# A Dynamic Model:
# Integrating Support Services and Classroom Instruction

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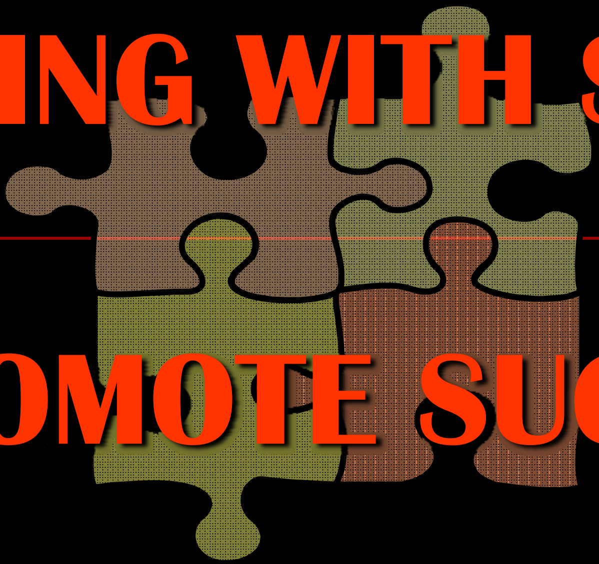
# CONNECTING WITH STUDENTS

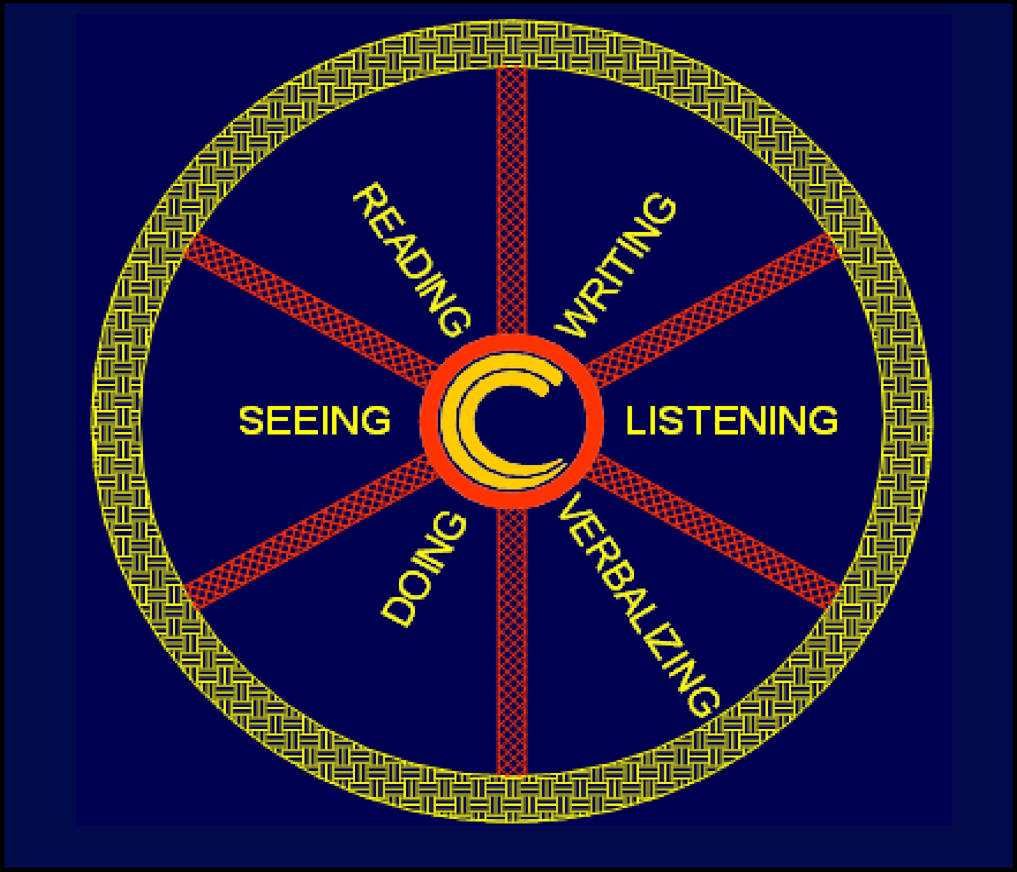


# TO PROMOTE SUCCESS

What are the missing pieces to this puzzle?

# Tools for Success

STUDY SKILLS - LEARNING WHEEL

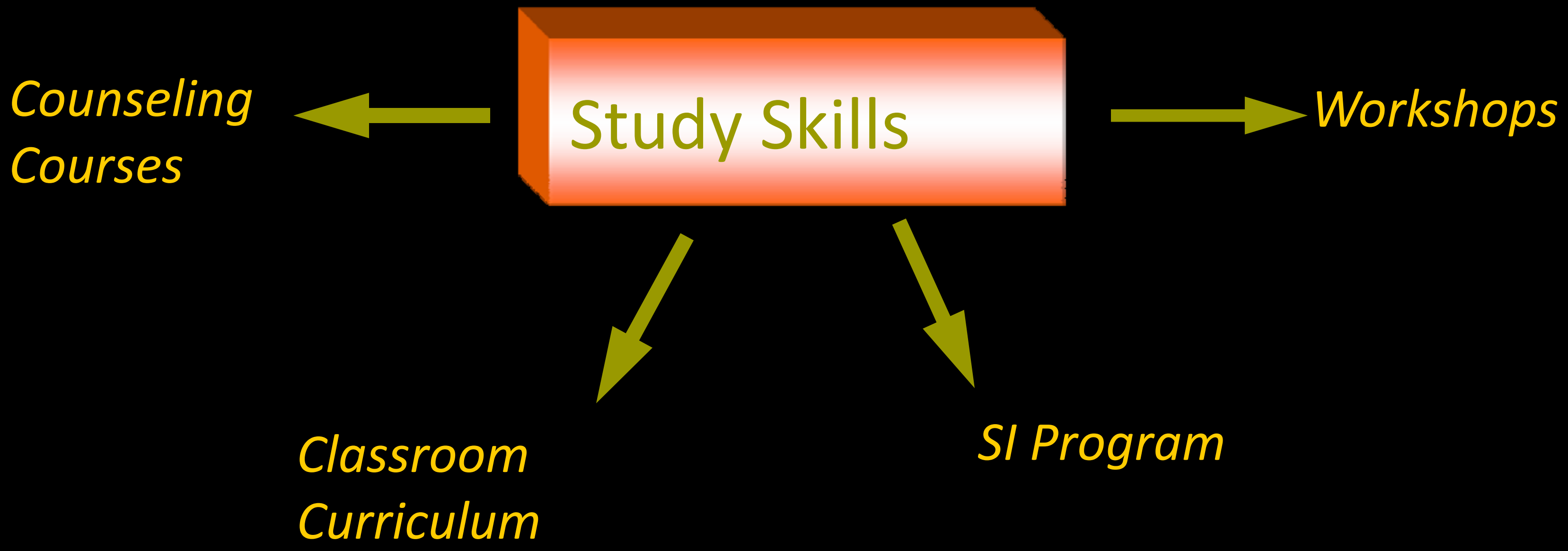


# PIECES OF THE PUZZLE

1. PROVIDING LINKED OR COHORT CLASSES
2. USING THE ‘*TOOLS FOR SUCCESS*’ IN THE CLASSROOM
3. COORDINATING WITH SUPPORT SERVICES
4. UNDERSTANDING THE BASIC SKILLS STUDENT’S ‘*TRANSITION TO ALGEBRA*’
5. CONNECTING WITH STUDENTS IN THE CLASSROOM

# Linked/Cohort Classes

Learning Community/ Freshmen Experience in the Classroom/Hybrid




Learning Communities/Freshmen Experience

# Tools for Success

Supplemental Instruction in the Classroom/Hybrid

1) *During Lecture -Tutor observes instructor and students*
2) Between topics – *Students practice their skills with instructor and tutor assistance*
3) Concept Check – *Quick check-up and review results*
4) Study Group – Optional or Link Classes

# Tools for Success

Study Skills in Classroom/Hybrid

- *Time Management*
  - *Daily planner*
- *Chapter Organizer*
  - *Topic, procedure, and example*
- *The Learning Cycle*
  - *Reading* ⟶ *Writing* ⟶ *Listening* ⟶ ⟶ *Verbalizing* ⟶ *Seeing* ⟶ *Reading*

# Tools for Success

## Study Skills in Classroom/Hybrid

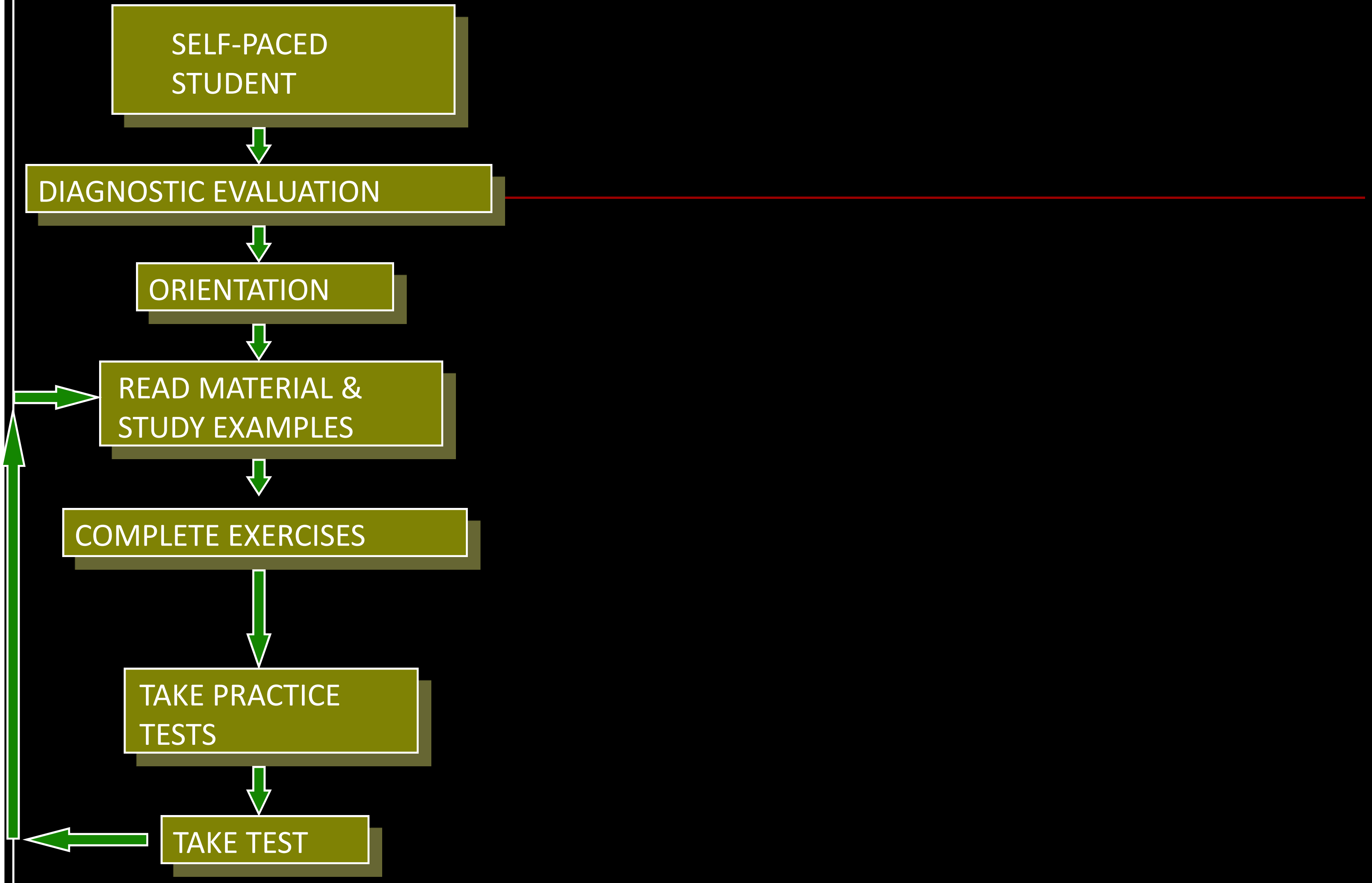
### Class Attendance and the Learning Cycle

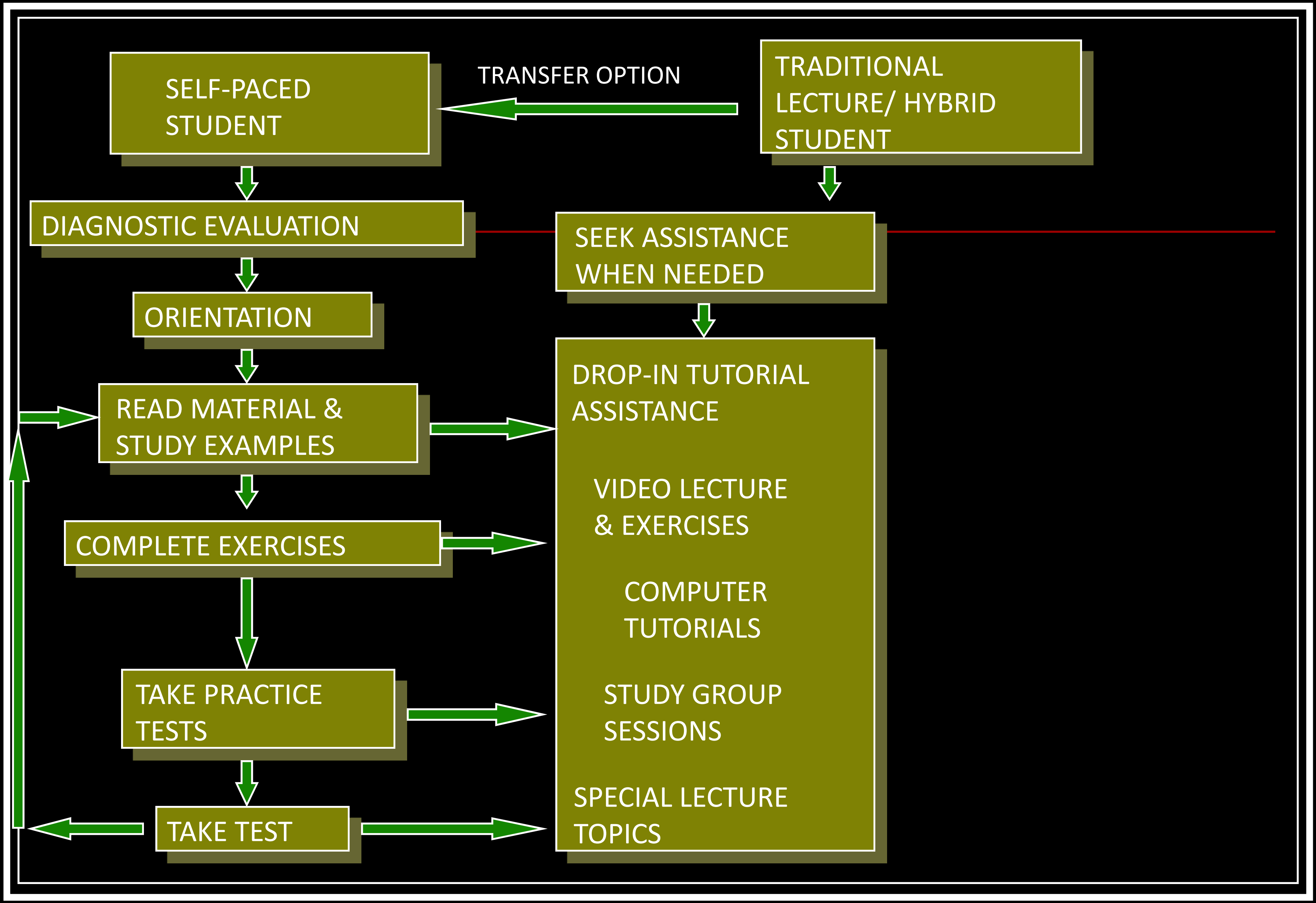
- *Listening and seeing*: hearing and watching the instructor’s lecture
- *Reading*: reading the information on the board and in handouts
- Verbalizing: asking questions and participating in class discussions
- Writing: taking notes and working problems assigned in class

# Coordination with Support Services

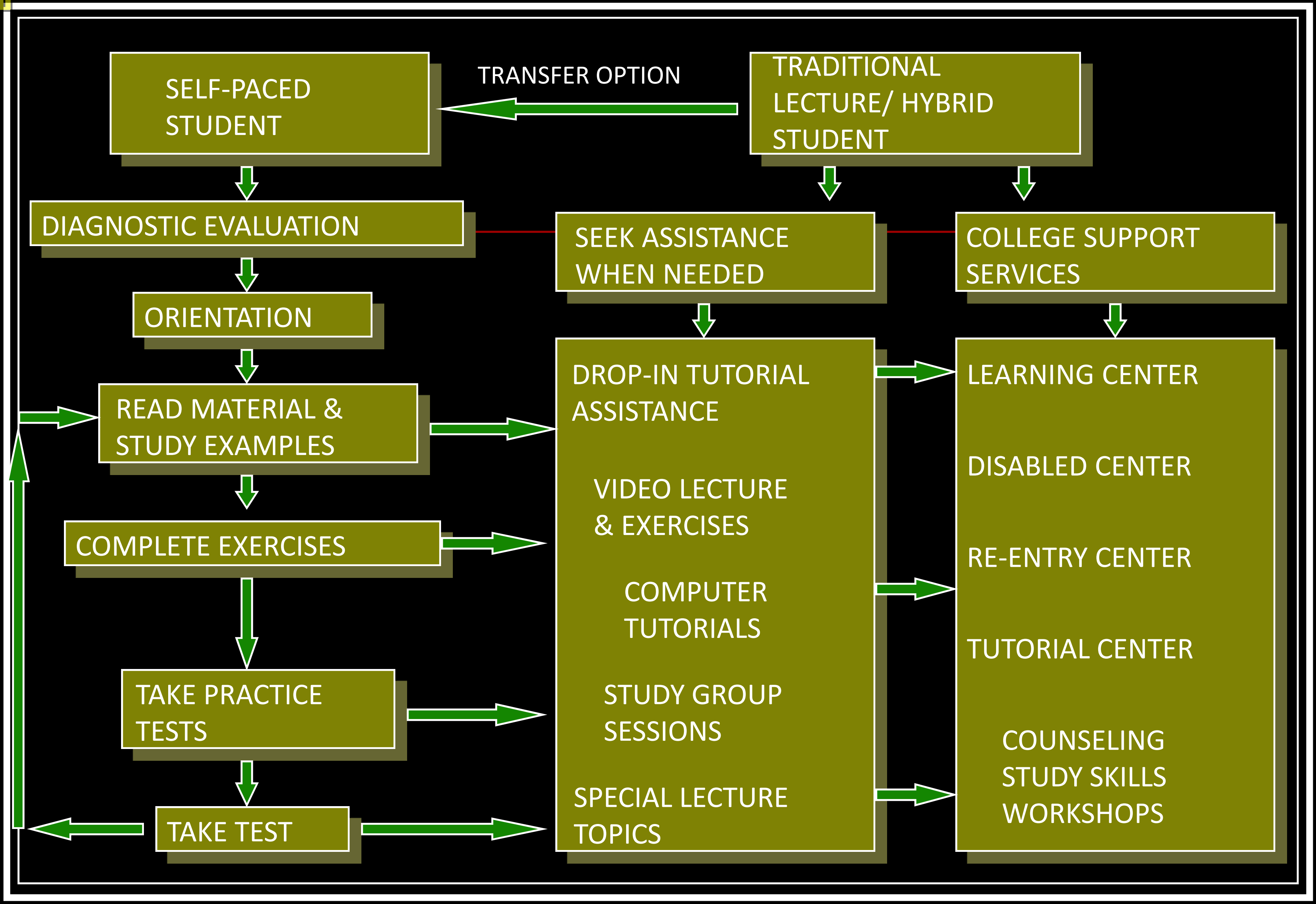
- THE KEY TO A SUCCESSFUL PROGRAM

Integrated Services


SELF-PACED STUDENT
DIAGNOSTIC EVALUATION
ORIENTATION
READ MATERIAL & STUDY EXAMPLES
COMPLETE EXERCISES
TAKE PRACTICE TESTS
TAKE TEST



SELF-PACED STUDENT
TRANSFER OPTION
TRADITIONAL LECTURE/ HYBRID STUDENT
DIAGNOSTIC EVALUATION
SEEK ASSISTANCE WHEN NEEDED
ORIENTATION
READ MATERIAL & STUDY EXAMPLES
DROP-IN TUTORIAL ASSISTANCE
VIDEO LECTURE & EXERCISES
COMPLETE EXERCISES
COMPUTER TUTORIALS
TAKE PRACTICE TESTS
STUDY GROUP SESSIONS
TAKE TEST
SPECIAL LECTURE TOPICS


SELF-PACED STUDENT
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SEEK ASSISTANCE WHEN NEEDED
COLLEGE SUPPORT SERVICES
ORIENTATION
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STUDY GROUP SESSIONS
SPECIAL LECTURE TOPICS
LEARNING CENTER
DISABLED CENTER
RE-ENTRY CENTER
TUTORIAL CENTER
COUNSELING STUDY SKILLS WORKSHOPS

# Understand the Basic Skills Student
## The Transition to Algebra

### UNSUCCESSFUL MATH STUDENTS…

*View mathematics (including arithmetic) as a subject they must MEMORIZE and become overwhelmed when they cannot memorize everything (memory overload).*

*Do not understand CONCEPTS, they memorize everything.*

# Understand the Basic Skills Student

## The Transition to Algebra

**UNSUCCESSFUL MATH STUDENTS…**

***View algebra as something foreign – a bunch of letters and numbers that mean nothing. They do not see that math is a language.***

***Cannot transition between the concrete and the abstract.***

# Understand the Basic Skills Student

## The Transition to Algebra

### UNSUCCESSFUL MATH STUDENTS…

*Have difficulty making the connection between the rules of algebra and those of arithmetic.*

*Have difficulty developing inductive and deductive reasoning.*

*Lack study skills and have math anxiety.*

# WE ARE READY!
# WE CAN FINALLY TEACH MATH

Now we are ready to *connect with the basic skills student* in the classroom.

# CONCEPTS *NOT* MEMORIZATION

- Selling to students the importance of *thinking* and understanding *why* instead of *memorizing* is an important first step.
- Use familiar arithmetic topics to introduce *concepts*.
- Break the *robot* mindset by immediately showing the *value of thinking*.

# CONCEPTS *NOT* MEMORIZATION

**Patterns**

Emphasize the value of thinking about numbers.

4 + 0 = 4

3 + 1 = 4

2 + 2 = 4 → We need to learn only 1 addition fact.

1 + 3 = 4 The last two rows of the pattern

0 + 4 = 4 illustrate the commutative property.

# CONCEPTS *NOT* MEMORIZATION

Show students that understanding properties is useful.

7 + 8 = ?

(7 + 7) + 1 =

14 + 1 =

15

# Explain Concepts in a Concrete Way

You have *3 hundred-dollar* bills and must make change using ten-dollar and one-dollar bills

$$\begin{array}{r} 3\ 0\ 0 \\ -\ \ 1\ 2 \\ \hline \end{array}$$

You break a hundred-dollar bill into *9 ten-dollar* and *10 one-dollar* bills. You have *2 hundred-dollar* bills left

$$\begin{array}{r} 2\ 9\ 10 \\ \not{3}\ \not{0}\ \not{0} \\ -\ \ 1\ 2 \\ \hline \end{array}$$

# CONCRETE ⟷ ABSTRACT

Use familiar topics to teach the language of mathematics.

Three *added to* a number

n + 3

The *difference of* three and x

3 - x

Triple a number is equal to 18

↓ ↓ ↓ ↓

**3 · y = 18**

# MAKE THE CONNECTION

Teach algebra and arithmetic topics together.

Emphasize that the rules of algebra are a natural extension of arithmetic, instead of an abstract topic with a new set of rules.

# MAKE THE CONNECTION

Arithmetic ⟷ Algebra

Five minus two equals three

**5 – 2 = 3**


Five y's minus 2 y's equals three y's

**5y - 2y = 3y**

y+y+y+~~y+y~~ = y+y+y

# Making Sense of Algebra

## Translation also helps students understand concepts

| English Phrase | Translation into Symbols |
|---|---|
| Question: Five times what number is equal to thirty five? | $5x = 35$ |
| Answer: That number is seven. | $x = 7$ |

# Making Sense of Algebra

## Discuss 'Why or Why not'

$2x + 3x$

$(2x)\ (3x)$

$2x + 3x^2$

$(2x)\ (3x^2)$

$(2x)\ (3y)$

$2\ (\ 4 + x\ )$

$2\ (\ 4x\ )$

# $2x + 3x$ $(2x)(3x)$

Students Now Have The Ability to Discuss Common Errors

<u>Student Question:</u>

$(2x)(3x) \neq$ **5x** Why?

<u>Response:</u>

We must look at the meaning of $(2x)(3x)$ and $2x + 3x$.

$(2x)(3x) = 2 \cdot x \cdot 3 \cdot x = 2 \cdot 3 \cdot x \cdot x = 6x^2$

Simplifying $2x + 3x$ can be compared to adding 2 *apples plus* 3 *apples* which equals *5 apples* or **5x**.

$2x + 3x^2$ $(2x)(3x^2)$ $(2x)(3y)$

Student Question:

We *cannot* simplify $2x + 3x^2$ because we do not have like terms. So why can we multiply $(2x)(3x^2)$ and $(2x)(3y)$?

Response:

We must look at the meaning of $(2x)(3x^2)$ and $(2x)(3y)$.

$(2x)(3x^2) = 2 \cdot x \cdot 3 \cdot x^2 = \ldots$

$2(4x)$ $2(4 + x)$

Student Question:

$2(4x) \neq 2 \cdot 4 \cdot 2 \cdot x$ and $2(4x) \neq 2 \cdot 4 + 2 \cdot x$ Why?

Response:

Do we multiply both 4 and 3 by 2 when multiplying $2(4 \cdot 3)$? Does this problem include addition as an operation?

We must look at the meaning of $2(4x)$ and $2(4 + x)$.

$2(4x) = 2 \cdot 4 \cdot x =$ **8x**

$2(4 + x)$ = two times $(4+x)$ or $(4+x) + (4+x)$

$= 4 + 4 + x + x =$ **8 + 2x**

# Engage Students

- Use fun activities to develop inductive and deductive reasoning skills.

- Start with easy and fun activities and work towards harder ones.

# The Missing Pieces to the Puzzle

- **Prepare Students for the “Transition to Algebra”**
  - Understand the Basic Skills Student
- **Integrate “ Tools for Success” into the classroom curriculum**
  - Supplemental Instruction / Study Skills
- **Provide Linked or Cohort Classes**
  - Learning Communities / Freshmen Experience
- **Coordinate with Support Services**
  - Integrated Services
- **Connect with Student in the Classroom**
  - Concepts and the Language of Mathematics