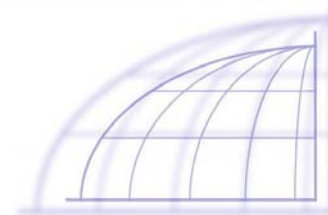


## Printout of MindLadder® Advisor

### Section B-5•



### R-3: Spatial Orientation

Everyone has had the unsettling experience of being disoriented in space at one time or another. This knowledge construction function includes the ability to establish the relationship of one's own body with frames of reference in the surrounding world and to use such relationships to navigate in the environment one is in. Spatial orientation is also used in determining size, shape, distance and direction among objects. Also, imagining how an object will look if rotated, figuring out how to fit a piece of furniture through a door or following a map all have to do with the function of space. Difficulties with this knowledge construction function are not hard to spot. You may notice students who frequently have trouble finding their way around school, students who always point rather than using words to describe locations or students who want to take you where you want to go rather than tell you the way to get there. Upon closer inspection you may see that all these students have difficulties with the knowledge construction function of spatial orientation.

Spatial orientation is necessary for the development of stable mental models ('cognitive maps') so that one may access relevant information regarding an object or event even when it is out of sight (T-7). For example, a mental model helps to think about where your car is parked and how to return to it. A mental model of the school building helps to navigate the hallways. A student with good spatial orientation is one who has established systems whereby objects can be related to one another and to stable frameworks of reference. On average it is not until around 9 years of age that a child develops an understanding of such systems. Prior to that a student may not understand that his left may be your right. He may not understand how come the water in a stream runs from left to right when he looks at it on one side of the stream and from right to left when he looks at it on the other. A student needs to have established the system of personal reference (left, right) in order to have a stable view of her

---

• Copyright © Amate, Ltd., dba Cognitive Education Systems. USA. All rights including the right of translation reserved. - For more information about the MindLadder® LearningGuide and the MindLadder family of programs go to [www.mindladder.org](http://www.mindladder.org).

surroundings. Also the reference system of north, south, east and west, which is invariant relative to personal orientation, will not be fully understood until the personal reference system is established.

Having good spatial skills is related to learning many academic subjects. Words such as right, left, up, down, front, back, in, on, top, bottom, between, beside, near, far, over, around and next to all deal with the concept of space. Good spatial skills will help students learn how to read graphs and charts in math and science and maps in geography. In reading English, a child must be able to read from left to right and see where words begin and end with reference to each other.

To mediate this knowledge construction function engage your students in learning events that require the use of spatial concepts and language. For example working with maps, drawing pictures, giving directions to various places in the classroom or around the school or community, copying from the chalkboard and imagining what objects look like from various angles and from another person's view. Help students to understand the personal reference system of left and right, which everyone takes with them as they turn in space, and the stable reference system of north, south, east and west which remains invariant. Provide experiences that will help them understand these systems. For example, the North Pole is always in the same place, but what may be to the right of me as I face north is to the left of me when I face south.

Use language to help mediate spatial concepts. Combine the use of spatial concept words when you see a student involved in an action. "I see that Mary is standing *in front of* John." or "Sue is putting the book *on* the table." Words that refer to relative distance such as near, far, close, next to, apart are often confusing to students because their meaning varies and they therefore require mediation. For example, I may be close to you when I sit next to you but we may also say that the office down the hall is close to our classroom.

Have students engage in exercises that directly involve spatial orientation to help them develop and take control of this knowledge construction function. You and your students can make up additional exercises based on the guided rotation exercise described here.

Guided Rotation Exercise. There are three steps to the exercises, Steps A, B, and C. You don't have to do them all at once.

*Step A-1: Naming.* In this step the student names objects relative to her position. Stand behind the student so you can gently tap her left

and right shoulders. Have the student pick and name one stationary object, respectively, in front of her, to her right, to her left and behind her. For this example, say the student picked Picture in front, Sink to the right, Door to the left and Closet in the back. As you both look forward ask the student “So what is in front of you - what did you choose?” [OK, good, the picture], “And what is to your right?” Gently tap the right shoulder so the student associates the word ‘right’ with her right side. “And to your left?” Associate the word ‘left’ with the left side of the body by tapping on the left shoulder. “And what is behind you?” [Great]. If the student doesn’t remember an object have her take a quick peek. Then go back and name all the objects from the frontal position so they are all identified.

*Step A-2: First rotation.* Standing behind the student have the two of you make a quarter or 90 degree turn clockwise. Then say “OK, tell me what is now in front of you?”. Sink. “So what happened, before the picture was in front of you and now the sink is in front of you? What happened?” – “Yes, you turned – the picture and the sink did not move but you moved. Great.” Have the student name the other objects.

*Step A-3: Additional rotations.* Continue to make clockwise 90 degree turns until you come back to the starting position. At each stop have the student name the objects. Have fun with it and reinforce the student as you go along. Reduce and eliminate the shoulder tapping as the student gains control over the function.

Remember, you can do as much or as little of the exercise as may be helpful at any given time for your student to acquire this knowledge construction function. Steps B and C are described below.

*Step B: Hypothetical spatial orientation.* In this step the student uses the knowledge construction function mentally based on her own frame of reference. From the face front position say “Now, tell me something, if you were to turn one time (quarter turn) to your right what would be in front of you”. If the student begins to turn just guide the student back “Yes, just stay where you are and think what would happen in the event or if you were to turn”. Using this hypothetical modality gradually increase the difficulty to enable the student to gain confidence in the mental application of this knowledge construction function: “What would happen if you made a full (four quarters) turn?” What would you see if you first made two turns to the right (two quarters) and then three turns (three quarters) to the left?”

*Step C: Decentered spatial orientation:* In this step the student uses the knowledge construction function mentally based on someone

else's frame of reference (yours). For this part of the exercise you need to stand in front of the student. From the student's face front position say "OK, let's review, of the items we chose which one is in front of you" *The picture*. "The Picture, good. Now tell me, without moving, what is in front of me? – What did we choose?" "*The Closet*. "Great! – The Picture is in front of you but the Closet is in front of me. How come?" – "Yes, because we face in opposite directions". "Now tell me, if I were to turn to face the Door what would be behind me?" – The Sink. "Correct. And where would the Sink be for you?" – To my right. "Excellent".

Compare the challenge of navigating in environments that are rich in landmarks, such as cities, with environments that have few or no landmarks such as oceans. Examine how such tools as the compass, the sextant and the chronometer (see also R-4: Temporal Orientation) help to navigate in environments without landmarks. Study how these tools, when used together, are able to help their users establish their position in the environment, their direction of movement, and the relative position of different locations in the environment. Together with your students come up with different examples where they use spatial orientation during the day (e.g. getting from home to school) and in their school work (e.g. darkening the correct circles in the columns and rows of multiple choice answer sheets).