Tiered Assignments

Tiered assignments are activities that are based on the same mathematical skill, but they are designed with differing levels of complexity. The assignments meet the needs of: low level achievers, on grade level achievers, and above level achievers. This ensures that all students in your classroom, regardless of their ability levels, are making progress on the same skill or content.

How do you create tiered assignments?
1. Choose the standard that you will be addressing.
2. Identify the specific skill or concept that you want your students to learn.
3. Provide a whole group introduction to the skill or concept.
4. Have students complete tiered assignments related to the skill or concept. These assignments will be based on their ability level: low level achievers, on grade level achievers, and above level achievers. The tiered assignments can be done individually or in small homogeneous groups.

<u>Example</u>
Topic or Skill: The effects of the dilation of a geometric figure on its perimeter and area.

Whole group instruction: Introduce the term *dilation* and explain the meaning of dilation. Ask students for examples of dilation that they have seen. Did the dilation represent an enlargement or a shrinkage? Ask the students how the length of the sides, the perimeter, and the area were affected by dilations.

Tiered assignments: Divide students into homogeneous groups based on their ability levels. Explain that each group will investigate dilation in different ways. Have students complete the appropriate tiered assignment. After students have completed their tiered assignments, you could create an extension of this activity by having one low level achiever, one on grade level achiever, and one above grade level achiever form an expert group and share their findings.

Low level achievers will benefit from being able to move from the concrete drawing of the figures to the abstract concept of dilation. Using graph paper and rulers, students will create dilated figures and investigate relationships.

On grade level achievers will benefit from being able to apply their previous knowledge of graphing points and finding the distance between points to the new concept of dilation. These students will use a scale to find new points on the graph paper and draw new figures.

Above grade level achievers can benefit from implementing the new concept of dilation to the use of lists and scatter plots on the graphing calculator. In this activity, students will create scatter plots and use the scale to create dilations.

Adapted from:
Differentiation Strategies for Mathematics by Wendy Conklin.

Leveled Questions

You can create questions to ask students in your classroom that are based on the students' different levels of understanding and readiness. For some of your students, leveled questions can challenge their thinking and help them to use critical thinking skills. For other students, leveled questions can provide the added support necessary to begin to develop ways of thinking about mathematics. By integrating leveled questions into your instruction, the questions then become accessible to all students. Leveled questions can be used during whole group instruction or in small group instruction.

How do you design leveled questions?

1. Start with the whole-class topic and identify an on-grade-level question.
2. Delve deeper into the topic by identifying an above-grade-level question.
3. Narrow down the topic with a low-level question.

Example

Topic or Skill: Multiplying binomials using the vertical method and the FOIL method.

On-grade-level question:
Explain how the FOIL method guarantees that each term in the second factor is multiplied by each term in the first.

Above-grade-level question:
Defend the argument that the FOIL method is the same as the vertical method. Then, use the distributive property to explain why the FOIL method works.

Low-level question:
Explain how the word FOIL helps someone multiply binomials.

Adapted from:
Differentiation Strategies for Mathematics by Wendy Conklin.

Flexible Grouping

With flexible grouping, students complete work in your classroom as part of many different groups depending on the learning task or content. Students can be placed in groups based on their performance, interests, social/emotional needs, or knowledge base. Groups can be purposefully or randomly assigned by the teacher or the students can choose their own groups. Flexible grouping allows for students to work with a wide variety of peers and avoids them from being labeled as struggling or advanced.

Examples of Different Types of Flexible Groupings

1. Students work in pairs – Have an above-grade-level achiever paired with an on-grade-level achiever. Have an on-grade-level achiever paired with a low-level-achiever. Working in pairs is a great starting point for students who have emotional or behavioral issues and who tend not to work well in larger groups.
2. Students work in triads – Have students work in groups of three with one student from each ability level (i.e., low-level, on-grade-level, above-grade-level achievers). Have students work in groups of three based on a common interest or a strategy for learning.
3. Students work in cooperative learning groups – Have students work in groups containing 4-5 students. Groups can be arranged homogeneously or heterogeneously. Assign specific roles or responsibilities to each group member to ensure that all group members are actively involved and engaged.
4. Students work in expert groups using the jigsaw method - Students begin as a member of a base group and are given different assignments that will help them form expert groups. Each expert group completes a different activity, uses a different instructional strategy, or accesses different information about a topic. Then the students return to their base group to teach their original group members what they have learned.

Leveled Question Starters Based on Bloom's Taxonomy

Level I: Knowledge or Recall
What is the definition for...?
What happened after...?
What were the characteristics of...?
How many...?

Level II: Comprehension
Why are these similar? Why are these different?
Explain this in your own words.
What do you think might happen if...?
What are some examples of...?

Level III: Application
Demonstrate the way to...
Which one is most like...?
Could this have happened in this situation? Why or why not?
How would you organize...?

Level IV: Analysis
What steps are important in the process of...?
If...then...
What conclusions can you reach about...?
What is the relationship between _____ and _____?

Level V: Synthesis
Can you design ...?
Why don't you devise your own way to...?
Can you further develop...?
Invent a different way to....

Level VI: Evaluation
In your opinion...
What do you think should be the outcome?
What solution do you think works best and why?
Which _____ does not work well and why?

Choice Boards or Choice Wheels

Giving students choices in the classroom is a great way to motivate them and maintain their interest. Choice boards or choice wheels provide students with multiple ways to process information and demonstrate learning. Teachers can design activities for choice boards based on differing student achievement levels. Students would then be required to choose options that meet their instructional needs. Another way for using choice boards or choice wheels in the classroom is to allow students to choose one or several of the activities to complete.

How do you create choice boards or choice wheels?

1. Select a standard or skill.
2. Design different activities, assignments, or projects for students to complete that are related to the skill. These activities can be based on different ability levels or modalities of learning (e.g., visual, auditory, tactile, kinesthetic). Also, consider including activities that incorporate the arts such as drawing, demonstrating or modeling, and speaking.

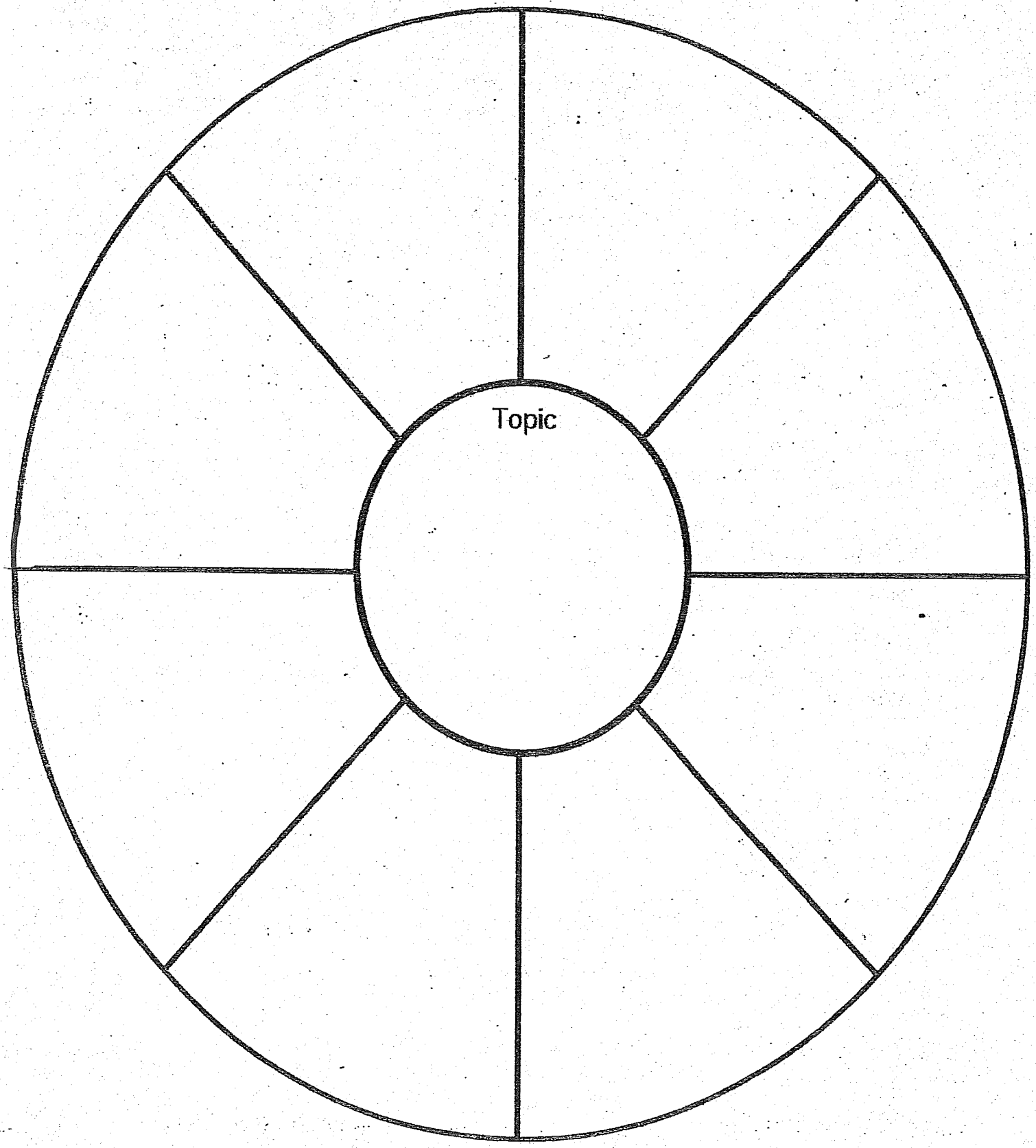
<u>Example</u>

An example of a choice board for probability is provided for you. This choice board is based on different student ability levels. Activities for above-grade-level achievers are represented by triangles, on-grade-level achievers by squares, and low-level achievers by circles.

Students should first complete one activity based on their ability level. Then students can choose from a more challenging list of activities. To do this, you can have on-grade-level achievers choose an activity from the triangle category. Low-level achievers can choose an activity from the square category. The above-grade-level achievers can create an activity to complete with your approval.

There is also a copy of a blank choice wheel. Each of the sections of the wheel can contain a different activity. Activities can incorporate: visual, auditory, tactile/kinesthetic, reading/writing, the arts, on-grade-level, above-grade-level, and activities that any ability level student could successfully complete.

Name _____ Date _____



Concrete-Representational-Abstract (CRA) Sequence

Concrete-Representational-Abstract (CRA) sequence is an instructional method that is used to increase students' understanding of mathematical concepts. This strategy is divided into three different stages that build upon one another and are sequenced as follows:

1. Concrete – During this first stage, manipulatives or physical objects are used to teach the mathematical concept. Examples of concrete items include fraction bars, base-ten blocks, and algebra tiles.
2. Representational – For this stage, the concrete objects as replaced by something pictorial. Examples of representational items include tally marks, lines, and circles.
3. Abstract – At this final stage, the mathematical concept is shown using graphs or symbols. Examples include numbers, equations, and formulas.

The CRA sequence is designed to help students first understand the concepts with concrete materials. Students are then introduced to a representation of the concrete materials. Once students are proficient at these first two stages, students are introduced to the concepts in an abstract form.

How can you use the CRA sequence in a mathematics classroom?

1. Select the skill or concept that students will be learning.
2. Begin explaining the concept using concrete materials.
3. Next, model the concept by using pictures that represent the concrete materials.
4. Finally, model the concept abstractly by only using numbers and mathematical symbols.

<u>Example</u>
Mathematical Concept: Completing the Square

Concrete Stage: Begin with algebra tiles to show how to complete the square.
Representational Stage: Have students draw a simplified version of the algebra tiles to complete the square.
Abstract Stage: Solve $x^2 + 3x - 17 = 0$

Problem-Based Learning

Problem-based learning provides students with the opportunity to solve problems in real-life scenarios. Students use information to create feasible solutions. This strategy for differentiating instruction can be implemented in small group work or independent student work. Incorporating problem-based learning in a classroom promotes the use of higher level thinking skills and motivates students to engage in meaningful, problem solving.

How can you design a lesson that utilizes problem-based learning?

1. Identify the problem – The teacher will identify a real-world problem that is connected to the standards and that students will be interested in investigating.
2. Develop a problem statement – Have students use their background knowledge and experience to discuss what they know about the problem. Students should analyze the problem, brainstorm ideas about the problem, and create a statement of the problem.
3. Create a plan – Have students decide on how they are going to solve the problem. Students should consider how they will gather the information and the resources needed to solve the problem.
4. Implement the plan – Students will now carry out their plan. The students' final work product should include an explanation of how they solved the problem and a justification of their solution to the problem.

<u>Example of Problem-Based Learning</u>

Problem: The cities of Columbus, Macon, and Auburn want to find a central location to build a new amusement park that would have the tallest roller coaster in the Southeast. Use the centers of a triangle to determine the best location of the amusement park.

Adapted From:
Differentiated instructional strategies: One size doesn't fit all by Gayle Gregory and Carolyn Chapman.
Differentiation strategies for mathematics by Wendy Conklin.

Mind Mapping

Differentiating Instruction