Slide 16 – Physical Development
Prenatal and Environmental Factors

During prenatal development, a child’s development is affected by various factors such as:
- nutrition (balanced nutrition or malnutrition).
- maternal substance abuse.
- alcohol use (excessive use of alcohol may result in fetal alcohol syndrome).
- the mother’s general health.
- sexually transmitted diseases (STD’s).
- general prenatal care.

Mothers who have used proper nutrition, avoided alcohol and drugs, have no STD’s and are healthy will have children who develop more quickly than do the children of those mothers who did not use healthful prenatal care practices. Children who were not provided good prenatal care often have development delays.

Slide 17 – Cognitive Development
Piaget (1985) was an innovative researcher who conducted meticulous studies about developmental differences in thought processes of individuals as they mature in understanding.

He believed individuals have two basic tendencies in their thinking, which he referred to as organization and adaptation. Organization concerns how individuals process information into generalizations, which he referred to as schemes.

Adaptation involves how individuals adapt their thinking to an environment or situation in which their schemes change. On one hand, people assimilate new knowledge into their existing schemes as they make sense of the information or situation. On the other hand, individuals revise their schemes as they evaluate the new information; this change is called accommodation in that the new information is accommodated and translated into a new scheme.

Slide 18 – Piaget’s Stages of Cognitive Development
From his research on individuals of different age groups, Piaget developed his stage theory of cognitive development. Here are Piaget’s stages:

Sensorimotor Stage (Birth to 2 years): Infants learn through their senses and motor activities. From these two sources their schemes develop. An important developmental milestone occurs when the infant realizes that than object still exists even when it is temporarily out of sight.
**Preoperational Stage (2 to 7 years):** Children learn to use symbols—primarily in the form of words and can think through operations in one direction only. In other words, children have trouble with what Piaget called reversible thinking in that they are not able to think backwards, and much of their thinking is illogical.

Children at this stage also have problems with conservation. Piaget used the example of water in glasses to illustrate this concept. Two glasses had the same amount of water; however, one glass was taller. Children in the preoperational stage typically assume the taller glass contains more water than does the shorter but wider glass. Another characteristic of preoperational children is they are egocentric and assume everyone thinks the way they do.

The use of concrete objects, props, and visual aids enhance student learning, and children need hands-on opportunities to practice important skills such as those used for reading comprehension. Also, instructions need to be short and as concrete as possible; using actions with words enhances student understanding.

**Concrete Operational Stage (7 to 11 years):** Children in this stage are able to think in more than one direction; in other words, they no longer have problems with reversibility and conservation. They are able to think logically when dealing with concrete items; however, they have considerable problems with abstractions and need learning activities that require concrete and hands-on thinking. In addition to understanding reversibility and conservation, children at this stage also have mastered seriation, which is the ability to sequence items in orderly arrangements such as from short to tall.

Teachers need to continue using concrete representations of concepts in the form of props, demonstrations, and visual aids; however, students are capable of classifying objects and need opportunities to do so. Also, to encourage critical thinking, teachers ought to ask open-ended questions and riddles or brain teasers.

**Formal Operations Stage (11 to adulthood):** Adolescents and young adults in this stage are typically able to think abstractly and to make generalizations and predictions. Nevertheless, there is wide variation in the abilities of individuals in this stage. Adolescent geocentricism affects their thinking and social interactions. Students in this stage become overly introspective and self-conscious and often assume their thoughts are as important to others as they are to themselves. The approval of their peers becomes especially important.

Visual aids, graphic organizers, and charts are helpful, and visual aids can become more sophisticated and require critical thinking (e.g., compare/contrast charts). Students need opportunities to explore and develop their own ideas (e.g., writing an essay about their version of a just society). Teachers need to develop problem-solving activities and to concentrate on developing students’ conceptual knowledge.
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Preoperational Stage (2 to 7 years): Children learn to use symbols, primarily in the form of words, and they can think through operations in one direction only. In other words, children have trouble with what Piaget called reversible thinking in that they are not able to think backwards; consequently, much of their thinking is illogical.

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**Slide 30 – Psychosocial Development**

Erikson (1963) viewed each stage of psychosocial developmental level as a continuum with two polar points. A child's personality will develop somewhere between these two points according to how the child is treated.

**Trust vs. Mistrust (birth to 1 year):** During their first year of life children learn to trust or to be distrusting. During this time a healthy children learn to trust when caregivers meet their needs consistently. Conversely, inconsistent treatment of children will cause them to be uncertain of what to expect from others.

**Autonomy vs. Shame and Doubt (2 to 3 years):** Children emerge from total dependence on their parents. Parents should allow toddlers to explore their environment to the extent that they can do so safely. This enables children to develop independence or autonomy. Doing too much for children or shaming them for unacceptable behavior leads to self-doubt. For example, parents need to allow their children to make some choices (e.g., food choices for lunch) without undermining their confidence.

**Initiative vs. Guilt (4 to 5 years):** Initiative adds to the quality of undertaking, planning, and attacking a task leads to autonomy. Freedom and encouragement help children initiate and undertake tasks on their own. For example, parents might allow children to help with household chores instead of discouraging their desires to help. Parents must encourage initiative and avoid ridiculing children when they offer to help.

**Industry vs. Inferiority (6 to 11 years):** Erikson sees industry as a form of achievement motivation. For example, children often learn to win recognition through hard work in school. The successes of children need to be recognized by significant individuals such as parents, teachers or peers. Children experience feelings of inferiority if their efforts are unsuccessful or if their successful efforts are not recognized. Consequently, teachers need to provide children with adequate time to finish tasks and to praise their effort. Teachers should begin with short assignments and then add length and complexity to students’ academic work gradually, so that they experience success. For those students who are discouraged by their academic performance, teachers can use progress charts to show their improvement. In addition, teachers need to develop students’ sense of responsibility and independence, and teachers often have a set of classroom jobs (e.g., watering the plants or feeding the fish) for students.

**Identity vs. Role Confusion (12 to 18 years):** The primary issue of adolescents is the development of an identity, and adolescents often ask, “Who am I?” Adolescents must organize their beliefs, attitudes,
goals, and choices into a consistent view of self. Teachers can encourage students to develop their own ideas and to find out what really interests them.

**Slide 32–34 – James Marcia**

Marcia (1991) posits adolescents have four identity alternatives: **identity achievement**, **identity foreclosure**, **identity diffusion**, and **moratorium**.

**Identity Achievement**: An adolescent explores various choices, and after exploring viable options makes clear decisions and pursues them (e.g., the choice of a career, or entrance to college).

**Identity foreclosure**: Occurs when an adolescent makes a commitment to various life choices without exploring various options; in such cases life choices typically resemble those of parents.

**Identity diffusion**: Occurs when an adolescent does not explore various options in life and is committed to no real goals. Students in this stage have no idea what to do in life. Their confusion may result in apathy or rebellion.

**Moratorium**: Conversely, some adolescents have explored choices and have life goals to pursue although they have temporarily decided to delay their commitments to career choices.

**Slide 37 – Kohlberg’s Six Stages of Moral Judgment**

Kohlberg (1984) developed a stage theory on moral development. He theorized there are three primary stages most people go through as they mature: (1) the **preconventional stage**; (2) the **conventional stage**; and (3) the **postconventional stage**.

**The Pre-conventional level (1 to 9 years)**: Children behave according to socially acceptable norms merely because they are told to do so by a parent or teacher. Everything is either good or bad. Also, children obey because of the threat of punishment. A child in the second stage of this level sees right behavior as a way of acting in one's own best interests. Children in this stage believe rules are absolutes.

**The Conventional level (9-20 years)**: Moral thinking primarily concerns how to behave in ways to gain the approval of others. Also, abiding by the law and fulfilling obligations of duty are considered as guides of morality, and civil and religious laws are considered absolutes. Students at this stage are able to consider the views of others, and teachers may want to use moral dilemmas from history or literature to challenge students’ thinking.

**The Post-conventional level of moral thinking (20 and over but reached by only a few people)**: Moral behavior is considered in terms of genuine interest in the welfare of others and is based on respect for universal principles and the demands of individual conscience. In other words, students at this level of thinking understand that that which is considered moral by the majority may not be just. Using moral dilemmas are especially valuable activities for students at this stage of moral development.
**Slide 42 – Parenting Styles**

**Authoritative parents:** Set clear boundaries and rules for their children and have confidence in them. They also explain their reasons for various rules so that they are more understandable for children. Children from these homes are often self-motivated and productive workers.

**Authoritarian parents:** Expect children to do as they are told, but they often do not set clear restrictions for children. Children learn to obey to stay out of trouble rather than to do so to elicit love and approval from parents. Typically children from these homes are not as self-motivated as they are inner-directed.

**Permissive parents:** Are inconsistent in setting rules and are often disorganized. They do not set clear boundaries and limitations for their children and are typically not assertive when necessary. They make few demands on their children. Children from these homes are generally not assertive and are not as intellectual as are children from authoritative homes.

**Rejecting-neglecting parents:** Do not respond to children’s emotional needs and make few demands on children. Children from these homes are typically not as socially adjusted or cognitively developed as are children who are raised by authoritative parents. They are often withdrawn emotionally.

**Slide 43 – Emotional Characteristics**

**Kindergarten:** Children in kindergarten express their emotions and views openly, and outbursts of anger are common. Jealously is common among children because they want the affection of their teacher (Slavin, 2001). Teachers need to show affection for all children and to help them understand their feelings.

**Elementary:** Children have already developed a self-image (Harter, 1990), and students often compare themselves with others in terms of how they fit in socially and perform academically. The stability of family relations is especially important in this period for the development of a healthy self-image.

**Middle School:** Students’ interpersonal skills develop in terms of more complex interpersonal reasoning in that they are more aware of the feelings of others. The peer group is so important that middle school students have strong inclinations to conform to the dictates of their peer group.

**High School:** Students still are influenced by their peer groups; however, the tendency to conform is not as pronounced as it was during their middle school years. Various disorders such as bulimia, anorexia nervosa, or depression are more likely to emerge in this stage as students attempt, and in some cases struggle, to develop their identities (Woolfolk 2005).
Slide 55 – Gender
In addition, classroom teachers need to consider the following research findings when planning lessons:

- Girls often are not active during hands-on science activities and are less inclined to assert themselves than boys are during classroom activities.
- Boys are placed in special education and in remedial math or English classes more often than girls are (Willingham & Cole, 1997).
- The contributions of women in various fields are often overlooked; teachers need to use examples of famous women in their lessons.
- Teachers are more inclined to call on boys and expect more from them in math and science classes than they are for girls (Nieto, 2004).

Slide 61 – Exceptionality
IDEA requires:

- Students with disabilities to receive services related to transportation and support services to enable them to benefit from special education.
- Students are to be educated in the “least restrictive environment.” In other words, children must be “mainstreamed” in the regular classroom if it is feasible and will enhance their educational opportunities.
- Students with disabilities must have a written Individualized Education Program (IEP), which includes specific learning outcomes and ways to meet and assess those goals.
- An IEP is required by law to be reviewed annually by each of the following parties: parent or guardian, a teacher, a professional who formally evaluated the child, another party (e.g., the principal or special education resource person), and the child.

Slide 67 – Communication Differences
For example, some cultures view direct eye contact with authority figure as respectful while other cultures consider direct eye contact as disrespectful (Cushner, McClelland and Sanford, 2003).

Asian students may speak to teachers and authority figures in much more reserved and formal ways than are typical for many public school students.

Research findings that display cultural misunderstandings:

- Teachers display more verbal or nonverbal forms of negativity toward students of color than they do toward European American students (Good & Brophy, 2000).

Teachers have fewer quality instructional interactions with and provide less encouragement for students of color than they do for European Americans.

Slide 69 – Learning Styles
Hemispherisity: Each half of the brain serves a different function. On one hand, learners who favor right-brain functions prefer visual, holistic, and spatially oriented learning activities. Teachers can
enhance right-brain functions when they employ graphic organizers, demonstrations, and open-ended questions that foster divergent thinking.

On the other hand, those learners who favor left brain functions are more inclined to think logically, sequentially, and analytically. To build on left-brain functions teachers should introduce content in sequential and linear modes and help students to learn note-taking and information processing skills.
The process of planning lessons typically begins with the identification of instructional objectives, which are specific observable learning outcomes (Mayer, 1997). In other words, instructional objectives concentrate on what teachers want students to be able to do and understand when the given lesson is concluded.

Mayer emphasizes that each objective focuses on three main components: (a) an action statement, which identifies the action or behavior students are expected to perform; (b) a conditions statement to clarify the circumstances in which the action is performed; and (c) a criterion statement about the level of proficiency.

Here is an example of an instructional objective:
- Students will memorize multiplication tables up to 10’s (action statement) after studying in class and at home over a five week period (conditions statement) with 100% accuracy (criterion statement).

Other Examples of Performance Objectives:
- Students will identify all states and their capitals using a map in class with at least 90% accuracy.
- Students will write an in-class essay about the strengths and weaknesses of the American political system using the five-paragraph essay format per the attached rubric.
- Students will shoot ten shots from the free throw line during class with at least 70% accuracy.

Bloom, Englehart, Furst, Hill, and Krathwohl (1956) emphasized there are three primary learning domains for teachers to consider: (1) the cognitive domain, which entails thinking processes; (2) the psychomotor domain, which concerns physical movement and skills; and (3) the affective domain, which focuses on students’ attitudes about learning and school. Most of student learning, however, focuses on the cognitive domain.

Consequently, Bloom’s Taxonomy of Cognitive Levels of Thinking is especially helpful for teachers when planning lessons, and here are the six levels of thinking codified by Bloom:

**Knowledge:** the lowest level of thinking in that pure memorization of facts does not require real understanding. If students are required to memorize definitions of vocabulary words, then they are thinking at the knowledge level on Bloom's Taxonomy of Cognitive Thinking.
- **Key action words for objectives:** arrange, define, duplicate, label, list, memorize, name, order, recognize, relate, recall, repeat, or memorize.

**Comprehension:** shows some understanding of the content; for example, students are able to state definitions in their own words although they may not be able to relate other ideas to the concept.
Key action words for objectives: summarize, restate, review, select, translate, or define/explain in one’s own words.

**Application:** involves using a concept or set formula to solve a problem such as applying the formula for surface area (e.g., to compute the surface area of a dining room floor to determine how much carpet is needed to replace the floor covering).

Key action words for objectives: collect, prepare, demonstrate, apply, draw, or choose.

**Analysis:** entails breaking down concepts into logical components, which requires critical thinking in that information is not just given to students.

Key action words for objectives: analyze, appraise, categorize, compare, contrast, criticize, differentiate, discriminate, distinguish, examine, experiment, or question.

**Synthesis:** involves the creation of new ideas by combining other ideas.

Key action words for objectives: construct, create, design, develop something new, combine, hypothesize or formulate.

**Evaluation:** evaluation involves making a judgment of some sort about ideas, materials, or methods.

Key words for objectives: appraise, argue, assess, attach, choose compare, defend estimate, judge, predict, rate, core, select, support, value, evaluate.

In brief, Bloom’s Taxonomy of Cognitive Levels is a valuable tool for classroom teachers as they write instructional objectives and plan a sequence of related lessons. For example, when teaching new concepts, teachers should begin at the lower cognitive levels to build background knowledge, and then they can guide students step by step to higher cognitive levels of thinking.

**Slide 98 – Madeline Hunter’s 7 Elements of Lesson Design**

**The Lesson Cycle as Represented by Hunter’s Model**

After teachers have identified their instructional objectives, which should be aligned with the TEKS, they need to plan lessons. One version of the lesson cycle is Hunter’s (1982) model, which consists of the following steps: (1) anticipatory set; (2) statement of the lesson’s objectives and purpose; (3) input; (4) modeling; (5) checking for understanding; (6) guided practice; (7) independent practice; (8) and closure.

1. **Anticipatory Set (Set Induction):** Is sometimes called a "hook" to grab the student's attention. Research by Brophy (1998) has shown how an introduction to a given lesson, which he refers as “entry,” increases student learning and understanding. This step also has a theoretical basis in cognitive constructivism in that the hook elicits students' background knowledge, and the teacher links this background knowledge to new concepts to be learned.

2. **Statement of What is to be Learned and Why the learning is Important:** Teachers explain to students what they will do and why it is important. Research has shown how informing students what they are to learn enhances their learning and motivation (Marzano, 2001).
3. **Input:** In this case the teacher introduces or reviews key terms or background knowledge. It is important for teachers to be very thorough when teaching critical background information and definitions of key terms. The success of a lesson is contingent to a great extent on whether or not students have the prerequisite skills or background knowledge to prepare them for the concept to be modeled.

4. **Modeling:** Once background information is taught in input, the teacher models how to complete each step of the task noted in the objective. For example, when the teacher models how to solve a mathematical problem, she should do so in a methodical, step by step manner, which is easily followed by students. Modeling is an instructional scaffold, which enhances student understanding (Bruner, 1996), and from a Vygostkian (1986) perspective it provides opportunities for students to learn within the zone of proximal development.

5. **Checking for Understanding:** The purpose is to determine whether students understand the modeled concept before proceeding to guided practice. The teacher may want to ask a number of questions while explaining each step to ensure students understand the concepts being taught. If students do not understand the concepts at hand, then teacher should reteach key points.

6. **Guided practice:** This step is an opportunity for students to demonstrate their grasp of new learning by working through an activity or exercise under the teacher’s direct supervision. The type of work assigned in guided practice is exactly like the type of activity taught in modeling. If the teacher assigned a different type of activity other than that which is modeled, then students will not be as prepared to complete the academic work. Teachers often have students work in groups during guided practice, and this provides an opportunity for students to learn within the zone of proximal development (Vygotsky, 1986).

7. **Independent practice:** Once students understand the given concept, they need to practice the concept on their own. As previously noted, the exact same type of learning activity or problems taught in modeling and practiced in guided practice ought to be assigned in independent practice. One way we learn is through repetition and practice. From a behaviorist perspective practicing skills correctly reinforces learning, and from a cognitive constructivist perspective students need to process the concepts. Independent practice follows modeling and guided practice to ensure students are prepared for their homework.

8. **Closure:** Is a review of key concepts; closure wraps up a lesson in the same way the conclusion of an essay brings an essay to a smooth and logical conclusion. Closure also provides another way to reinforce key concepts.
Slide 102 – Marzano’s Nine Instructional Strategies

1-Identifying Similarities and Differences

- Students need explicit instruction on how to identify similarities and differences between concepts or categories.
- Students should have the opportunity to independently practice in comparing and contrasting.
- Nonlinguistic representation (graphs and symbols) are especially powerful.

Applications /Activities
- Compare and Contrast
- Venn Diagrams
- Classifying objects
- Metaphors
- Analogies
- Patterns and attributes

2-Summarizing and Note Taking

- For students to effectively take notes and summarize, they must be able to discriminate between:
  - essence and detail;
  - terms and meaning;
  - claims and evidence.
- Summarizing: students must understand information in order to delete, substitute and keep information.
- Note taking: students must process information and record information in the most concise manner.

Applications /Activities
- Teach students how to take notes.
- Evaluate note taking skills.
- Embed summarizing and note taking activities in learning activities in a lesson plan.

3-Reinforcing Effort and Providing Recognition

- Not all students realize the importance of believing in effort.
- Students can learn to change their beliefs to an emphasis on effort.
- Self-Efficacy

Applications /Activities
- Teach and exemplify the connection between effort and achievement.
- Share stories about people who succeeded by not giving up.
- Rubrics
- “Pause, Prompt, Praise.” (Fred Jones)
- Incentives and Rewards (both academic/non-academic)

4-Homework and Practice
- Research shows that the amount of homework assigned should vary by grade level and that parent involvement should be minimal (meaningful interactions).
- The purpose of homework should be identified and articulated.
- If homework is assigned, it should be commented on (feedback).

Applications /Activities
- Establish and communicate a homework policy.
- Design homework assignments that clearly articulate the purpose and outcome.
- Vary the approaches to providing feedback.

5-Nonlinguistic Representations
- According to research, knowledge is stored in two forms: linguistic and visual.
- The more students use both forms in the classroom, the more opportunity they have to achieve.
- Recently, use of nonlinguistic representation has proven to not only stimulate but also increase brain activity.

Applications /Activities
- Incorporate words and images in lessons.
- Use physical models and physical movement.
- Graphical organizers
- Generating mental pictures.
- Visual Instructional Plans.

6-Cooperative Learning
- Organizing students into cooperative groups yields a positive effect on overall learning.
- Keep groups small and don't overuse this strategy—be systematic and consistent in your approach.
- Organizing groups based on ability should be done sparingly.

Applications /Activities
- Use a variety of criteria for grouping students.
- Use a variety of group patterns: Informal or ad hoc (last few minutes of a class period), formal (long enough to complete an academic project) and base groups (semester or year, providing students with long-term support).
- Combine cooperative learning with other classroom strategies.
7-Setting Objectives and Providing Feedback

- Instructional goals/objectives narrow what students focus on. Instructional goals/objectives should not be too specific. Students should be encouraged to personalize the teacher’s goals.
- Feedback should be "corrective" in nature by explaining to students what they are doing correctly and incorrectly.
- Feedback should be timely.
- Feedback should be specific to a criterion.
- Students can effectively provide some of their own feedback.

Applications /Activities

- Lesson objectives
- TEKS & TAKS
- Criterion referenced tests
- “Start with the end in mind”
- Informal vs. Formal Feedback
- Summative vs. Formative Assessment
- Self-Assessment (metacognitive)

8-Generating and Testing Hypotheses

- Hypothesis generation and testing can be approached in a more inductive or deductive manner. In general, students produce better results when using the deductive thinking process.
- Deductive thinking requires students to apply current knowledge to make a prediction about a future action or event.
- Inductive thinking involves students in a process of drawing new conclusions based on information they know or have presented to them.

Applications /Activities

- Problem Solving
- Historical Investigation of Controversial Issues
- Experimental Inquiry-The Scientific Method
- Decision Making

9-Cues, Questions, and Advance Organizers

- Cues, questions, and advance organizers help students use what they already know about a topic to enhance further learning.
- Research shows that these tools should be highly analytical, should focus on what is important, and are most effective when presented before a learning experience.
Applications /Activities
- Questioning techniques
- Pre-surveys
- Skimming before reading
- Graphic organizers

Slide 107 & 108 – Learning Styles or Preferences

Field-Independent learners like to break down concepts into parts and monitor ways they process information; they like to work independently and often excel in science and mathematics. Step-by-step instructions are helpful for these students.

Field-dependent learners like to see holistic patterns of that which is to be learned. They work well in groups and often excel in social studies and language arts. Graphic organizers and other visual representations of the big picture of what is to be learned are helpful for field-dependent learners as are group types of activities such as cooperative learning (Davis, 1991).

Modality preferences are other factors teachers must consider when planning their instructional activities, and students often have preferences for visual, auditory, kinesthetic, and tactile modalities.
  - **Visual modality**- learns through visual representations such as graphic organizers, demonstrations, video clips, or reading.
  - **Auditory modality**- learns through hearing and lectures and audio tapes are especially helpful.
  - **Kinesthetic modality**- learns by doing or acting out a role; using hand or body movements used when learning concepts are effective methods.
  - **Tactile modality**- learns through touching- using manipulatives and making models enhance student learning.

Slide 114 & 115 – Scope and Sequence

Scope: Refers to content selection. Because classroom teachers have limited time during any academic year, they must carefully select content to meet their instructional objectives, and in Texas teachers must focus on the TEKS.

Sequence: Refers to the ordering of the content selected. From a curriculum perspective, teachers sequence content they intend to teach, so that a logical progression of concepts/skills unfolds smoothly as one concept builds on and leads logically into the next concept taught. A logically sequenced curriculum enhances student learning to a great extent.

Scope and Sequence: So how can we conceptualize what a sound scope and sequence entails? In simple terms it is like a detailed outline, which a writer develops to plan an essay before she writes her initial draft. In this respect, a well planned scope and sequence is like an outline of concepts a teacher intends to teach.
**Slide 125 – Theories of Learning**

**Reinforcement:** Reinforces desired behaviors. The two primary types of reinforcement are positive and negative.

**Positive reinforcement** consists of valued rewards such as stickers, extra privileges, or praise.

**Negative reinforcement** primarily concerns avoidance. For example, let’s presuppose kindergarten students want to go to recess but have not cleaned up their work stations. To encourage students to clean up properly, a teacher might say: “It’s almost time for recess, and we can avoid losing any of our recess time if we return to our work stations to clean up the materials we left there.” In this case, students may not want to clean-up; however, they will clean their work stations to avoid missing recess.

**Punishment:** to change an undesirable behavior punishment is sometimes used. Teachers sometimes use time-out or take away a privilege.

**Observations of Models:** Modeling is a key concept of social modeling theory, and students learn effectively from the various forms of models such as:

- A teacher may model how to clean up after an activity or may refer to a student as a model of how to clean up properly.
- Models of successful work products with set steps of how to complete the assignment are valuable models for student learning.
- Students may follow the example of another student who has mastered the given academic work.

**Slide 126 – Theories of Learning (Cont.)**

**Information processing** - a way to study how people acquire, process, store, and recall information to guide their learning. Learning processes, as presented in this model, entail information entering the mind through the senses, and then the information is quickly stored in the sensory memory for short duration and is remembered if there is something of importance or personal interest.

When details are initially remembered, they are stored in an individual’s short term memory. During this initial short period of about twenty seconds, a person needs to pay close attention to the information by using a rehearsal strategy. Typically a person’s working memory is able to handle only five to nine items at a time.

However, if a person uses chunking, more pieces of information are retained because all information is chunked into one unit or theme of information. Showing students a common theme or concept to attach relevant bits of information to is a helpful learning strategy. In terms of long term memory, information is retrieved if it was consider important enough to be retained, and of course, the more we use important information, the more likely we will be able to retrieve it at appropriate times.
**Cognitive Constructivism:** emphasizes how information is processed and made meaningful in the processes of assimilation and accommodation. In other words, the classroom teacher needs to elicit and build on students’ background knowledge when teaching new concepts. The following strategies are effective for eliciting and building students’ prior knowledge (Marzano et al., 2001):

- Graphic organizers to provide students with an overview of key concepts before teaching a lesson;
- Using KWL Charts in which a teacher elicits prior knowledge (e.g., K- what students know), then focuses on what students want to know about the given subject (e.g., W- what are students’ purposes for learning about the given concept), and what students learned after the lesson was taught (L- is a form of debriefing about the lesson).
- Using reading strategies such as the SQ3R strategy in which students following a set five sep process: (1) S- survey the reading material; (2) Q- develop questions about the given reading; (3) R- read and take notes on key passages; (4) R- recite key themes and information; and (5) R- review the material.

**Slide 135 – The Information Processing Model**

Information/stimuli is/are encoded in sensory memory. One’s perception and attention direct what information will be held in the working memory. Then the newly encoded information in the working memory is connected with the old information (prior knowledge) in the long-term memory. The stronger the connection between the newly learned information with information in the long-term memory, the stronger/greater the retention of the newly learned information in long-term memory.