Focuses on solving real-world problems, frequently used in math and engineering classes.

O4

## Guided Inquiry Approach

Teacher-led process that supports students in asking questions and finding solutions, often found in elementary and middle school settings

# EXAMPLES OF INQUIRY BASED ACTIVITIES

## **1. Science Experiment**

This allow students to conduct experiments. This will encourage them to ask questions and think critically about the results.

## **2. Field Trips**

Students embarking on an investigative field trip is another exciting way to promoting classroom inquiry. This will allow them to explore real-world problems and see how what they are learning in the classroom is relevant.

## **3. Classroom Debates**

Classroom debates are another great way to encourage this type of learning. When students debate a topic, they are forced to think critically about both sides of the argument.

## **4. Projects**

When students are given the opportunity to work on a project that is related to the topic they are studying, they will be more likely to learn and remember the information.

## **5. Group Work**

When students work in groups, they are able to share their ideas and thoughts with others. This helps them to understand the material better



# CLASS ACTIVITY

## Habitats and Communities

- What impacts do humans have on habitats?
- Study the characteristics of different habitats to compare and contrast them, or they can investigate the ways animals and plants depend on each other in a specific habitat. For example, how does deforestation affect habitats in Gabon affects wild life in Gabon.
- Furthermore, what effect does home building and residential development have on habitats?

Not only can students explore the impact of human activities on habitats, but they can also go deeper to investigate the ways plants and animals adapt to these changes.

They could also explore the impact of hunting, climate change, or invasive species. Give students space and materials to investigate their natural curiosity about the topic and see where it takes them.

# CLASS ACTIVITY

## Cross-Curricular Links:

- **Science:** Students are to conduct a scientific inquiry about creating an ideal honeybee habitat, construct labeled, to-scale dioramas of two contrasting habitats
- **History:** Students construct maps showing how habitats have changed over time and the causes for the changes, interview members of the community to hear their perspective on how their local community has changed, and highlight their voices in a mini-documentary





# CLASS ACTIVITY

## **Decomposition Demonstrations**

Most learners understand that when you leave food out on the counter for a few days, it will begin to get brown, slimy, and yucky. However, most learners don't know what really causes this to happen. This inquiry-based learning activity will give them an opportunity to explore how the decomposition of organic matter is affected by factors such as temperature, humidity, storage, time, and type of food.

For this activity, teach your learners the science behind decomposition and how organic matter gets broken down into simpler chemicals and molecules. Then discuss the factors listed above and how they can affect the rate of decomposition. To allow learners to explore this for themselves, provide them with a variety of fruits and vegetables.



# CASE STUDIES

## **Ocean Disruption**

*According to the International Union for Conservation of Nature, at least 14 million tons of plastic end up in the ocean every year. Plastic makes up 80 percent of all marine debris, which entangles animals and is ingested by marine species. Marine plastic pollution is a global threat, and according to projections, by 2025 the ocean will contain one ton of plastic for every three tons of fish. By 2050, there may be more plastic in the ocean than fish.*

- **How can we preserve and protect the world's oceans?**

## **Eliminating Homelessness**

*It is estimated that 150 million people are homeless worldwide. How can this issue be addressed, ensuring everyone live in a safe and healthy environment?*

- **How can we address the problem of homelessness in our community?**

# CASE STUDIES

## **Food Scarcity**

*In an article published by Columbia University's Earth Institute, the effects of COVID on the earth's food supply is discussed. It points out that "The underlying cause of the pandemic has been attributed to agricultural activities encroaching into natural habitats. Now the pandemic is encroaching on agricultural production."*

### **Inquiry Questions About Food Scarcity:**

- **How has COVID-19 affected agriculture around the world?**
- **What is a food desert and how can we make access to food more equitable?**
- **In what ways can we help promote food production in our communities?**



# CASE STUDIES

## Art in the Community

- **How can Art be used in community representation?**

*Students brainstormed adjectives that matched the place they lived in and chose the top three that best described what life was like in their community. Next, they chose places to photograph, sketch, paint, or draw that best represented their communities. They needed to consider the time of day, space, textures, and colors. The final product was up to them, but they needed to include at least ten artworks that represented life in their community.*

## Questions About Community Art:

- **What is the function of art in our lives?**
- **How have artistic expressions evolved?**
- **How has art historically been used to cultivate change?**

## Community Gardening

*In this inquiry-based learning example, students investigate the connections between resources and health. Students explore concepts like urban farms, food sovereignty, and food scarcity.*

- **What impact can growing our food have on the community?**



# CASE STUDIES

## **Cross-Curricular Links:**

**Math:** Students measure and calculate the perimeter and area of planting beds, use cubes to measure the heights of pre-existing flowers and plants, calculate the cost savings of growing their own food vs. buying food at a local grocery store

**Science:** Students conduct a scientific inquiry into the conditions favourable for growing healthy flowers, or into the best soil for optimal vegetable growth

## **Engineering an Ideal Car**

- **How can we redesign cars or buses to make travelling more comfortable for passengers, while being cost-effective for transport companies?**

## **Questions About Airplane Design:**

- **How can passenger comfort be maximized while maintaining a reasonable ticket price?**
- **In what ways can we design cars to be more eco-friendly?**
- **How could we use recyclable materials to build cars?**

# CASE STUDIES

## Designing an Equitable School

- **How can we design a school that is more inclusive and/or equitable?**

*Consider physical inclusion. For example, are there any places at their school that could be more accessible? Do ramps, railings, or other supports need to be built in a particular area? Does the layout of certain rooms need to be rearranged to accommodate students with disabilities?*

## Boat Float

*Provide learners with basic information regarding the physics of floatation and buoyancy. Have them explore how boats the size of luxury cruise liners and container ships can stay afloat even with the extra weight. Then have them use their knowledge to create a boat that can remain afloat in a plastic tub of water.*

**They should experiment with different types of materials and designs while following the scientific concepts they've learned. Once learners have found a way to keep their boat afloat, have them add items such as paperclips or thumbtacks to see if the weight causes their boat to sink. They can also simulate storms and ocean waves by causing disruptions to the water in the tank. Do their ships still stay afloat?**



*Curiosity is probably one of the most important characteristics that people have who go into science, and engineering is about solving problems and creativity.*

Ellen Ochoa