



## The Round House Diagram Strategy

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**Article DOI:** 10.55677/SSHRB/2025-3050-0507

**DOI URL:** <https://doi.org/10.55677/SSHRB/2025-3050-0507>

**KEYWORDS:** teaching strategy, Round house Diagram

**ABSTRACT:** Given the ineffectiveness of traditional teaching strategies in the educational process, as confirmed by numerous studies, it is essential to explore new strategies, such as the Roundhouse Diagram strategy. This article discusses this strategy in terms of its concept, theoretical and philosophical foundations, objectives, stages of forming the Roundhouse, how to construct the circular diagram, points to activate teaching through the Roundhouse Diagram and its evaluation, the role of the teacher, its importance for students, related difficulties, and provides an example of this strategy.

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**Published:** May 16, 2025

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### INTRODUCTION

In light of the changes and challenges witnessed in various fields of scientific and technological knowledge in this era, questions abound about how to keep pace with these changes, resist the challenges we face, and strive for a better understanding that leads to creative individuals capable of contributing in various fields.

Undoubtedly, these scientific changes and developments have affected and continue to affect the educational process. Today's educational systems must, in one way or another, confront this massive explosion of knowledge, facts, and information. They must repeatedly reconsider their curricula, teaching methods, educational tools, and evaluation methods in a comprehensive, integrated, and continuous framework that qualifies them to face the new and evolving in this changing world.

This does not happen without relying on teaching methods that are considered a fundamental pillar of the educational process. Therefore, there have been calls to adopt modern teaching methods and techniques that highlight the positive role of students, enabling them to build cumulative experiences that help them make appropriate decisions.

In line with this, educators/educational specialists have developed strategies for constructivist theory, which is one of the most prominent educational innovations that has received increasing attention recently. This has led to a reconsideration and development of curricula to include concepts, knowledge, activities, and skills that contribute to activating the teacher's role in dealing with them in a way that achieves educational goals consistent with the students' characteristics and previous experiences. This is done through the ability to test the effectiveness of teaching methods and techniques, and then use what proves effective to achieve the goals and better learning of scientific concepts, aiming to bring students to a higher level of achievement and increase their awareness of the importance of what they learn in their academic and practical lives.

Constructivism is one of the intellectual doctrines that emerged in the modern era, pioneered by its first theorist, Jean Piaget. It (Constructivism) revolutionized human and social studies and methods of dealing with knowledge, in addition to its significant impact on the field of education, Constructivism shifts the focus from external factors that affect students' learning, such as teacher variables, school, curriculum, peers, and other similar factors, to what happens inside students' minds when they are exposed to educational situations. This includes their prior knowledge, any naive understanding of concepts, their ability to remember, process information, motivation to learn, thinking patterns, and everything that makes learning meaningful to them (Al-Johari, 2010, p. 20). There are many strategies based on constructivist theory, including the Round House Diagram Strategy proposed by James Wandersee in 1994. The round house diagram is a two-dimensional circular geometric shape, consisting of a central disc divided by an optional line, surrounded by seven external sectors (which can increase or decrease by two sectors), representing the conceptual structure of a limited part of knowledge

Atiyah (2009) believes that metacognitive strategies emphasize the connections between what an individual learns and his previous thoughts and experiences, as well as his mental skills in perceiving and organizing these connections and Learning is effective when

students feel it is meaningful, and meaningful learning is fundamental in modifying behavior, unlike superficial learning, which does not contribute to behavior modification (p. 239).

Given the importance of constructivist theory strategies, the researcher saw the necessity of discussing the Round House Diagram Strategy.

### **An Introduction to the Round House Diagram Strategy:**

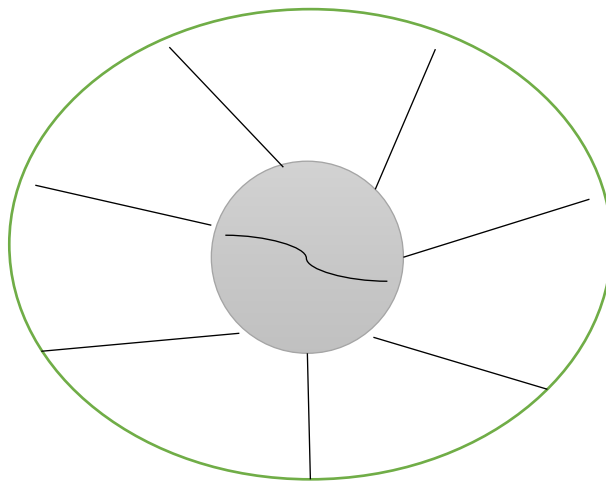
#### **Introduction:**

Constructivist theory emphasizes that knowledge resides within individuals, constituting a highly personalized and internal process. Through this approach, individuals actively modify and reorganize their understanding daily based on new experiences.

Many strategies are rooted in constructivist theory, one of which is the Round House Diagram Strategy. In this strategy, students independently formulate key ideas and place them within the diagram, facilitating easy and efficient recall of information (Al-Busaidi & Al-Balushi, 2009, p. 487).

The Round House Diagram Strategy was proposed by Wandersee in 1994, who likened it to the circular, disc-based structures used in railways to switch train carriages. In this analogy, the central disc represents the core idea, while the radial divisions either segment or juxtapose complementary ideas. The seven surrounding sectors serve various functions, including segmenting complex concepts, organizing event sequences, or outlining problem-solving steps. Students fill in the diagram, starting at the 12 o'clock position and moving clockwise (Al-Fawwal & Suleiman, 2013, p. 526).

Figure 1 illustrates the structure of the Round House Diagram Strategy:



**Figure 1: Diagram of the Round House Diagram Strategy**

#### **1- The Concept of the Round House Diagram Strategy:**

Through a review of educational literature and previous studies, the researcher has found multiple definitions of the Round House Diagram Strategy, including:

-McCartney & Figg (2011) define it as "a visual story map designed to enhance long-term memory. This type of diagram requires students to build knowledge through visual associations, replacing rote memorization of content. In this way, students create a concept map or icons associated with the concepts in a sequential and orderly manner" (p. 2).

-Mahana (2013) defines it as "a set of educational activities based on a circular visual organizer that helps present a concept through seven sectors, each containing key ideas along with images and symbols that represent these ideas, facilitating easy recall" (p. 15).

Based on the above, the researcher identifies several core elements common to these definitions of the Round House Diagram Strategy:

- A creative visual tool.
- A circular diagram divided into seven sectors and a central core.
- Based on constructivist knowledge principles.
- Relies on the sequence and interconnection of ideas.
- A learning strategy aimed at developing concepts and linking them with images to enhance recall.

#### **2- The Theoretical and Philosophical Foundations of the Round House Diagram Strategy:**

Wandersee developed the Round House Diagram Strategy based on Ausubel's theory of learning, Novak's humanistic constructivism, Miller's research on memory, and studies in visual perception, as follows:

### **2-1 Ausubel's Theory of Meaningful Learning:**

At its core, Ausubel's theory rests on a key assumption: the most influential factor in learning is the extent, clarity, and organization of students' existing knowledge. This knowledge, comprising facts, concepts, propositions, theories, and raw perceptual data available to students at any given moment, is what Ausubel refers to as the "cognitive structure." According to his theory of verbal learning, instructional material becomes meaningful when it is genuinely connected to related principles and concepts that are already established within students' cognitive structures, thus enabling meaningful learning (Al-Mazrou, 2005, p. 27).

### **2-2 Novak's Theory of Humanistic Constructivism:**

Humanistic constructivism emphasizes that the cognitive processes used by experts to produce exceptional work are the same processes employed by beginners with limited experience in a field. In both cases, individuals construct knowledge by forming connections between new concepts and existing concepts, which are part of their prior cognitive structures. Thus, the psychological processes through which individuals create unique and new meaning are the same epistemological processes involved in constructing new knowledge. This construction of new knowledge is a form of meaningful learning, implying that when meaningful learning occurs, the process of building new knowledge has taken place. Novak derived humanistic constructivism from Ausubel's work on meaningful learning and cognitive theory (Zaytoon & Zaytoon, 2003, p. 218)

### **2-3 Miller's Research on Memory:**

In his 1956 study, Miller demonstrated that the capacity of short-term memory ranges from 5 to 9 units, with a unit possibly being a name, number, or phrase. The average capacity of short-term memory is 7 digits, 7 letters, or 7 names. Short-term memory functions as a temporary holding station for information retrieved from long-term memory before it is utilized. Accordingly, the seven sectors with sequential information surrounding the inner circle of the Round House Diagram aid in the recall of content being studied (Ward & Lee, 2006, p. 14).

### **2-4 Visual Perception:**

The Round House Diagram Strategy is aligned with Paivio's Dual Coding Theory, which posits that visual imagery complements written or verbal information, enhancing the brain's information-processing systems (Khalaf & Al-Shabani, 2011, p. 82). Ward and Wandersee (2002) also noted that the Round House Diagram Strategy comprises a circular diagram, a highly valuable tool for students' visual learning. This visual preparation occurs not only through the eye but also through the mind-eye-brain system, wherein the brain interprets and organizes information into visual patterns. Such diagrams are visually essential because our minds naturally seek bidirectional forms in the environment, helping to improve information processing through perception, where the mind interacts with environmental stimuli, making it easier to recall information (p. 577).

Based on the theoretical and philosophical foundations outlined above, the researcher recognizes the importance of advance organizers, prior experiences, and sequential relationships between concepts, as well as the significance of segmenting instructional content according to Miller's theory. The researcher also believes that the nature of the content and the educational context as a whole should determine the number of segments (5-9), alongside visually representing abstract information to facilitate its retention and recall.

## **3- Objectives of the Round House Diagram Strategy:**

The Round House Diagram helps achieve several objectives outlined by Khalaf and Al-Shabani (2011) as follows:

**3.1** It encourages students to engage in self-directed learning, which facilitates easier and more efficient information retention.

**3.2** It trains students to convert extensive scientific information into simpler, more accessible content using short phrases and drawings.

**3.3** It assists teachers in identifying students' existing knowledge and uncovering any misconceptions.

**3.4** It enhances students' drawing skills, highlighting the connection between science and art through the use of the Round House Diagram in teaching (p. 81).

- Additionally, Ward and Wandersee, as cited in Al-Kahlout (2012), mention that the Round House Diagram:

\* Assists in developing scientific processes, some related to the nature of the lesson for which the diagram is designed, and others linked to the diagram itself. These processes include:

- Classification: Enhanced by segmenting information related to the main concept placed at the center of the diagram, using conjunctions like "and" to connect terms within that segment.

- Modeling: Enabled as students transform complex, abstract scientific information into simplified, accessible forms using drawings and illustrative models in the diagram's seven outer sectors.

- Communication: Fostered as each group presents their completed diagram to other groups.

\* Promotes the development of various types of intelligence:

- Linguistic Intelligence: Enhanced through discussions among students during the diagram's design.

- Logical-Mathematical Intelligence: Developed through brainstorming to organize ideas within the diagram's seven sectors.

- Visual-Spatial Intelligence: Strengthened by organizing scientific concepts visually within the diagram, facilitating recall and retrieval.

- Interpersonal Intelligence: Cultivated through collaborative group work in designing the diagram (p. 15).

Based on the above, the researcher views the Round House Diagram Strategy as an effective tool for developing thinking and engaging both hemispheres of the brain. It stimulates the right hemisphere through its use of imagery, color, and mental visualization, while it activates the left hemisphere by organizing concepts and information in a sequential manner. The strategy also involves verbal expression following the creation of the diagram by students and aids teachers in correcting students' misconceptions by providing insight into their current understanding.

#### **4- Stages of Developing the Round House Diagram Strategy:**

According to McCartney & Figg (2011), there are three stages in developing the circular house:

##### **4.1 Planning Stage:**

In this stage, students use a worksheet to record their ideas. Since the process of creating the circular house format closely resembles other types of visual presentations, the planning phase is considered the initial and essential stage. Here, students are guided through the following steps:

- Identify the main ideas you wish to explore.
- Write your title using “and” or “from.”
- Define your objectives for constructing this map.
- Take the entire concept and divide it into seven segments (plus or minus two).
- Reformulate the concept within each segment.
- Find an artwork, image, or icon directly related to the concept.
- Ensure each concept is connected to the next in a sequential or related manner.

##### **4.2 Graphing Stage:**

In this stage, students fill the segments of the circular house diagram with concepts, illustrations, and relevant icons, beginning at the 12 o'clock position and proceeding clockwise in sequence with the other sections. At this point, it is advisable to write a detailed title to stimulate students' thinking and help them expand on the main ideas placed in the outer parts of the circle. Additionally, reading skills are utilized throughout the lesson. Through this skill, students reflect on the primary concepts, practice writing titles, rephrasing, summarizing key ideas, and developing critical thinking skills. They also work on creating drawings and images that help to enhance memory on certain topics. Furthermore, students engage in self-assessment based on a set of shape-control standards

##### **4.3 Thinking Stage:**

This final stage takes place after students complete their diagram and receive feedback from the teacher. Students then explain, in their own words, the meaning and significance of the diagram. They may also be asked to write an essay that tells the story of the diagram (p.p. 3-7).

From the above, it is evident to the researcher that each of these stages holds its importance for both the teacher and the students. The first stage fosters logical-mathematical thinking, as students follow organized, sequential steps. The second stage develops visual thinking, as students engage in drawing and planning while also enhancing language skills, such as expression and summarization. The third stage promotes creative thinking, as students compose and write essays and stories.

#### **5- Building the Round House Diagram Strategy:**

Students construct the circular house diagram by following a model of steps, as outlined by Ward and Lee (2006):

##### **5.1 Setting the Objective:**

Students first define the objective behind creating the circular house diagram, as this helps them concentrate on studying the topic and guides their learning process.

##### **5.2 Identifying the Main Topic:**

They determine the main topic to be studied—whether it is a concept, an experiment, or specific procedures—and record the main title within the circular disc.

##### **5.3 Defining Two Subtopics:**

If applicable, students identify two aspects of the main topic, which then become subheadings branching from the main topic. These subheadings are noted on either side of the curve within the circular disc.

**5.4** Students divide the main topic into seven main points (or key ideas), with a possible variation of plus or minus two points. For each, they write a brief description and summarize it in a title that captures the essence of the idea. They then create an icon (such as a shape, image, or simple illustration) for each point to help them remember the titles.

**5.5** Students begin by filling the outer segments of the circular house diagram, starting with the segment pointing to 12 o'clock and moving clockwise. They use short titles and accompanying icons in each segment. Ready-made images may also be used for assistance.

**5.6** If students feel the need to elaborate on a particular point, they may use an “expanded segment” format for additional explanation and commentary.

**5.7** Students use a self-assessment model to ensure they follow the guidelines for constructing the circular house diagram, promoting self-directed learning.

5.8 Upon completing the diagram, students write an essay on the topic (p.13).

Figure (2) illustrates the steps for constructing the Round House Diagram Strategy:

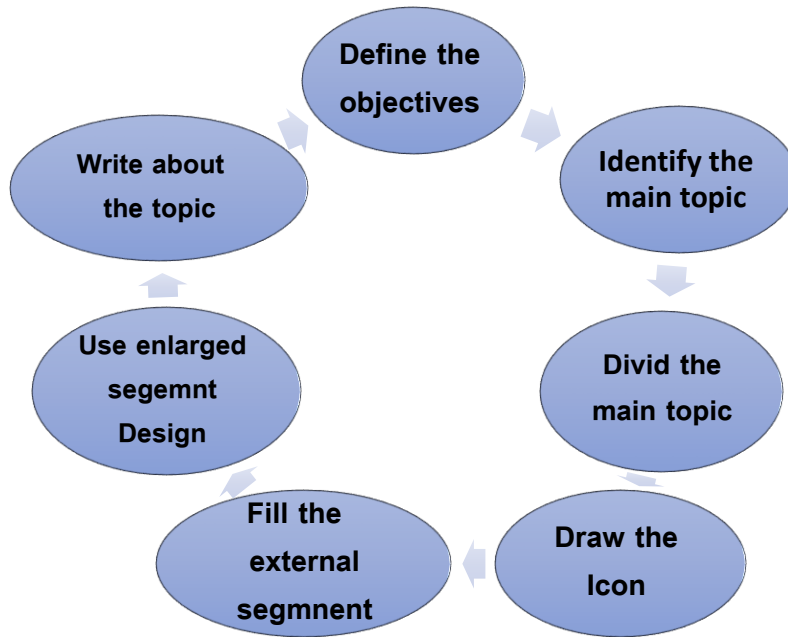


Figure (2): Steps for constructing the Round House Diagram Strategy

#### 6. Points for Activating and Evaluating Teaching through the Round House Diagram Strategy:

Fuwal and Suleiman (2013) noted that Ward and Wandersee proposed a set of points for effectively using the circular house diagram in teaching. These points serve as guidelines for teachers and students on how to construct and design the diagram, as follows:

- 6.1 Students, with the assistance of the teacher, identify the main idea(s) to be explored and represented in the diagram.
- 6.2 Students then write a title for the central concept, using connecting words such as “from” and “and.”
- 6.3 Students write the objectives for designing the circular house diagram at the bottom of the page where the diagram will be drawn, or on a separate sheet of paper.
- 6.4 Students break down the information related to the concept into seven main parts, or slightly more or fewer (by two).
- 6.5 Students write the information for each segment of the diagram, using simple words, drawings, and models that are easy to recall and retrieve. Simplified illustrative drawings must be included in each segment.
- 6.6 If one of the segments contains essential information that cannot be adequately clarified within the segment itself, the teacher may enlarge that segment. In this case, the enlarged segment should be drawn on the same page as the original diagram.
- 6.7 The minimum number of external segments is five, while the maximum is nine, depending on the nature of the concept being represented (p. 529).

Regarding evaluation, Table (1) outlines the evaluation criteria that teachers can use to assess the diagrams designed by students.

statement	Yes	NO	Not Available	Needs attention
Has the student clearly identified and written the objectives?				
Is the title comprehensive and covers the scientific concept the diagram represents?				
Does the diagram include sub-concepts and information related to the main concept?				
Are there 5 to 9 clear sub-ideas in the diagram?				
Are the concepts accurately identified?				
Is there a drawing or image in each segment illustrating the concept within the segment?				
Is there accurate and correct sequencing of information within the segment?				
If the student enlarged one of the segments, is it included on the same page where the diagram was drawn?				
Has the space been used effectively in each segment?				
Is the diagram organized and aesthetically pleasing, making it easy to read?				
Is the diagram organized and aesthetically pleasing, making it easy to read?				

(Fuwal&Suleiman,2013,p.530).



The researcher emphasizes the necessity and importance of adhering to and applying these criteria to assess the accuracy of constructing the circular house diagram.

#### **7- The Role of the Teacher in the Round House Diagram Strategy:**

Al-Kahlout (2012) stated that the use of the circular house diagram strategy may lead to a shift in the teacher's role, as it:

- Helps the teacher clarify abstract concepts.
- Can be used as a strategy to conclude the educational situation.
- Enhances the teacher's use of unconventional tools and activities when employed through computers.
- Assists the teacher in diversifying educational activities and experiences.
- Encourages the teacher to combine theoretical and practical aspects, which becomes evident through students identifying the elements of the circular house diagram and drawing icons within the diagram (*pp. 21–22*).

On the other hand, Al-Janaih (2011) indicated that the circular house diagram strategy is highly significant for the teacher, as it is considered:

- A tool for effective lesson planning.
- An engaging and stimulating approach to teaching.
- A guide and assistant for students to organize their ideas and sequence the scientific material while clarifying it with visuals.
- A means to identify students' misconceptions and incorrect ideas and work on correcting them.
- A method to create a collaborative educational environment for discussion among students.
- Suitable for implementing scientific activities and experiments (*p. 167*).

Furthermore, McCartney and Samsonov (2010) added the following:

- It shifts the classroom climate from teacher-centered to student-centered, making students the focus of the educational process.
- It enhances teachers' confidence and teaching efficiency due to students' enthusiasm and active participation.
- It transforms the teacher's role from being a transmitter of information to a facilitator, assistant, and listener to students.
- It shifts teaching from reliance on textbooks to addressing students' questions (*p. 1400*).

The researcher believes that the significance of the circular house diagram strategy for teachers lies in its ability to be used before the lesson, during the lesson, or at its conclusion.

#### **8- The Importance of the Round House Diagram Strategy for Students:**

According to Muhanna (2013), Al-Kahlout (2012), Al-Janaih (2011), and Ward & Lee (2006), the importance of constructing the circular house diagram for students lies in the following:

**8-1** It simplifies the understanding of concepts by presenting them more comprehensively.

**8-2** It helps students retain information since the information is represented both verbally and visually.

**8-3.** It assists students in organizing ideas and rephrasing sequential events.

**8-4.** It supports students in analyzing and classifying information by extracting the main idea of the content.

**8-5.** It increases attention to the material compared to traditional teaching methods.

**8-6.** It fosters teamwork and collaboration.

**8-7.** It develops visual thinking skills in students.

**8-8.** It creates an enjoyable and engaging atmosphere during the learning process.

**8-9.** It provides an opportunity for all students, regardless of their academic levels, to participate.

**8-10.** It connects students' new knowledge with their prior knowledge within their cognitive structure.

**8-11.** It facilitates the learning of concepts related to the subject, anchoring them in students' minds for easier recall and retrieval in the future.

**8-12.** It encourages creativity and thinking, as evidenced by students' ability to construct the circular house diagram.

**8-13.** It organizes the educational content and prepares a detailed summary of the learning material.

**8-14.** It represents the educational content using icons and images, aiding in clarification for students.

**8-15.** It links information extracted from the study material, interconnecting them.

**8-16.** It builds a solid knowledge base by reducing the number of misconceptions.

**8-17.** It enhances students' visual fluency, flexibility, and originality.

**8-18.** It boosts students' self-confidence by helping them express their ideas and select suitable artistic representations.

**8-19.** It utilizes the study material by analyzing texts and deriving appropriate interpretations through drawings.

#### **9- Challenges Associated with the Round House Diagram Strategy:**

Hackney & Ward (2002) and McCartney & Figg (2011) identified several challenges that students face when implementing the circular house diagram strategy. These challenges, summarized by the researcher, include:

**9-1.** Students' dislike and reluctance toward drawing.

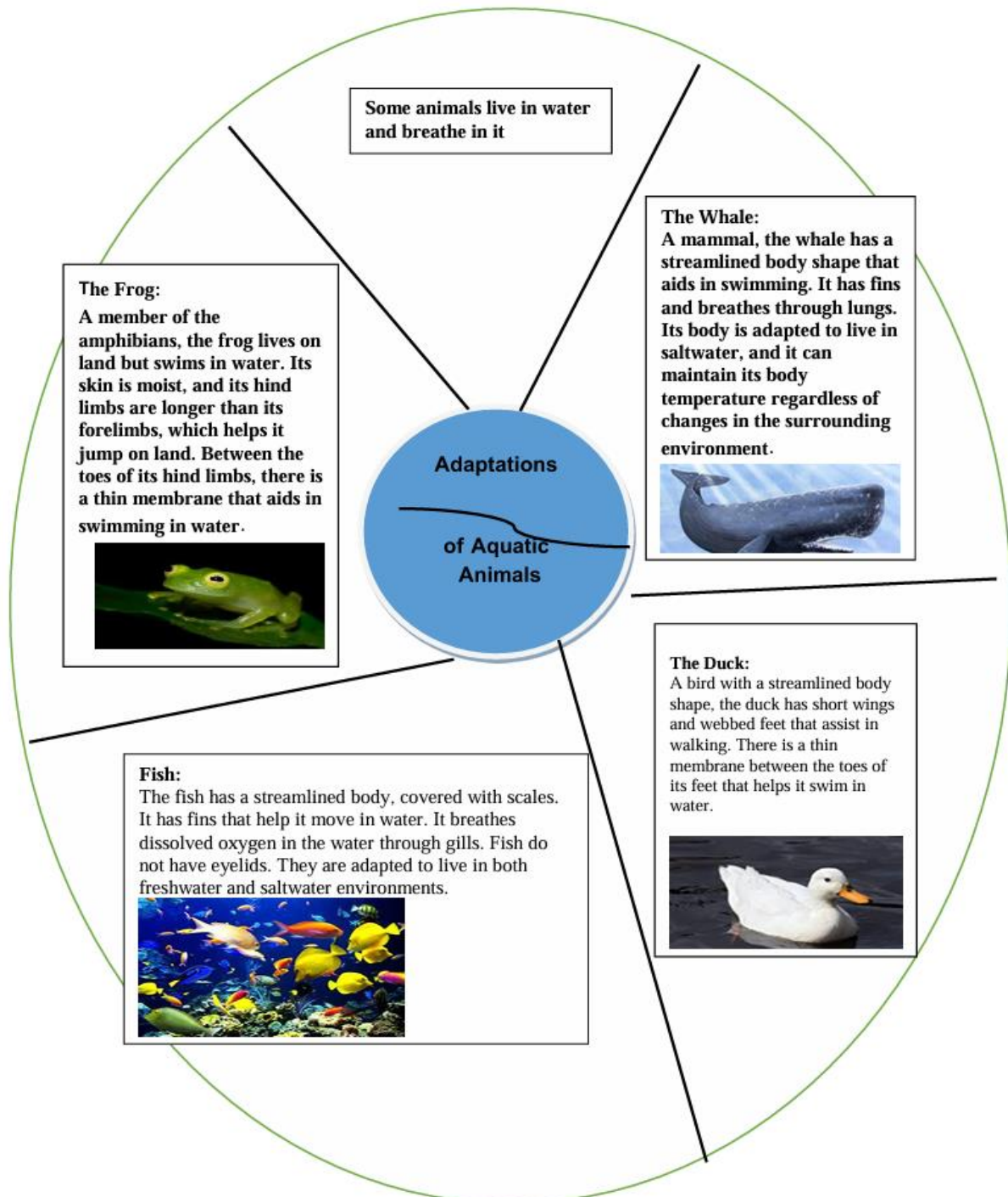
- 9-2. Students' fear of being mocked by their peers, especially those less skilled in drawing.  
9-3. Difficulty in extracting main ideas from the textbook.  
9-4. Difficulty in interpreting concepts within the context of overall and specific meanings.  
9-5. Difficulty in formulating precise sentences and sequencing events accurately.

Al-Kahlout (2012) suggested that overcoming these challenges lies in the teacher's role by:

- Encouraging and supporting students' drawings.
- Clarifying that the purpose of drawing is to translate concepts into tangible forms, not focusing on the quality of the drawings themselves.
- Training students to analyze content and extract specific elements by identifying objectives at the beginning of the lesson or through assignments (p. 233).

Based on the above, the researcher emphasizes the importance and necessity of the teacher closely monitoring their students during each step of constructing the circular house diagram to identify the challenges they face and work on resolving them.

### the Round House Diagram Strategy for Adaptations of Aquatic Animals to Their Environment



## REFERENCES

1. Ambosaidi, Abdullah bin Khamees, and Al-Balushi, Suleiman bin Mohammed. (2011). *Teaching Methods in Science: Concepts and Practical Applications* (2nd ed.). Amman: Dar Al-Mesira for Publishing and Distribution.
2. Al-Janaih, Asmaa. (2011). *The Impact of the Circular House Diagram Strategy on Enhancing Academic Achievement and Retention of Learning among Second-Year Middle School Female Students in the Science Curriculum*. Unpublished Master's Thesis, College of Education, Saudi Arabia.
3. Al-Johari, Mohammed Ahmed. (2010). *Pamphlets of the Exploratory Science Center*. Egypt: Exploratory Center, Vision and Goals.
4. Hackney, M. & Ward, R.E., (2002). *How-to-learn biology via Roundhouse diagrams*. The American Biology Teacher, Volume 64 Issue 7, pp525-533. Retrieved october, 6 ,2015: from: [http://www.nabt.org/websites/institution/File/pdfs/american\\_biology\\_teacher/2002/064-07-0525.pdf](http://www.nabt.org/websites/institution/File/pdfs/american_biology_teacher/2002/064-07-0525.pdf).
5. Khalaf, Kareem Blassem, and Al-Shabani, Huda Sabah Malik. (2011). *The Effectiveness of Teaching with the Circular House Diagram Strategy in Acquiring Biological Concepts among 4th Grade Female Students*. Al-Qadisiyah Journal of Arts and Educational Sciences, 10(3-4), 75-88.
6. Zaytoon, Hassan, and Zaytoon, Kamal. (2003). *Education and Teaching from the Perspective of Constructivist Theory*. Cairo: Alam Al-Kutub.
7. Atiya, Mohsen. (2009). *Metacognitive Strategies in Reading Comprehension*. Amman: Dar Al-Manahij for Publishing and Distribution.
8. Al-Kahlout, Amal Abdul Qader Ahmed. (2012). *The Effectiveness of Using the Circular House Diagram Strategy in Developing Concepts and Visual Thinking Skills in Geography among 11th Grade Female Students in Gaza*. Unpublished Master's Thesis, Islamic University, Gaza.
9. Al-Fawal, Mohammed Khair, and Suleiman, Jamal. (2013). *General Teaching Methods for the Educational Rehabilitation Diploma*. Damascus University: College of Education.
10. Al-Mazrou, Haya. (2005). *The Circular House Diagram Strategy: Its Effectiveness in Developing Metacognitive Skills and Academic Achievement in Science among High School Female Students with Different Cognitive Abilities*. Gulf Arab Journal of Research, 96.
11. Muhanna, Marwa. (2013). *The Effectiveness of the Circular House Diagram Strategy in Developing Scientific Concepts and Systemic Thinking Skills in Life Sciences among 11th Grade Female Students in Gaza*. Unpublished Master's Thesis, Islamic University, Gaza.
12. McCartney, R. E. & Figg, C. (2011). Every picture tells a story: The Roundhouse process in the digital age. Teaching and Learning, Volume6 ,Issue1 pp,1-14, Retrieved 15 October,2015, from:
13. <http://brock.scholarsportal.info/journals/teachingandlearning/home/article/viewFile/374/336>.
14. McCartney, R. & Samsonov, P. (2011). Using Roundhouse Diagrams in the Digital Age, Proceedings of Society for Information Technology & Teacher Education International Conference ,pp. 1199-1207. Retrieved 20 January,2015 From: <http://www.editlib.org/p/36451>.
15. Ward, R. E., & Lee,W. D. (2006). Understanding the Periodic Table of Elements via Iconic Mapping and Sequential Diagramming: The Roundhouse Strategy. Science Activities,Volume42, Issue4, pp,11-19
16. Ward, R. E., & Wandersee, J. H. (2002). Students' perceptions of Roundhouse diagramming: A middle school viewpoint. International Journal of Science Education, Volume24 Issue2, pp 205-225. Retrieved May 5 ,2015: from <http://comp.uark.edu/~scimap/index.php/references/item/7807>.