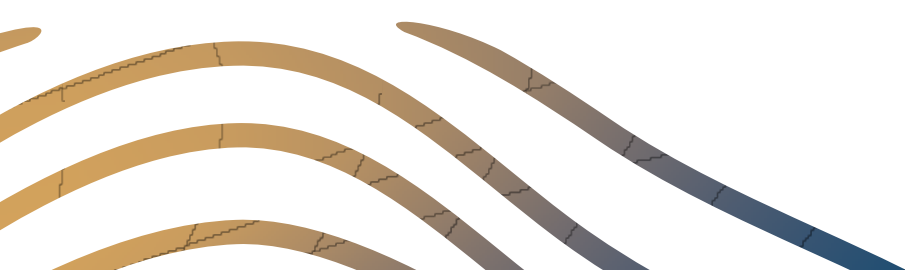




**THE OCEAN SENSES
ACTIVITIES BOOK**



FUNCTIONS OF SENSES IN LEARNING

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Using various senses to process and store new information is a powerful way of exploring the natural environment for children, but also adults. Using senses through the sensory organs (the eyes, ears, nose, tongue, and skin) makes the learning experience effective, meaningful and unforgettable. This is the most natural method that children use to learn each detail in their environment since they were born.

The world comprises various objects that stimulate our senses in multiple ways. We connect the outer world through our senses so that we perceive the environment around us and make interactions (Ranu, 2022). Therefore, it is advantageous for children to integrate all their senses into their learning environment. Children learn best by being actively involved in the action. One can forget the theoretical description of how to ride a bicycle or bake a cake. Still, it is an everlasting experience/information when such actions are done actively by integrating the senses and body movements. After receiving such information, brain networks stimulate the senses, but learning from this unique experience is only possible by using memory networks.

Tang (2017) explains the brain network involved in learning and teaching using memory systems. The information we receive from our environment is stored in our sensory memory, and this first step forms short-term memory. Short-term memory is temporary storage for small amounts of information. After processing the information in short-term memory, long-term memory is created to store the information over long periods and to communicate this information with the outer world. The memory process includes three stages: Encoding, storage and retrieval. Each of these stages recruits different brain networks. For example, sensory memory activates three different systems to encode the information, which is visual, acoustic and semantic systems. Moreover, encoding the information requires interaction between attention and memory networks. This interaction can be different in each individual's brain; each brain creates its unique way of learning.

“Sensory Theory” by Laird (1985) suggests that effective learning occurs only when the senses of sight, hearing, touch, smell and taste are stimulated. Using the five senses simultaneously in

processing the information helps us to learn. The theory also suggests that there is a greater chance for learning to happen if multi-senses are stimulated. Therefore, it is crucial to adapt the sources and methodologies used in teaching according to the sensory system.

In an era where we are so close to the digital screens in our daily lives, children need to be presented such materials that encourage them to grab, shake, smell, listen, taste and write, therefore designing and implementing multi-sensory materials leads to re-shape the educational approaches (Ponticorvo et al., 2019).

Katai (2011) and Sheyesteh et al. (2019) suggest that a combination of senses connects individuals with the outer world and offers them the opportunity for inclusive learning. Sensory experience alerts the emotions evoked through the senses according to the frequency of sensory experience (Pishgadam et al., 2013). The emotions and sensory inputs received from the environment also influence individuals' understanding of reality and perception of the future (Pishgadam et al., 2016). Accordingly, all the activities that involve the combination of multiple senses in this book would not only be beneficial to get a closer experience of the ocean but also leads to exploring one's senses and emotions. Furthermore, the book offers active learning with engaged activities that invite children and adults to do things and think about the actions they are involved. Active learning help to integrate the diversity of children when used in the classroom. This allows engaging all the populations in a classroom, such as underrepresented groups, which helps to improve the classroom atmosphere (Haak et al., 2011). Active learning explains the reason why the atmosphere in the classroom is better enhanced with constructivism. Constructivism describes the different types of practice that are influential for underprepared groups in the classroom, such as the exercises that involve students explaining their thoughts and those that challenge their previous conception towards that topic (Vygotsky, 1978). The constructivist approach is crucial, especially for introductory courses, so there would be no missing minds in the classroom. A classroom can include various types of intelligence, such as natural, kinesthetic, interpersonal, intrapersonal, visual-spatial, verbal, logical (Multiple Intelligence Theory, Gardner, 1993) and neurodivergent brains, such as autistic and attention deficit individuals. With that said, the Ocean Senses book, a multi-sensory learning tool that supports active learning using senses, can be an overarching agent for all types of students in the classroom environment.

References

Gardner, H. (1993). *Multiple intelligences: The theory in practice*. Basic books.

Haak, D. C., HilleRisLambers, J., Pitre, E., & Freeman, S. (2011). Increased structure and active learning reduce the achievement gap in introductory biology. *Science*, 332(6034), 1213-1216.

Laird, D. (1985). Approaches to training and development Addison-Wesley. Reading, Mass.

Miri, M. A., & Pishghadam, R. (2021). Toward an emotion based education: a systematic review of the literature. *Frontiers in Psychology*, 12, 727186.

Pishghadam, Reza. "Emotioncy in language education: From exvovement to involvement." The 2nd conference on interdisciplinary approaches on language teaching, literature, and translation studies. 2015.

Ranu, H. (2022) <https://catalyst.harvard.edu/news/article/senses-and-sensibility-experiencing-the-world-around-us/>

Pishghadam, R. (2016, May). Emotioncy, extraversion, and anxiety in willingness to communicate in English. In Proceedings of the 5th International Conference on Language, Education, and Innovation (pp. 1-5).

Ponticorvo, M., Di Fuccio, R., Ferrara, F., Rega, A., & Miglino, O. (2019). Multisensory educational materials: five senses to learn. In *Methodologies and Intelligent Systems for Technology Enhanced Learning*, 8th International Conference 8 (pp. 45-52). Springer International Publishing.

Tang, Y. Y. (2017). *Brain-based learning and education: Principles and practice*. Academic Press.

Vygotsky, L. S., & Cole, M. (1978). *Mind in society: Development of higher psychological processes*. Harvard university press.