5

Constructing a Concept Map

Learning Objectives

- Identify and demonstrate the necessary steps for creating a concept map
- Discuss how concept mapping theory is evident within the problem list and complete concept map
- Explain how concept map formatting demonstrates relationship analysis
- Analyze and explain how problem identification defines nursing actions

Introduction

Information prepared for use within a concept map is important. There is no doubt about that and indeed it is part of the process. However, collection is only part of the process. It is taking that information and placing it within a concept map that gives it meaning. Placing information into a map breathes life into it. Separate and isolated facts form associations, clarify concepts, and are valuable to analyze our thought processes. So, formatting and layout are as valuable as what the concept map contains. These two components allow a story to flow demonstrating the factual information, how it relates to main and related concepts, and how it leads to actions. The bonus result is that specific thought processes are mapped out as well, providing insight into abilities reflecting judgment, decision making, and applying knowledge.

While the purpose of this text is an emphasis on nursing applications, let's first consider a nonnursing example. Concept mapping theory places a great deal of emphasis on forming links and associations between concept. Many times, this can take place more easily at first when associations are made using familiar concepts, examples, and exercises. From there, we will move on to nursing examples. These examples will reinforce the inclusion of previously learned materials into newer theory to allow us to compare what we have learned to how it can be used as part of patient care and nursing actions. This layering of information—blending past with current knowledge—is necessary in the theory application process. Formatting the concept maps will pull all of this together. It will also give you great insight into the degree to which you can critically think and make associations between concepts. At the heart of concept mapping theory is application: taking what you know and what it means in terms of defining actions, anticipating patient needs, and considering cause and effect. You will use this knowledge in exactly this way throughout your nursing career. Now is the time to establish an expansive database of knowledge and, additionally, the critical thinking thought processes that assist you in applying it. This chapter applies concept mapping theory. It also affords an opportunity to delve more deeply into knowledge application.

Key Terms and Definitions

- **Nursing-based concept maps:** concept maps containing information based on applying nursing knowledge through analysis of skills and nursing care–related actions
- **Concept map formatting:** physical layout of concept map construction to demonstrate critical thinking and relationship analysis
- **Learning continuum:** the process of learning that begins with attaining simple knowledge and continues to comprehension and ultimately application
- **Concept map uniformity:** use of one style throughout a concept map for clarity and interpretative ease
- **Open copy templates:** blank, pre-formatted concept maps adapted to a student's preferences based on learning style and mental processing
- **Symmetrical concept map formatting:** balanced symmetry within a concept map for visual appeal and interpretation

Setting Up a Concept Map

Now that you have an idea of what a basic map looks like, we need to explore how to set one up. We will use all of the information we have gathered to select the required components and starting point. Remember, each step is simple in and of itself. It is sometimes the construction part that gets confusing. We will address this and it will become clearer. I will begin with a nonnursing example that any student can relate to. This allows for an easier beginning, because we are dealing with simple and easy recall of a common situation. There are more known facts than unknown ones, which makes problem identification and relationship analysis a bit easier.

Using a familiar example makes for easier links and the ability to see where each applies and fits into our final product, which is a completed concept map clearly demonstrating concept mapping theoretical components. Proceeding in this way may make it easier to transition to a nursing example. Although the following example could be expanded, we are going to keep it simple for better demonstration. In any given situation, there is a possibility for a large number of problems or considerations. We will limit the list to about five considerations. Let's say we are having our relatives over for a holiday meal. We will create a map from that scenario.

Step 1

Ask: What is the main concept? What are other, smaller concepts that relate in some way to the main concept?

Do: Create a list with the main concept as the heading and the related concepts listed below it.

One of the most confusing elements for students is the creation of this list, especially when research related to its creation involves abstract concepts. What you have to remember is all learning involving nursing theory progresses along a continuum. That **learning continuum** involves taking knowledge and analyzing how it fits into what was previously learned and making associations. Because the process becomes easier and clearer with more exposure to knowledge and experience, creating the problem list will become easier over time. A major step in this process is to use links and associations with *all* learning and studying. Linking and associating concepts will ensure more meaningful learning and enhance critical thinking skills.

The main concept is usually very clear, depending on the map's focus. The list of related concepts requires some deeper thought processes and may stymy you at first. Review of theory or skill knowledge may be required for accuracy and completeness of the map. Instant recall of previous knowledge occurs with repeated exposure and processing of it. Although this may be viewed as time consuming, it is in reality a part of the whole concept mapping theory described earlier in the text. As any educator is aware, repeated exposure to factual knowledge aids in the comprehension process. As stated earlier, comprehension is essential if progression to application can occur. Also, because relationship analysis is a major ingredient in the process, simply thinking about what related concepts to include and how they might fit is a big step in stimulating the critical thinking spark, where one question leads to many more.

Related concepts may further be subdivided into primary and secondary related concepts. Primary concepts usually have a more direct relationship with the main concept. They are necessary to direct the actions that will be taken next. Often, secondary related concepts have an indirect connection with the main concept but are still important to the actions taken. Separating concepts into these categories assists with the analysis process and reinforces conceptual information.

So, we know that our main concept is the dinner itself. Easy, right? Now visualize the situation as if it were really happening and you were hosting this get-together in a week. Next, think of everything else you will need or need to consider that relates to having a dinner for a group of people. (Note: if you are doing this exercise with a class,

you may want to limit the list to five things because of time constraints.) Your list would look something like this:

Dinner Party

- Number of guests
- Menu and courses
- Invitations
- Special dietary needs?
- Supplies

As you see, once you start thinking of things, many more possibilities pop into your head. You might choose other considerations such as time of day to host the event, the dinner theme, beverage supplies, whether to serve alcoholic beverages or not, and seating arrangements.

Once this has been completed, take a moment or two to determine what interrelationships exist on the related concept list. We can immediately take note that the supplies we need and the number of invitations necessary directly relate to the number of guests. Any special dietary needs among the group of guests directly relate to the supplies, as well as the menu and courses. Being aware of these relationships will help when we begin placing the data into the shapes. It will help to either record these extensions of the related concepts alongside each one or create small boxes near each one to establish relationships and to prevent omitting necessary information. Writing it out in this way allows you to see the interconnectedness of everything needed to plan and host a successful dinner. If not all relationships are clear, you will want to either draw lines or color code the categories. This will make you think through how each factor is linked to reinforce it. This will be especially helpful when you begin to create a **nursing-based concept map**. As you progress in this process, you will begin to look at everything you learn and encounter clinically as having an association or interrelationship with something else. *This is an important goal to set for yourself.*

The first list you see in **Figure 5-1** is a general listing of the main and related concept list. The left-hand side of the chart would be considered the main problem or consideration concepts. The remainder of the list would signify the related concepts.

Figure 5-1 Main and related concept list for the dinner party example.

Dinner Party	
Main List	
Number of guests	Consider: seating arrangements, relationship to host, facility size
Menu/courses	Consider: special dietary needs/restrictions, prep time, cost
Invitations	Consider: design, number of guests, postage costs, mailing date
Special dietary needs	Influences ingredients, menu, and costs
Supplies	Consider above information plus table decoration, favors, place settings

Before we proceed, let's take the list and identify related concepts according to their primary or secondary status (see **Figure 5-2**). Then we can begin to think about actions we need to take.

As you can see, each time you consider a problem area, there are many things you could think of in addition to what is listed. Let's now focus on the list we have created.

Dinner Party Guests

This is the main, determining factor from which all other considerations originate. This main concept has helped us to formulate the related categories. The guests are the focus of the party and the basis for actions taken in planning the event. Thus, an association has been made between the guests and the related concepts.

Number of Guests

Our guest list is a vital part of planning and decision making related to cost, seating, and all other organizational planning. The specific number decides overall cost and number of supplies needed. The other important association to make is that having knowledge of the guests will determine the party's success. Although this impacts many things, I

Figure 5-2 Organizing related concepts into primary or secondary status.

Main concept:

Dinner party guests

Primary related concepts	Secondary related concepts
Number	Cost, room/facility size, seating arrangements, relationship to host/hostess
Menu choices	Presentation, place settings cost, ingredients, preparation time
Invitations	Cost, mailing schedule, RSVP instructions, postage, design
Dietary considerations	Knowledge of guests' dietary needs/restrictions, cost, inclusion of nutritional information
Supplies	Groceries, beverages, place settings and silverware, cost, table decorations, favors

have isolated dietary restrictions. Not considering guest dietary restrictions could lead to allergic reactions, reluctance to attend, or even a great deal of leftover food.

Preliminary actions related to all of the information gathered could include:

- Setting up a budget
- Calling guests to ask about food preferences and any dietary restrictions
- Planning a time budget for food preparation
- Preparing table cards labeled with nutritional information of the food served

So, already in the first step, we are thinking about possible actions and making associations between them and our list of items.

Using a formal tool such as a collection tool or an informal tool such as a piece of notepaper and recording the problem or concern as you research is a good plan for a rudimentary problem list. Once that has been completed, you will then refine the list as we did here. No matter the method, be sure to begin to make associations immediately. You can include notes for each category, enclose like groupings within circles, or draw a type of chart to begin making associations. Again, I have to emphasize that because everyone assimilates and mentally processes information differently, choose a method congruent with your learning and mental processing style. Some generalized questions to ask during this process are:

1. What concepts or things relate directly to the main concept?
2. What concepts or things relate indirectly to the main concept?
3. If a link is identified, in what ways is that link evident?
4. In what ways do the items on the related problem lists associate with and differentiate from each other?
5. How do cause and effect play a role in making associations?

In order to fully tease out the specific associations, it will be necessary to ask specific questions as well. Some specific questions for this scenario might be:

1. How is cost affected by guests' food preferences?
2. How many varieties of foods are necessary based on those preferences?
3. When should the invitations be sent out so that there is enough time for guests to RSVP?

In each part of Step 1, we have used critical thinking and relationship analysis to identify concepts and anticipate actions. The same process will take place within nursing-based concept map problem lists.

Step 2

Ask: What shapes can be used and what goes in each one?

Do: Begin to play with various formats, being sure the map is legible.

In general, there is no limit to the number of shapes. It is much better to have more shapes with less content in each than too many concepts lumped together in a too large shape. Using multiple shapes allows for more effective definition of concepts through isolation, makes for a cleaner and more organized appearance, and is a format that better demonstrates the path of your concept map. It is a wonderful idea to practice as we proceed for maximum benefit. You may indeed come up with a different related concept list and use different shapes. This is where your creativity and learning style come into the picture. Having said that, if your learning style has a strong verbal focus, placing small lists or even outlines into a map may work better for you. For the more visual learner, clip art may work better. (To use a Concept Map Creator, see the Student Companion Website at http://go.jblearning.com/schmehl.)

As you begin to practice and try out various formats, pay close attention to your formatting, including all basic components and avoid clumping. It may even be helpful to simply draw shapes first to see which you like best. Then, you can adjust layout and see which ones look best. For instance, **Figure 5-3** shows some possible preliminary layouts.

The left side of the diagram in Figure 5-3 shows a clear information pathway and clear links. The right side has a chaotic and jumbled appearance that would be distracting and difficult, if not impossible, to interpret and follow. When formatting, one of the goals is to show each step in your thought process. This establishes a clear pathway demonstrating the use of critical thinking thought processes and can be used as a reflective tool as well.

Step 3

Ask: What descriptive phrases and lines work best with the relationships you want to demonstrate?

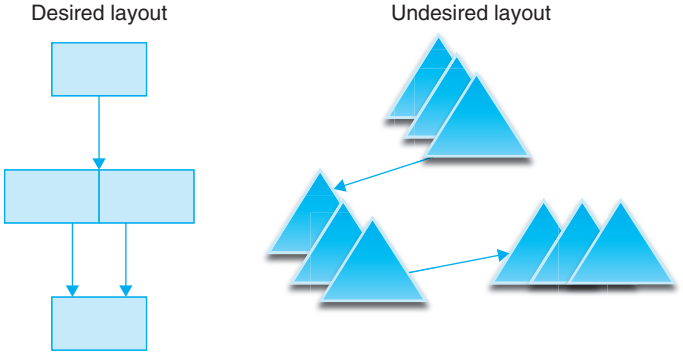
Do: Use lines to link all concepts.

Do: Choose action phrases.

Do: Experiment and find those that best fit with what you want to show.

If you draw a blank, go back and review the previous information on descriptive phrases and remember that each phrase is describing an action you have either performed

Figure 5-3 Desired versus undesired layouts.



or plan to perform. The phrases assist you with demonstrating how you have linked a piece of knowledge with a necessary action. You can practice this on paper or while providing care. Let's assume you are caring for a patient with a new finding of hypotension. As you recognize that this is an abnormal finding, your mind should be linking an action. Examples of the thought patterns and possible linking phrases found below will be useful to think this through. Putting all thoughts in sentence form is another method to help reinforce information and to understand how you would "say" the same thing in a concept map.

1. *New hypotension can lead to dizziness so my action is to monitor for orthostatic vital signs and institute safety measures.*

   The phrase "can lead to" connects your recognition of hypotension to dizziness. Use of the phrases "monitor" and "institute" includes safety considerations and takes your actions a step further.
2. *My patient's blood pressure is 98/45, and this is a new finding. I will need to notify the RN and assess the patient for symptoms.*

   The first statement demonstrates recognition of an abnormal finding as well as comparative analysis of the patient's other blood pressure results with this measurement. The descriptive phrase "notify" indicates actions related to collaborative care are chosen. Additionally, it demonstrates that you recognize your own practice limitations, that the physician will be notified, and that new orders will most likely be received. Finally, choosing an action to "assess" the patient demonstrates your knowledge and critical thinking are leading you to anticipate symptoms and the possible need for further nursing actions.
3. *My patient has a hypotensive blood pressure. Before I administer these antihypertensive medications, I will need to assess for any hold parameters and then recheck the blood pressure prior to administration.*

   Several meaningful information links are evident here. Critical thinking and relationship analysis have been used to recognize the link between hypotension and administering the antihypertensive medications. In addition, past experience with these medications has created an awareness of hold parameters. The phrases "need to assess" and "recheck" reflect these thought processes.

The type of lines you use needs to connect all problems, related concepts, and actions. The lines are the roadways, so to speak, and assist with deciphering the concept map and the path your thought processes have taken. They help to show interrelationship among and between concepts.

Step 4

Ask: What layout demonstrates a clear flow of information and makes the statement I want?

Do: Fill in the layout, and then review for clarity and uniformity.

This is where you will really put your learning style and brain to work. Your brain has already absorbed, investigated, categorized, and organized the information under

consideration. Now the information moves through your brain and becomes a pattern of thought processes that then move to your hands where you will express what your mind sees. While you absolutely need to have clear, in-depth knowledge of your learning and brain processing methods, please know that formatting may not come easily at first. Thinking through something and then getting that information onto paper in a logical format is not always easy. Although you may think this way and carry out actions this way, there is a certain degree of difficulty at first. You need to work at it and tune in to how your brain "sees" so that the flow of information makes sense. As I stated earlier, this process is somewhat like reading symbols or thinking in a different language. It takes time and practice. Most students will choose a pattern and then continue to use it, maybe with slight variations at times. Others may experiment over several weeks until they find a format that works for them and feels comfortable. Please do not get discouraged. The work you put into this process now will most definitely reap rewards later. Give it time, be patient with yourself, seek help, and above all do not give up.

Begin with one concept at a time. Choose a shape for it, a descriptive phrase, and line style, and then link it to the main concept. Repeat this process until your map is complete. Continue to make associations as you go, just as you have done when creating the problem list.

Once you find a layout format that flows congruently with your learning style, you may choose to keep an open or blank copy of it for use in other projects. These open copy templates may need alterations when used in living maps, but can be used as is for static maps.

Open copy templates usually include shapes and formatting styles that are pleasing to the eye and flow according to how your brain sees and processes information (to use a Concept Map Creator, see the Student Companion Website at http://go.jblearning.com/schmehl). The benefit is that they lend themselves to a variety of uses because they are personalized, and all you will have to do is fill in the blanks. They can be used and stored on either paper or via electronic methods. Formatting will change little when used as a static map. At the same time, adding information when used as living maps will be very easy because you will use the same formatting. Any "add on" information will simply be an extension of the template.

Concept Map Formatting Options

In this section you will find several variations of **concept map formatting** based on the dinner party theme we explored earlier. Yours may look different, and that is fine. Remember, your personal learning style and hemispheric brain dominance in processing information is a huge part of how you see that the flow looks as it should to your mind's eye. You will know when it looks "right." Then, as long as it *demonstrates relationship analysis, contains all the components of a basic map setup, and is legible and uniform*, your concept map will have *value and meaning*. Value and meaning become evident as you follow the pathways of your map. If you take your finger and trace it along the shapes and lines of your map, critical thinking and relationship analysis should be evident. This is applied concept mapping theory.

However, this is not where everything ends. The end result of any map—what appears on the paper in front of you—is a direct result of your thought processes. It is a direct expression of how you took the information in and then processed, separated,

and categorized it to create that map. It becomes a window into your mind and how it problem solves. When you are finished and are studying your map, ask yourself the following questions:

- Have I been able to see and include all necessary information?
- Did I ask enough questions and demonstrate all the necessary steps needed—whether they are skill or nursing action related?
- If I did not accomplish the above two goals, why not?

This evaluation is a form of reflection and absolutely necessary in nursing practice and nursing education.

As you move beyond creating *static maps* to creating *living maps*, you will be able to use that insight to assess your critical thinking skills as they apply to complex patient situations. Concept maps are barometers of critical thinking ability. The finished product allows you to reflect on your performance and assess your ability to apply knowledge. Faculty can assess clinical competency in addition to using each map as a teaching tool at the same time. Maps are a wonderful tool for providing feedback and guiding students toward attainment of competencies and acceptable practice standards. An extremely important component in faculty evaluation of student maps is feedback. I cannot stress that enough. Student self-assessment paired with constructive and regularly provided faculty feedback serve as reinforcement of performance and competency fulfillment.

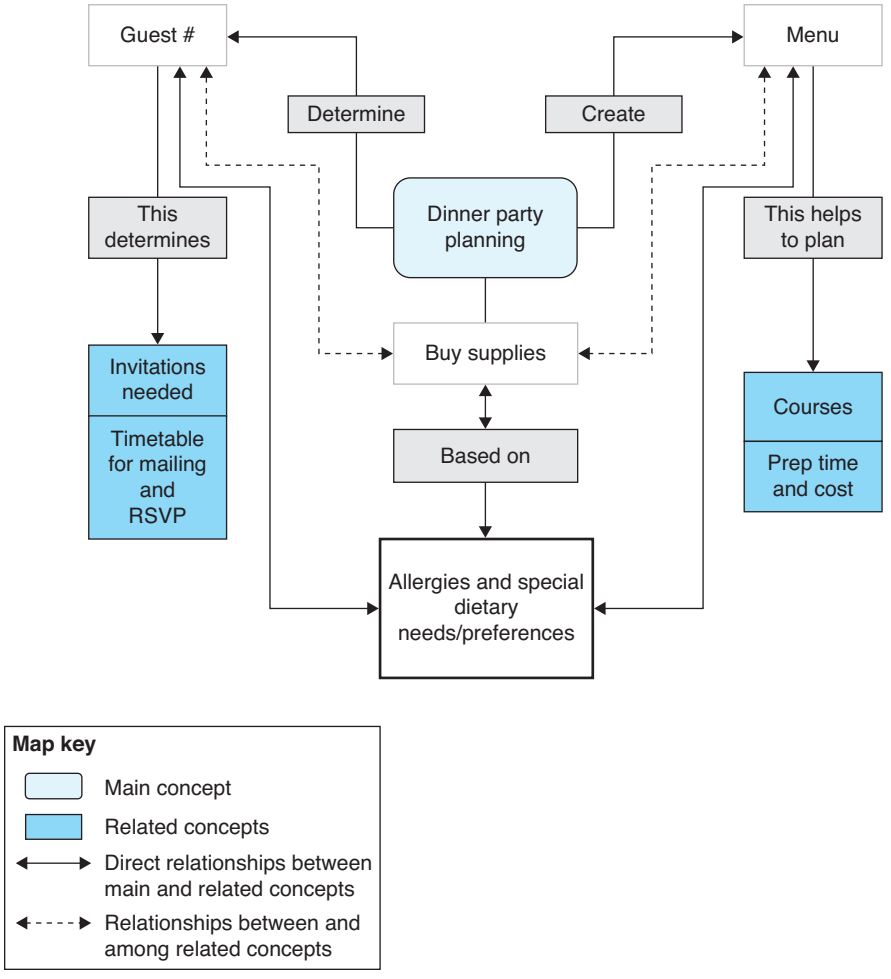
Formatting can be carried out much more smoothly when there is an awareness and application of your specific learning style. Knowing your learning style is important because it will point you in the right direction. If you like to examine pieces of information first, your map may show a main concept in the middle of the paper, surrounded by shapes with arrows pointing back to it. If you like to consider the overall concept first, your map might show a shape at the top of the page with related concepts fanning out from it. One student might set up a map with the main concept or problem set on the left side of the page with the flow of information extending out to the right. Another may choose to place the main problem/concept in the center of the paper and then group related concepts in small clusters in each corner. *I cannot reiterate enough that there is no right or wrong way in map formatting as long as concept mapping theory is evident.* To become both proficient and comfortable with this process, you need to practice, practice, practice.

As you experiment with various formatting styles, be sure to use a pencil rather than a pen or marker. Using larger sized drawing paper or a poster board will give you more room to practice. Another helpful hint is to use small pieces of paper on which you have written your concepts/lists. You will then be able to move them around to find which layout works best. You will find that although practice is key, knowing your content is essential as well.

Figure 5-4 is set up in a sort of "T" shape where the main concept is centrally located and differentiated by color and a different shape from the others. I have altered the main concept a bit to overall planning of the party and narrowed down the related concepts because of space constraints.

The three main related concepts are outlined in gray and are the launching point for additional related concepts important to the project—signified by the cyan boxes. Interrelationships between the related concepts are demonstrated through placement of the cyan boxes against each other. This demonstrates and reinforces their links to each other

Figure 5-4 Formatting example 1.



as well as the main concept. Descriptors are highlighted and connect the main focus to the related ones. Arrows show dependent relationships, and the bold black outline on the lower box stresses the importance of considering this information when planning the party. Overall, this style looks first at the main concept and then at how everything else affects it. Although it is somewhat simple, all the components of concept mapping theory are evident. This map is fairly easy to read and interpret, but the included key is helpful to reinforce the connections made.

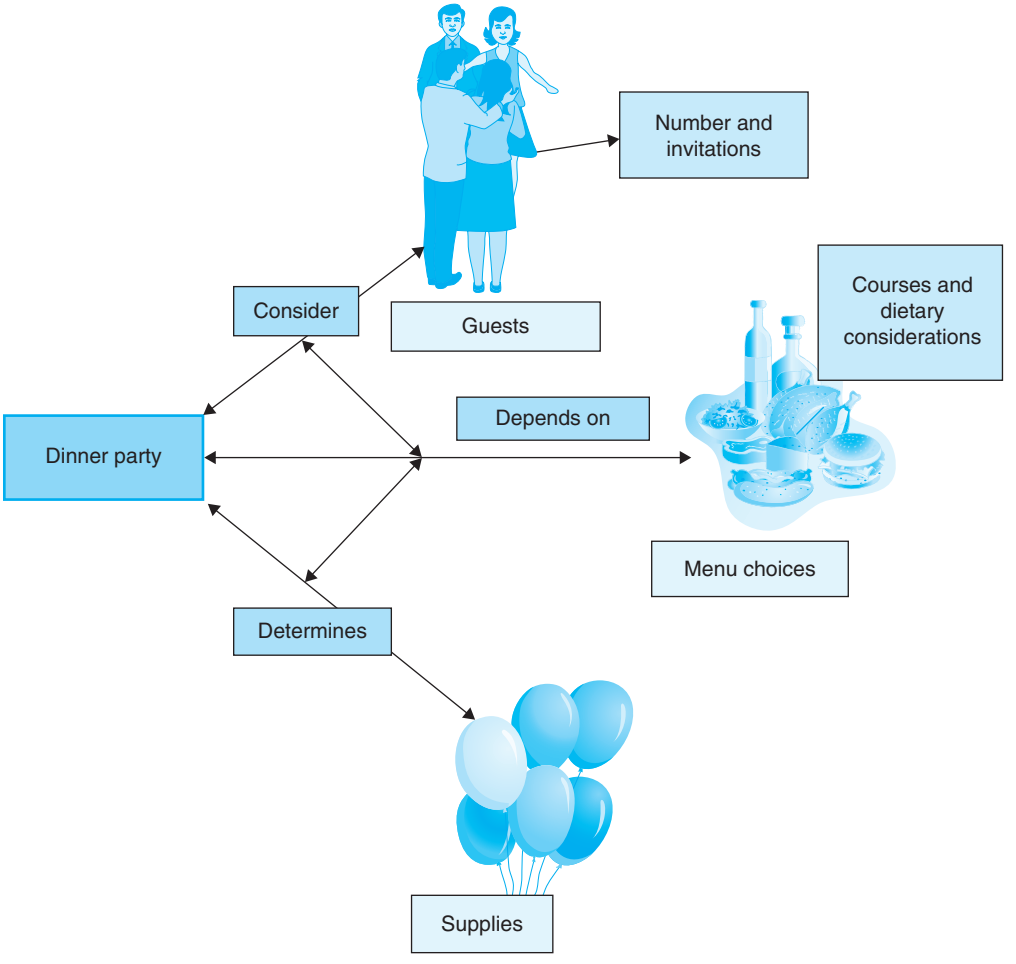
Another thing that stands out in this map is symmetry. Though symmetry is not essential to formatting, it may make the map appear balanced and emphasize comparison and contrast within the concept map. Because one goal of map formation is creating a pathway of information that flows easily, symmetry may aid that process. Using balanced, **symmetrical concept map formatting** may also be more pleasing to look at. Just remember that the content of the map is what counts. It is not supposed to be a grand work of art. Symmetrical structure in a concept map may appear as balanced clusters of

information spread out over the entire sheet of paper (often in each corner) or as divided segments of information in halves of the sheet (top and bottom or left and right). Often, this is not intentional but part of the expression of thought accompanying the learning style and brain processing method of the student. Each style has its own preference, and this will be expressed as the map takes shape. Symmetry allows for each portion of the map to be considered separately. This can assist students with analytical review and reinforce learning. It may also provide a starting point for faculty in evaluation and grading.

Figure 5-5 incorporates more visual components and a smoother format. Double-pointed arrows indicate a global interrelationship between all concepts, as do the descriptive phrases. It is also more of an action-based map. Take a moment and consider the types of descriptive phrases used in both maps. The first map has a stronger focus on planning, while this example places more emphasis on carrying out actions related to seeing the party through.

In this map, there is more of a focus on the related concepts and how they contribute to the main concept. You now begin to see how relationship analysis is accomplished in

Figure 5-5 Formatting example 2.



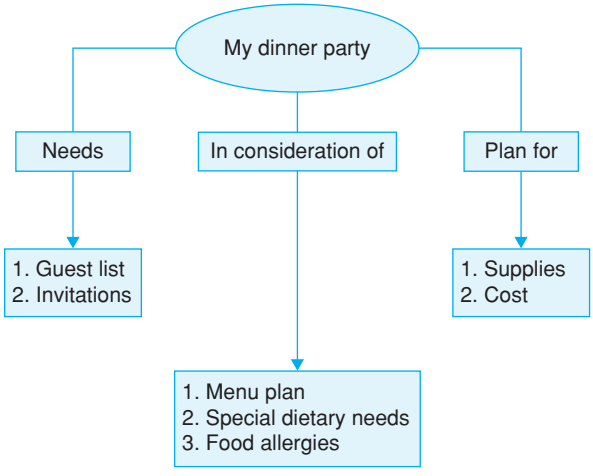
varied ways. Each of these maps is demonstrating the same thing. It is only the format that has changed. While the first map's structure appears to be very concrete and tightly structured, the second map's is looser and more open. Each map shows a starting point as well as the critical thinking and analysis allowing the endpoint to be reached. Each demonstrates the action needed to plan and host a successful dinner party. This equates to the steps of assessing, planning, implementing, and evaluating we know from the nursing process. We have assessed the needs involved in having the party. After that, we planned and implemented well-thought-out strategies. Although evaluation is not clearly demonstrated in these examples, it would occur after the host or hostess reflects on positive outcomes such as happy guests and positive comments.

There is also a much stronger visual focus with the map in Figure 5-5. Photos and clip art can have a strong impact in stimulating critical thinking for visual learners. Visualizing a situation or action can provide valuable insight into judgment and followthrough. It is important to note that if the pictures do not appear on the map a student creates, they can be mentally depicted images that aid in map creation and formatting.

For nonvisual learners, simply seeing their mental actions written on paper will accomplish the same thing. In this situation, however, that depiction may be in words, lists, or phrases. I often tell students who are having difficulty visualizing nursing actions to sit quietly and picture what they did for their patient step by step throughout the day. Then they can better create a map based on those actions. This helps all students, regardless of their learning styles. This insight then becomes integral in evaluating the knowledge application process. After you finish studying and comparing all the maps shown here, ask yourself which one looks best to you and why. Then compare that with your learning style. How does it match up?

Let's look at one more example. **Figure 5-6** is based more on a verbal learning style. It features a top-down approach, a simple format, lists, and an interconnectedness of all concepts by the *linked* boxes. The focus is the main concept and how the smaller concepts relate back to it. This is a great example of the fact that a concept map does not have to be artistically creative. This map contains all the information seen in the others

Figure 5-6 Formatting example 3.



yet is short, concise, and to the point. It still demonstrates the same thing. Please do not mistake the simplicity and directness of this map as not having insight as I spoke about earlier. Simplicity and straightforwardness does not equal shortsightedness. These characteristics reflect a different learning style and mental processing and are like a snapshot of information. This map, as the others, would need to be expanded as needed to be complete and thorough.

Both simplicity and complexity in a map are determined by learning and brain processing styles, topic, subject matter, and the particular focus of the map. This is true whether the concept map is nursing based or nonnursing based.

There are other possible formatting options, personally tailored by you according to your learning style and how your brain processes information. An essential part of discovering formatting options is practice. All of the thought and reasoning processes used in creating a concept map are methods you are already using, whether in the nursing skills lab or in the clinical setting. Now you need to practice by taking your thoughts and actions and transferring them to paper. Obtaining a glimpse of your thoughts on paper is a powerful tool for self-evaluation.

All three formatting examples shown here reinforce some important points:

1. Learning styles are evidenced in completed concept maps. This is true whether a mixture is noted or one certain type dominates.
2. Creative expression is evident and reflects on critical thinking abilities. This refers to how you are able to demonstrate the connection between concepts.
3. Individual formatting styles are partially determined by mental information processing. This statement is drawn from concept mapping theory. While formatting is influenced by learning style, mental processing of learned knowledge is necessary in structuring and formatting as well.

Evaluation and Review of Your Concept Map

Once your concept map has been completed, evaluation and review are essential. The process will become faster as you go and will play an important role in the self-reflection process. A checklist is helpful in completing this process. The example in **Figure 5-7** explains how using a checklist can help ensure that you have included all necessary information within your map. It is that final step, such as you would use prior to submitting a scholarly paper or other assignment, where you check the final product for completeness. In addition to serving as a reminder of what to include, this process also reinforces learning through repetitive analysis of your map's content.

This particular checklist is not a rubric but a list of considerations for evaluation based on concept mapping theory. Please note that most students do not fully achieve all of the listed components at first. Concept mapping is a learning process and needs to be paired with theory, experience, and nurturing of critical thinking. As a student you need to know that each map should become more detailed, complex, and complete as you proceed through each week of the semester. This is not because you lack either the knowledge or the critical thinking abilities to ace this on the first try, but because you are using your thought processes in a different way. The way you think, process, and learn have not changed. What has changed may be the number of steps you use to travel

Figure 5-7 Component checklist.

Component	Yes	No	Notes
Is my main concept/map focus shown clearly?			
Are related concepts differentiated from the main concept?			
Do my descriptive phrases show interrelationships?			
Does my map demonstrate all connections that exist?			
Is a key necessary to interpret the map?			
Is the map legible, uniform, and easy to follow?			
Is my map comprehensive?			
Did I include all necessary components?			
Did I follow all the steps?			
Is there evidence of adequate knowledge and the ability to apply it?			

from point A to point B and how you may have to reorganize those steps and thoughts to transfer them to paper. Although you may feel you are processing information totally differently, I can assure you that this is not the case.

Now it is time to consider all we have learned so far to construct a map from a nursing example. We will use a relatively simple example. More examples will follow in subsequent chapters. Consider the following scenario: *You are getting your elderly female patient out of bed for the first time following a bowel resection the day before*. As we complete each step, please use the preceding pages to test yourself to see if you remember how to proceed. There may be a few more steps than the number listed earlier because we need to break things down a bit to thoroughly address all components.

Step 1

Our first step is to identify the main consideration or topic for our map. Although several things stand out with this patient, it is the act of getting out of bed that is our main focus. Because this patient is a postoperative patient, our *main topic*, concern, or focus can be labeled: *assisting the fresh postoperative patient out of bed*. Now we are ready to formulate the problem list.

Step 2

Our second step is to start a list and then populate it. We have an activity order to get the patient out of bed. We already have a heading. Now we need to think about all the other related considerations that have some sort of relationship to this action. Take a moment to think about this, and then look at the list I have created. If you run out of ideas, use the mini checklist in **Figure 5-8** to guide you. The mini checklist features

Figure 5-8 Mini checklist.

Component	Thought Processes/Rationales
Critical thinking	What particular factors affect this action based on: • Patient history • Safety • Communication • Related factors
Relationship analysis	How do all of these considerations affect each other and enable the action to be completed?
Application	Use all of the above thought processes and rationales to formulate a plan and complete this task. This determines specific actions listed in your map and also considers outcomes.

main components you would include, based on concept mapping theory. As stated earlier, it may help you to think about a patient you assisted out of bed in the past. What things did you think about before you completed that task? What information did you have to know? All of these things become the *related concept* listings. This step is also where *relationship analysis* should appear. Related concepts cannot be considered without a knowledge base that allows for comparison and recognition of connections that exist between actions and the factors that must enter into decision making before an action is carried out. In addition to the mini checklist, overall general categories to consider and that will assist you are:

- Safety
- Communication
- The impact of the history of present illness (HPI) and personal medical history (PMH)
- Any diagnosis or information related to patient ambulation

This checklist may be used with either static or living maps. It may need to be revised somewhat depending upon the focus of the map, particular patient considerations, the care setting, and the action to be performed. What may change is the section on thought processes and rationales. The components will always remain the same, because they embody concept mapping theory. Using this mini checklist, which can be tailored to a specific patient or situation, with the component checklist will assist you in formulating a complete and thorough problem list and concept map. In a moment we will use the mini checklist to evaluate our problem list. At this point, you should be able to determine that constructing a concept map requires use of concept mapping theory, use of all necessary components, and a knowledge base from which to draw information for analysis. Applying concept mapping theory also allows comparison and contrast between old and new knowledge in a way that reinforces the application of it.

Problem List

Main Concept: Assist the fresh postoperative patient out of bed.
Related Concepts: Considerations relative to completing this task include:

- Patient history related to any mobility/ambulatory concerns
  - Diseases/conditions causing mobility/ambulatory dysfunction
  - Sensory deficits
  - Past history of falls/PMH
  - History of syncope
  - Mental status and ability to understand teaching
- Current considerations
  - Abnormal lab tests contributing to syncope
  - Medication effects leading to dizziness/syncope
  - Pain control
  - Need for any assistive devices/personnel
  - Incisional support

Let's take a moment to analyze the list. In consideration of critical thinking, we know safety is of primary concern. We need to have knowledge of all factors that might contribute to any adverse safety outcomes. Our actions within the map will demonstrate this. If we take a closer look at our list to determine interrelationships, we see that patient history and all of its components directly relate back to our task at hand. Failure to consider any one of those items may result in undesired outcomes. Perhaps our patient has a history of ambulatory dysfunction, a fact that greatly impacts the action of assisting her out of bed.

Communication is an essential part of this task because we need the patient's cooperation. Mental status and any sensory deficits relate to our main task and goal of getting this patient safely out of bed. The presence of any deficits may mean the task will take longer and require more education as well as more reinforcement of it to ensure understanding. Splinting the incision will aid in controlling some of her pain and prevent wound dehiscence. The patient's ability to comprehend and follow directions is integral to outcomes.

The related factors under the current considerations have a relationship with critical thinking and relationship analysis, as well as application. If we are not able to recognize, consider, and research these, there is a critical thinking deficit. Pain control is essential before we begin, but we must also recognize side effects such as dizziness. Major surgery usually means blood loss equivalent to at least a half unit of blood (approximately 200 mL) or possibly more. Knowledge of hemoglobin and hematocrit levels would indicate whether the patient may experience orthostatic hypotension, which increases her fall risk. Finally, all of this translates into application, because that is the culmination of all of the considerations, relationships, and actions we have recognized. Does this all make sense? Can you recognize the nursing process within this scenario?

Our thought processes here have demonstrated both concept mapping theory knowledge and the steps of the nursing process. We have identified where each component of concept mapping theory enters into our decision making. We have also assessed our patient's needs, diagnosed patient deficits, and planned actions to complete our task.

Implementation will be the act of transferring the patient from bed to chair, and evaluation can be added to our maps as a section on how this patient tolerated the procedure. Although I have emphasized how the concept map itself will highlight your critical thinking skills, you can and should easily see that the process starts with the related concept list. If you are unable to recognize every essential concept that affects or has a relationship with the main concept, you may need to take another look at how you critically think. The same is true if you lack insight into interrelationships between items on the related concepts list as well as those that occur between that list and the main concept. Making associative learning an active process—a learning and comprehension focus based on interrelationships—will assist you in achieving goals of enhanced critical thinking.

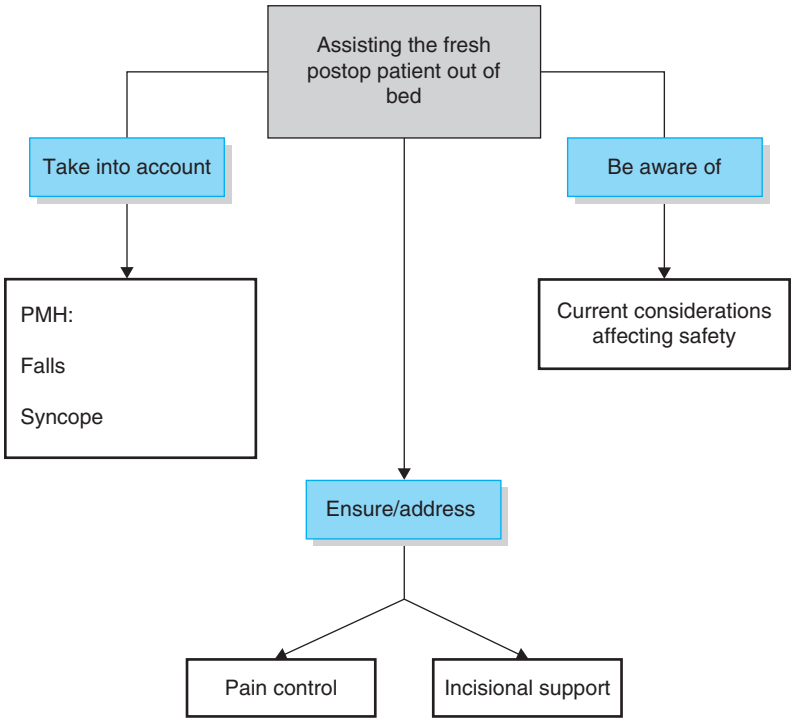
Step 3

In this step, we are ready to choose shapes and begin formatting our map. But before we do this, we have to determine how we want to identify and label the related concepts. For this example, the related concepts' shapes will contain the necessary nursing actions relative to getting the patient out of bed. Looking at the list we have created, it is evident that there are *primary* or main concerns and *secondary* concerns. A very important consideration in this step is deciding what a prime area of focus is and what then extends off of or stems from that primary consideration, which then becomes the secondary consideration. This is what we mean by taking actions out far enough on a concept map. That process takes into consideration all steps needed to meet all requirements of mapping theory, allowing for outcomes. This is one of the steps in relationship analysis—being able to compare and contrast through isolating and examining individual and grouped concepts. Take a few minutes to think about this and give it a try. Then look at the following example.

Once you have done that, it is time to choose shapes for the main and related concepts. Choose any shapes you would like. Enter the main concept. Then, before adding the connecting lines, decide on the formatting you will use. Use large paper and a pencil with an eraser. Take your time and experiment with formats you like. Remember that those you like, that appear very pleasing to your eye, will be aligned with your learning style and mental processing methods. Draw, erase, and reformat as needed until it looks the way you want it. Once you have completed that task, add lines and linking phrases for this first section. (You can also use a Concept Map Creator from the Student Companion Website at http://go.jblearning.com/schmehl.)

Figure 5-9 is an example of the first steps utilized in creating a concept map for our patient. Color differentiates the main concept from our primary related concepts inside the heavily lined boxes. These have been identified as having a primary focus because they will guide our actions. Think back to the dinner party example. Although we had an entire list of considerations, we separated out those things that were necessary to focus on that would then include all of the others. The first sets are areas and actions that have to be satisfied before we can move forward. And so it is in this example. Everything we begin with considers factors related to safety, communication, patient history, and other related factors, as we identified earlier. Each primary related concept extends from the main concept as identified by the arrows, and the cyan linking phrase boxes explain their relationship back to the main concept. You can easily see that each linking phrase speaks to an action. Each action can be equated to a step in the nursing process. The blocks containing information on PMH and current considerations would be part of assessment,

Figure 5-9 Example of the first steps utilized in creating a concept map.



diagnosis, and planning. The boxes containing information on pain and incisional support are the implementation.

Step 4

Our next step is to complete the map by adding the secondary related concepts, along with their specific linking phrases. Use color differentiation if necessary and be sure to include a key if needed. This will include any remaining items from our list not previously addressed. Again, they are our nursing actions—things we will specifically need to perform to ensure positive outcomes related to our goal of getting the patient out of bed. Sources for obtaining some of this information may be:

- The patient's verbal statements or health history
- The nursing database
- The chart itself
- The patient Kardex
- Family members
- Vital sign graphs
- The medication administration record (MAR)

If you are not familiar with where to find valuable patient information on the chart, please take time to review this. In some institutions hard copy charts have been replaced completely by electronic charts. These may display information in a different format that makes it difficult to find and/or access information. Other institutions may have both types. Request an orientation period where you have time to research both types. You cannot have full knowledge of your patient without this information.

The history and physical (H&P) section will contain the admitting diagnosis, HPI, and PMH, as well as any past surgical history, social history, and medication listings. Psychosocial, cultural, and any substance abuse history would also be found there, and including this information in your plan is integral to providing holistic care. The nursing database will have a health history, the admission physical assessment, and religious preferences.

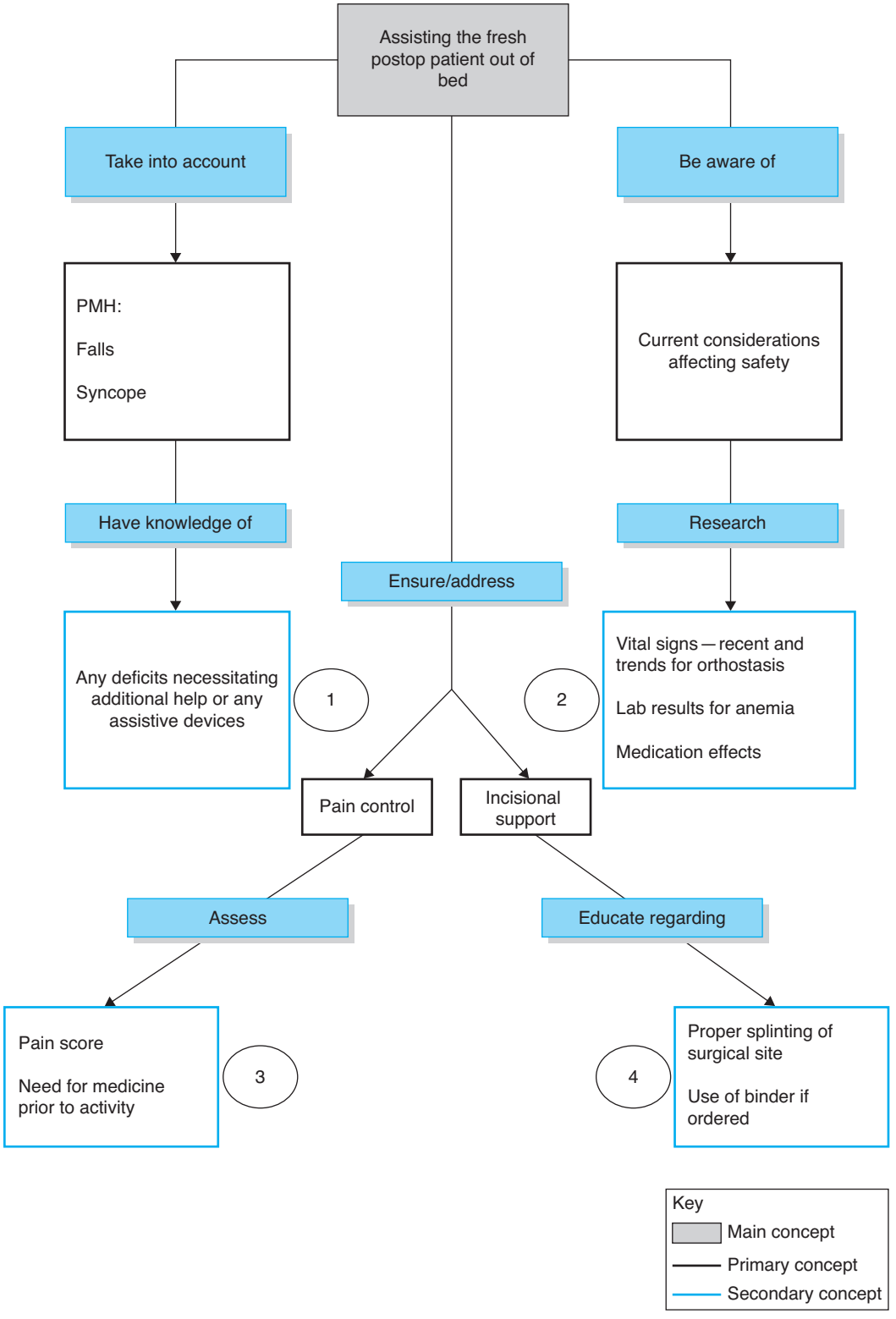
Step 5

Now that our map is complete, we have to review it for clarity, symmetry, all components of concept mapping theory, and information flow (see **Figure 5-10**). You may recall that your map may have a different formatting. As long as it meets all the criteria we have been discussing, that is fine. No two maps are or have to be exactly alike. The example map clearly differentiates between the main concept and the related ones. If we had more room, we could be even more specific. Let's examine each of the numbered boxes in Figure 5-10 and think about what else we could add:

1. This box addresses deficits. Things to include here would be deficits present post-cerebrovascular accident (CVA) such as a flaccid extremity, a limb with a fracture, an amputated limb, blindness, a neuromuscular disease, or generalized weakness. Any of these are important to outcomes when it comes to tolerance of the activity and its duration. Include any assistance and the number needed, as well as any assistive devices used. An inclusion and awareness of these indicate strong critical thinking skills. Getting a patient out of bed seems simple, but many individual factors must be considered.
2. In this section, other actions to be included would be the need for dangling the patient to assess for tolerance when the blood pressure is orthostatic. Identify specific lab results such as hemoglobin and hematocrit that contribute to the preceding facts. Because this affects oxygenation, including measurements such as oxygen saturation and any respiratory symptoms that occur would be an excellent idea. Any medication effects resulting in dizziness would be noted. Perhaps the medication would need to be held until the patient is returned to bed.
3. Pain must be assessed before trying to move the patient. Things will proceed much more smoothly when the patient can tolerate it. Adding a box for the medication name, dose, and effectiveness would address this. In addition, a pain score before, during, and after would indicate pain medication effectiveness.
4. I would include teaching in this section, as well as return demonstration. Also valuable would be a wound assessment, both before and after the activity.

The last element you could add would be additional lines showing the interrelationships between data groupings. For example, adding dashed lines connecting syncope with

Figure 5-10 **Completed concept map.**



medications and abnormal labs would show that syncope has occurred secondary to those findings.

You should now begin to see the type and volume of information needed when determining nursing actions as well as their sources. Always strive to know as much as possible about your patient. Have adequate knowledge of available resources and how to quickly access them. As I stated earlier, nothing is static. This process is a great example of that statement. As you proceed, you are applying but also continuing to learn. In fact, everything you just did is application. Now, the last thing is to use the checklist provided in Figure 5-7 to review your map.

Summary

In summary, a concept map can be as simple or complex as you need it to be. Simplicity or complexity is often affected by the map's purpose but is also an indicator of your critical thinking skills. For instance, in the creation of a skill-related static map, a relatively simple style can be utilized because the relationships are simpler and the list of related concepts may be smaller. A larger, more complex living map related to nursing care, however, or a more involved skill, will be more complex because there are more concepts to consider and a greater degree of in-depth critical thinking skills is required. *A concept map is a direct expression of your critical thinking, problem solving, and clinical judgment skills.*

Following specific steps for problem list and concept map formatting, as well as applying concept mapping theory and use of basic or advanced components, allows you to blend past and present theory for the most effective and meaningful learning. This entire process also impacts and is impacted by the nursing process, standards of care, and evidence-based practice. Concept mapping is a powerful tool for blending and demonstrating all of these practice-defining nursing standards.

We have used nonnursing examples within this chapter, as well as nursing based ones. It is a wonderful way to compare and contrast knowledge. You can continue to use this idea as you gain more understanding about concept maps and their use within nursing education. Examples such as these will allow you to envision how concepts affect each other and how those effects relate to decision making. The scenarios you choose can be very simple and involve few actions and conceptual interrelationships or be a bit more expansive. The important thing is that you are thinking in terms of associations. This type of practice also reinforces how you research and extract information sources. Implementing these concepts with a nonnursing example makes it much easier to then subsequently apply it in nursing practice.

We have also discussed terms such as *symmetry* and *clarity* in concept map formatting. Style may vary among individuals, but being able to demonstrate key concepts clearly is a must for effective learning, interpretation, and reflection purposes.

Critical Thinking Questions and Activities

1. Discuss the similarities and differences in using nonnursing- and nursing-based examples to understand concept mapping theory and problem list formulation.
2. Use the following nonnursing example to answer questions related to concept mapping:

You are planning to clean out your car and wash it.

a. Create a problem list identifying the main focus.
b. Identify the primary and secondary components.
c. Create a concept map demonstrating your thinking related to the supplies needed and the rationale for choosing them.

3. Create a problem list and concept map detailing nursing actions for a patient with a large volume IV infusion. In addition:
   a. Discuss your rationales for the primary and secondary concepts you identified.
   b. Compare your concept map and problem list with your classmates' maps and lists.
4. Discuss both the differences and similarities between nonnursing- and nursing-based concept maps in relation to the problem list and construction.
5. Discuss your thought process when completing the following:
   a. Identifying problems for the problem list
   b. Thinking about concept map construction
   c. How you make associations, connections, and links
6. Discuss and share ideas for other ways to think about the term *problem list*. What additional terms might be applicable dependent upon the specific patient care situation?

Case Studies

Directions: Read through each case study and answer the questions using the chapter material provided.

1. Katie has been asked to create a concept map focused on a simple nonnursing example to help her and her classmates to understand concept map construction. She decides on steps to consider when buying a new car.
   a. How should Katie begin to create this concept map?
   b. What types of things will make up the problem list?
   c. What criteria are used to differentiate between main and related problems/concerns?
2. Katie has constructed her concept map like a wheel with spokes. She has placed the phrase, "buying a new car," in the center and all related concepts spreading out from that. How does this correlate with Katie's learning and mental processing style?
3. Todd is creating a concept map for one of his patient's main problems: surgical wound care. He is having difficulty demonstrating information flow and reasoning related to the actions he has carried out. His goal is to show his nursing actions in response to wound assessment, redressing, and care management.
   a. How does concept map construction relate to this?
   b. How do design and the use of descriptive phrases help with the flow of information and decision making?

   c. How can both design and construction reflect critical thinking?
   d. What are some other tools and techniques Todd could use to help explain his concept map and make it easier to follow and interpret?

4. Lucy has asked how the use of color can best be used to emphasize or highlight a feature of her concept map.
   a. What is the best answer to this question?
   b. Help Lucy to understand this through providing her with some basic rules for using color within a concept map.
   c. How can color and symmetry be used to make a concept map's purpose clear?
   d. How does the use of line types affect interpretation?

For a full suite of assignments and additional learning activities, use the access code located in the front of your book to visit this exclusive website: **http://go.jblearning.com/schmehl**. If you do not have an access code, you can obtain one at the site.

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