### Appendix A

### 3CA MANUAL

What is 3CAM/3CA?

    3CA is a model of mastery learning in the classroom, and an acronym for Concept Maps, Critical Thinking, Collaboration, Assessment and Mastery. The definition for mastery learning is that everyone in this class can master the content of this class. If you complete all the assignments in this class in a responsible way you will achieve mastery learning and an “A”. This class is different, in most classes there are those who are successful and those who are not. In this class all can be successful and earn an “A” if you put forth the necessary effort.

    The 3CA model is a formative model of skill based mastery learning and assessment that produces high levels of academic achievement and empowers you with a feeling of fulfillment and fairness.  The model includes learning the skills of: concept maps, critical thinking, prioritization (evaluation), social and cognitive synthesis, group evaluation (prioritization), and the application of multiple reasoning items to assess the facts, concepts and knowledge of the content of the course. Multiple reasoning items created by and collected from teams of students are posted on Moodle and are available for all to see and used in their assessment. Each step toward mastery is observable, transparent, and open to public view by the students.

\*It will take you two sessions to get used to the procedures in this class. After that you will be comfortable and at ease with the processes. Students in previous semesters have found the procedures difficult at the beginning and super easy after a few sessions.

It is necessary to mention that the first two weeks are allocated for training. We will reduce the assignments so that everything can be accomplished in class. For the first two sessions, we only cover one chapter. After the training we will cover one chapter per week.

Purpose of the Manual:

   The purpose of the manual is to provide you with a description of the procedures necessary for your learning, success and mastery in this classroom. There are two major phases in the 3CAM model: the individual homework phase and the collaborative classroom phase.

    The individual homework phase is necessary to be completed and to prepare you to participate in the collaborative classroom phase. The individual homework phase includes: 1) the creation of digital concept maps, 2) the application of critical thinking questions to the maps, 3) the prioritization of the concepts-critical thinking items, and 4) the creation of multiple reasoning items.

      The collaborative classroom phase prepares you for mastery learning in this classroom. It includes:  1) learning how to collaborate (social synthesis skills), 2) to share the concept maps and create a new collaborative concept map (cognitive synthesis), 3) prioritization of concept-questions, 4) creation of multiple reasoning questions, and 5) self and peer assessment.

Now, we will be discussing each and every step in the individual homework phase and in the classroom collaborative phase of the model.

Note: The students test items are reviewed weekly, modified and changed slightly if necessary by the instructor to improve accuracy, ease of understanding and clarity between the stem and the multiple reasoning alternatives.

question

     In the first section of this manual, we will provide you with definitions of the Wh, critical thinking questions because you will be using these questions at each step of the model. These definitions will be followed by descriptions of the individual and collaborative phases of the model.

    In the second section of the manual, you will see some guidelines for the generation of the questions.

Definition of WH Critical thinking questions/strategies:

|  |  |
| --- | --- |
| “What questions” | have as their target a single event. The focus upon understanding a single event which is the focus of inquiry and the nature of being. |
| “Why questions” | are of the form what is the relation between two events,  E1 and E2...? This is the familiar question of the causal relations between two events. The causal relations is central to much of scientific research and the search for deductive relations between between events. |
| “How questions” | take the form of what is the relation between a series of events, E1, E2, E3 and En.  The search for the relations between a series of events is an exercise in inductive reasoning and a  hallmark of procedural knowledge and goal directed action. Following a sequence of events: E1, E2, E3, and En, the goal is to understand if the E1, E2, E3 are necessary and/or sufficient to bring about En. |
| “When questions” | invite a procedural answer.  What is the relation between E1, E2, E3 and En when each event is a period in time? When questions have the same logical form as how questions, historians and storytellers are concerned with when an event took place. The simultaneous use of what and when are ways of deepening our understanding of historical events. |
| “Who questions” | are questions about human beings and human perspectives applied to explanations of events. Who questions can be answered with: I, you, (he, she, or it), we and they. Here the concern is with human actions and explaining the actions that led to an event, En. Consider I, you, he, she, it, we and they as different events that could bring about En. |
| “Where questions” | is deceptively complex because it is context and includes what, who, why, when and how. A picture of the context is a picture of the whole and is the background for making judgments and taking actions. A picture does not have significance by itself; it has significance in application. We come to understand things by forming pictures and then using them to interpret reality (Ackermann,1988) . |

Individual Homework Phase

Individual Homework Phase: You are expected to complete the following homeworks each week prior to coming to class.

Step 1: Creation of concept maps.

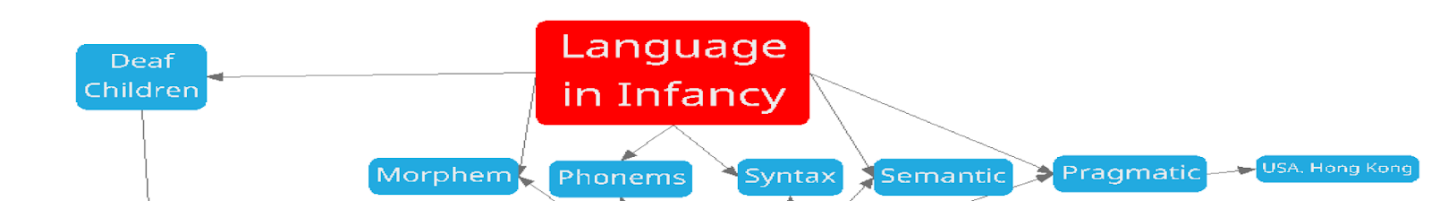
What is a concept? Concepts are the key terms, words, or ideas that are a part of each chapter in our textbook, “Understanding Human Development” . Each week we will complete one chapter in the text and use the concepts in that chapter as the basis of learning for the week. Each week you will identify the key concepts that are essential to understanding the chapter. You will use at least 20 of the key terms at the end of each chapter plus at least five more terms of your choosing.

The creation of concept maps is the first step in the process. You are responsible for learning how to generate the concept maps.

1: Construction of Digital Creation of concept maps, You click on the following address: [https://www.mindmup.com](https://www.mindmup.com/):

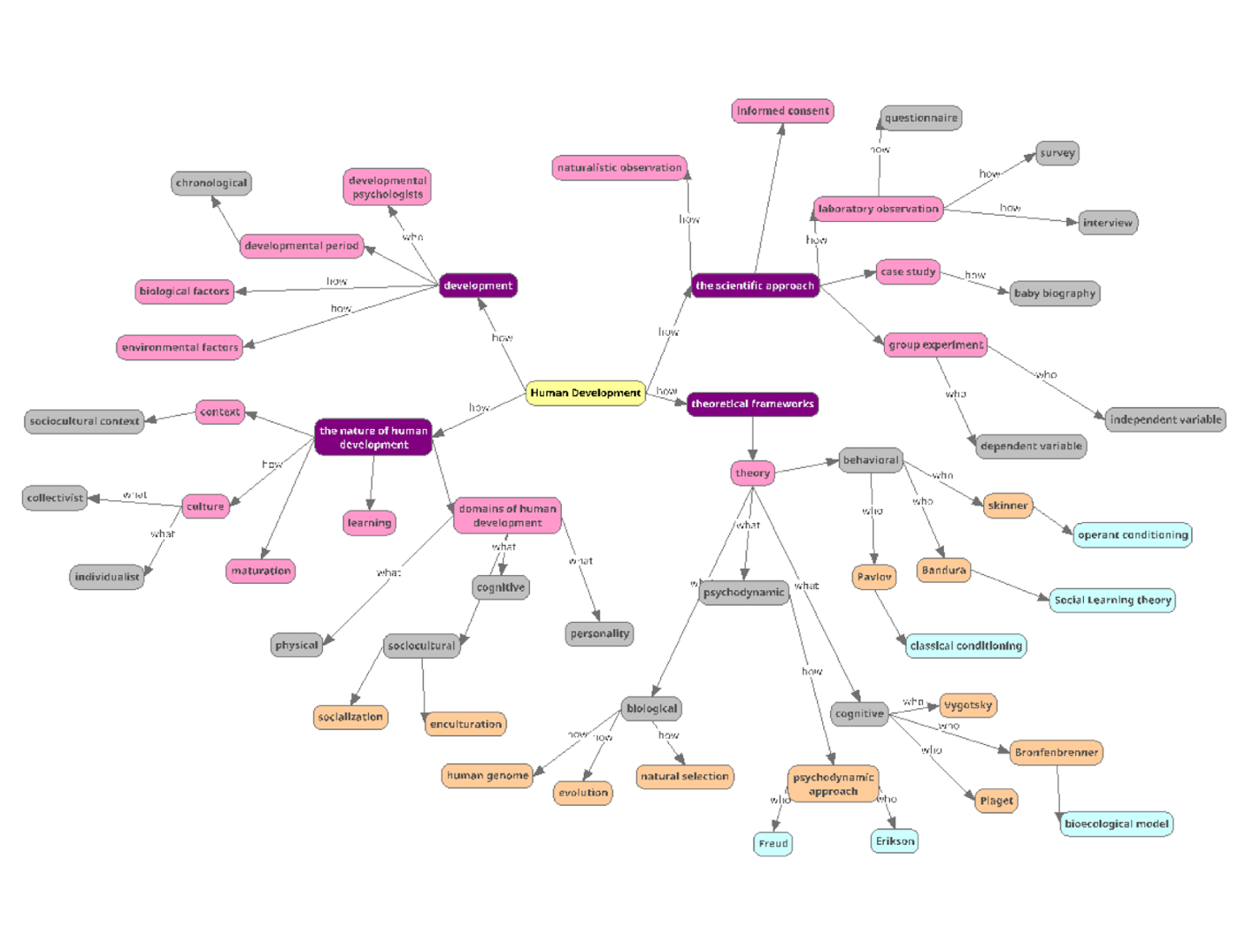
Click on the third option “tutorials” on the upper left side to learn how to generate a map.

Sample of concept map with one concept (Yours should have 20 concepts at least)



Step 2: Applying critical thinking

     Students apply the critical questions of “why, when, what, where, how, and who” to the concept map they have created. You will use the arrows to connect the concepts in your maps. Each of the arrows will be labeled using the critical thinking questions. Choosing which of the six critical thinking questions to apply to the concepts, is a matter of your own thinking and choosing.

   The result is that each student comes to class with a digital concept map of the assigned reading. (Please see the sample completed version of the map )      

Step 3:  Prioritization

    Students prioritize the concepts in their maps: The concepts (concept-critical thinking items) are ordered from the most to least important. The reason for the prioritization is to give some ideas about the next step in the process which is the creation of the Multiple Reasoning Items. Sample of prioritized list:

Key Concepts:

1.      Human development

2.      Development

3.      Biological factors

4.      Environmental factors

5.      Developmental psychologists

6.      Nature of human development

7.      Culture

8.      Collectivist

9.      Individualist

10.   Human development domains

11.   Theoretical frameworks

12.   Theory

13.   Psychodynamic

14.   Biological

15.   Human genome

16.   Cognitive

17.   Behavioral

18.   Scientific approach

19.   Laboratory observation

20.   Naturalistic observation

Step 4:  Creation of the questions

      Students will create the multiple reasoning items that will be the basis of their assessment.

Step 5:  Post the 1)concept maps with 2)critical thinking questions, 3)the prioritized list of concepts, and 4) the multiple reasoning to Moodle.

Notes for the submissions of your home assignments:

1-  On moodle, there is a place for the submission of the individual maps, individual prioritization list and the individual generated questions. Please put all of the 3 homework assignments in one package and post them on Moodle.

PHASE TWO:  THE COLLABORATIVE CLASSROOM PHASE OF THE 3CAM MODEL

The steps in this phase are the same as those in the individual phase; the only difference is that you are collaborating and synthesizing your ideas with your partner.

Step 1:  Learning to collaborate: The concepts of social synthesis and collaboration are used interchangeably. Students come together in teams and exchange concept maps. Students are randomly assigned to a group of 6, and they work together in three pairs.  The group selects a leader and for each session there is a different leader. The leader assigns each pair of students to a team.

Step 2  (Cognitive Synthesis):

Cognitive synthesis includes the exchange process that involves the following steps:  identifying the differences, identifying the commonalities.

 a. Each pair exchanges their concept maps. They give feedback to each other, criticize, agree, disagree and identify gaps in their knowledge. While they are discussing and giving feedback to each other they apply critical thinking cues (What, How, Why, When, Where, Who).

b. Each pair of students synthesize and combine the individual maps to generate a new collaborative map of the chapter. The result of this stage is having a new collaborative map . Again the new collaborative map will be created at the “Mindmup”.:[https://www.mindmup.com](https://www.mindmup.com/)

2. In pair- Prioritization

This step includes prioritizing the concepts-questions identified in the collaborative concept maps and ranking concepts from the most important to the least important. The connections between the concepts are the critical thinking strategies.

Step 3: In pair- Generation of multiple reasoning items

At this stage each individual creates 3 multiple reasoning questions and they shares them with their partner. Each individual presents their questions, they critique each others questions and revise their questions. The pairs of students share their generated multiple reasoning items and ask each other about the reasons for the response to each question. They assess and give feedback to each other.

Step 4: In group- Assessment

      So far,each group of six students, create 18 multiple reasoning items with each pair of students creating six questions;Now,The whole group comes together and reviews the items created in the group.You answer each other’s question, criticize and revise the items as a group.At this stage the group leader is responsible to have the group to follow the instructions and guidelines in the Manual.  Each pair presents their questions to the larger group, and asks the group to critique their items and discuss their answers. The group members give feedback to each other and revise their items. At this point you decide which 9 multiple reasoning items are better to choose and submit to Moodle. After group discussion and sharing all the questions, the group reduces the 18 items to 9 .(Important note: These are the questions that will be used in the mid-term and final exams)

Group leaders’ responsibilities: At this point the group leaders get into action. They put all the typed questions/answers by the pairs into a single document and post them to the Moodle  where the collaborative maps and questions are available for everyone in the class. (Important Note: The group leaders also fill out “the group report form” about the group discussion to the TA (ezandvakili@umass.edu) within 48 hours after the class meets.

Notes regarding the submission of the assignments:

1- On moodle, there is a place for the submission of the collaborative maps and prioritized lists and all should be submitted at one time there.Do not forget to include your names (Since you are working in pairs, there should be two names and the names should be included both on the documents and on moodle).It does not matter which member of the pair is submitting the documents, because both names are included.

2- On moodle, there is also a place for the submission of the 9 questions by the group leader.Do not forget to include the names of the group members on the document.

Here is the form for group leader:

### Appendix B

### PRACTICUM STAGES

**Practicum Stages (Presented as PowerPoint in class)**

1- Find your group members (1 min)

Raise your hand and Show the number of your group to the class, so you can find each other easily

2- Choose a group leader (1 min)

For each session, you will choose a person to be the leader of your group, so each group member will have only one opportunity to be the group leader.

Being a group leader is an obligation and one of the most important parts of group activity.

Group leader should solve the problems of the group. For example: Pairing up the students for sharing their maps.

**Synthesis**

3- Social synthesis (Chose a partner in your group to share your concept maps) (1 min)

Note: You should choose a different partner for each session, since we want you to make improvement in your communicative skills and learn new things from each other.

All of you have different talents and knowledge so let`s learn from each other

4- Cognitive synthesis: Share your individual concept maps (feedback provision) (10 min)

At this stage, you share and explain about your individual map that you generated at home. You talk about the reasons and logic behind not only the concepts you chose to use in your maps but also about the connections among them. You discover the gaps in each other’s map which is the picture of your thinking.

7- Generate your collaborative conceptual map (handwritten in the class- digital at home)  
(15 min)

Note: At this stage, you can use all available resources to generate a great conceptual map.

What are the resources:

Critical thinking tools (WH questions)

Your individual maps

Power-point from the lecture (We post it on Moodle after each lecture session)

Textbook

8- Generate a list of the concepts from the most important to least important ones (10 min)

Note: You need the list to construct your multiple-choice items. (Tell your partner why you think the concepts are important)

9- Generate Your questions based on the list and the map that you have (20 min)

In each group, each individual generates 2 questions using (what, when, where, why, who and how),1 compound, 1” what if”

Each pair shares the questions and assess each other. Please make suggestions for revisions.

Each pair generates a compound(mixed) question.

The group members get back together and share their questions, revise them and assess each other.

Each group generate one “what-if” question.

You need to discuss and think critically to generate this question.

Notes for creating questions

Since you are equipped with critical thinking tools(why,when,how,where,why,who) you can generate great questions which are appropriate and can be used in your exams)

Note 2: Please follow the guidelines for test construction. (checking for grammar, spelling and do any necessary revision,)

10- Assessing each other (5 min) (each pair 3 min to ask the questions from the group)

Each pair will ask the group to reply to their items and discuss their answers.

You can give feedback to each other and revise each other items.

Don`t forget that most of the score for each session will be given to your group activity.

10- Group leaders get into action (5 min)

Each individual will post the questions and each pair will post the collaborative map.

She/he should type the 2 items (mixed question and what if question) in one document (Microsoft word) and post it on Moodle, so the whole class will have access to generated items that will be modified and used for both mid-term and final exams. (Don’t forget to put on the paper the number or name of your group

 Group leader should send the report to TA.

Formatting of the questions

Font Size: 12

Font: Times New Roman

Spacing: 2

Capital Letters should be used for alternatives and the answer should be written after the alternatives:

A child typically has a vocabulary of about 50 words at which of the following ages?

A. 6 months

B. 12 months

C. 18 months

D.  24 months

Answer:  C

Review of the questions

Please ask and answer the questions from chapter 7

11- Housekeeping (2 min)

Arrange the chairs of your group in row.

12- Take good care of yourself  
(1000000000000000000000000000000000010000000000000000 min)