Differentiation:
the key to meeting the needs of gifted learners

with Lisa Van Gemert

Let's Connect!

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Before we begin, please respond:

On a scale of 1-10, how much do I already know about differentiation?

On a scale of 1-10, how open am I to this principle?

What is the thing I'm most hoping to get out of today's training?

If I had to define differentiation, I would say it is

If I had to identify two challenges to differentiation, I would say

America has believed that in differentiation, not in uniformity, lies the path of progress. *Justice Louis D. Brandeis*

Notes on introduction:

Environment

Points to consider -

- physical arrangement of the room
- grouping
- centers
- variety of materials
- social/emotional needs of gifted

Notes to self:

One thing I'm doing now:

One thing I can do this year:

One thing I could think about doing in the future:

One thing I could share with another teacher I know:

Content

Pre-Assessment

Graphic Organizers

- **bit.ly/graphic-org**
- **bit.ly/graphic-org-2**
- **bit.ly/graphic-org-3**

- Squaring Off

  Place a card in each corner of the room with the following phrases: Dirt Road, Paved Road, Highway and Yellow Brick Road. Instruct the students to go to the corner of the room that matches where they are in the new unit of study. Students go to the corner of the room and as a group, discuss what they know about the topic. Record your impressions of class pre-readiness.

- Post-it Poster

Students are each given 5 post-it-notes and are asked to generate 5 ideas about a topic which will be soon covered in class, for example dividing fractions.
Students are to initial each post-it-note and label each idea with the following symbols:
!! I'm sure of this fact
! I'm pretty sure of this fact
? I think I heard this and I think this is so and maybe true

Students take their 5 post-it-notes to a small group. The group members share one idea at a time and evaluate each idea. If the group decides it is not true, the idea is removed - majority rules. Duplicate ideas are kept together. The group identifies ideas that go together in some way.

Teachers will learn about student knowledge or lack of knowledge about a particular topic as well as their misconceptions. They will find out who the "experts" are as well as who has limited experience with the topic. (The initials will tell you who wrote which ideas.) This information will help in grouping students.

If desired, students can verify ideas on the post-it-notes using their text or the internet then remove ideas that are incorrect and then share with the class share with the class what they learned.

For students with no prior knowledge, teachers can write general ideas first and let groups classify them.

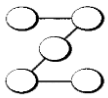
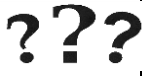
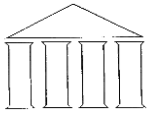
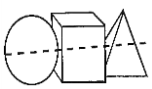
This activity may be done a few weeks in advance of teaching the unit to help with planning.
(Source: Heacox, D. (2005) SDE Conference notes)

- Punnett square

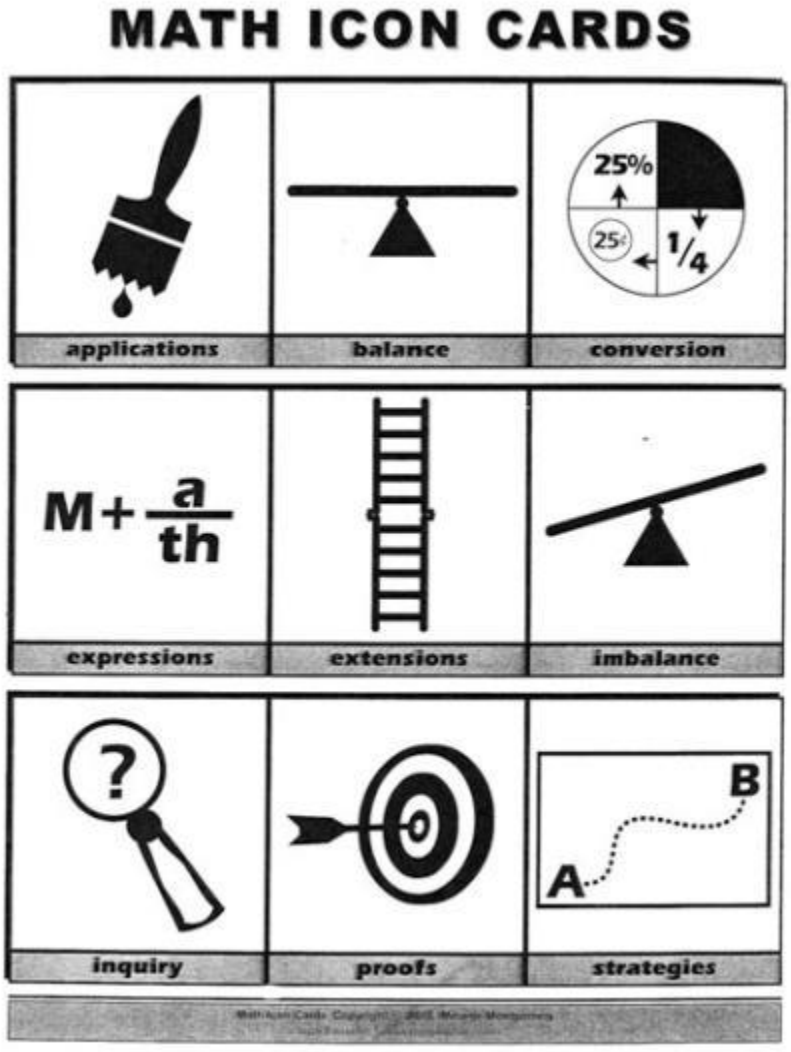
define	what it is
what it isn't	other things I know

- draw a diagram, picture
- written response
- picture matching
- label a diagram
- multiple choice
- essay response
- most difficult first
    - Teach the lesson.
    - Assign homework with 10 or so minutes left in class.
    - Star the 5 most difficult problems of the assignment.
    - Allow <u>any</u> student the opportunity to try to do the 5 most difficult. If they have 4/5 right during the time given, they do not have to do the rest of the assignment.
    - If they miss more than one, they need the additional reinforcement of the homework.
    - If they can't complete the 5 problems in a reasonable time, they also need the reinforcement of the homework.

Depth and Complexity Icons (Sandra Kaplan)

Depth & Complexity	*Icon*	*Definition*	*Example*
Language of the Discipline		**What vocabulary terms are specific to the content or discipline?**	**Tools Jargon Icons Acronyms Special phrases Terms Slang Abbreviations**
Details		**What are the defining features or characteristics? Find examples and evidence to support opinions and ideas.**	**Parts Factors Attributes Variables Distinguishing Traits**
Patterns		**What elements reoccur? What is the sequence or order of events? Make predictions based on past events.**	**Predictability Repetition**
Unanswered Questions		**What information is unclear, missing, or unavailable? What evidence do you need? What has not yet been proven?**	**Missing Parts Incomplete Ideas Discrepancies Unresolved issues Ambiguity**
Rules		**What structure underlies this subject? What guidelines or regulations affect it? What hierarchy or ordering principle is at work?**	**Structure Order Reasons Organization Explanation Classification "Because…"**
Trends		**Note factors (Social Economic, Political, Geographic) that cause events to occur. Identify patterns of change over time**	**Influence Forces Direction Course of Action Compare, Contrast and Forecast**
Ethics		**What moral principles are involved in this subject? What controversies exist? What arguments could emerge from a study of this topic?**	**Values Morals Pro and Con Bias Discrimination Prejudice Judging Differing Opinions Point of View Right and Wrong Wisdom**
Big Ideas		**What theory or general statement applies to these ideas? How do these ideas relate to broad concepts such as change, systems, chaos vs. order, etc? What is the main idea?**	**Draw conclusions based on evidence Make generalizations Summarize Theory Principle Main Idea**
Across the Disciplines		**Relate the area of study to other subjects within, between, and across disciplines.**	**Connect Associate Integrate Lind Ideas Cross-Curricular study**

Changes over Time		**How are elements related in terms of the past, present, and future? How and why do things change? What doesn't change?**	**Connecting points in time Examining a time period Compare and Contrast**
Different Perspectives		**How would others see the situation differently?**	**Different roles and knowledge Opposing viewpoints**



Links:

Intro to depth & complexity: **bit.ly/depth-complex-byrd**
More resources: **bit.ly/depth-complex-more** & yet more **bit.ly/depth-complex-res**. But wait! There's more! **depthandcomplexity.wikispaces.com** and even **bit.ly/depth-complex-2**. And then of course there's this **bit.ly/depth-complex-math** and this **envisiongifted.com/math.html** for math people.

Depth: Language of the discipline, big idea, essential details, rules, patterns, trends, unanswered questions, ethics: **bit.ly/elements-of-depth**.

Complexity: Change over time, multiple points of view, across the disciplines. **bit.ly/depth-complex2**.

Introduction slide deck: **bit.ly/intro-depth-complex**. Ugly, but comprehensive and with good techniques in the classroom. Don't like these? Try the new icons **bit.ly/new-depth-complex**.

Student Interest

TED: **www.ted.com**
TED Connections - **bit.ly/tedconnections**

Interest-a-lyzers
- secondary - **bit.ly/secondary-interest**
- primary – **bit.ly/elementary-interest**

Notes to self:

One thing I'm already doing:

One thing I can do this year:

One thing I could think about doing in the future:

One thing I could share with another teacher I know:

Process

Zone of Proximal Development – embrace appropriate challenge
Flow: The Psychology of Optimal Experience by Mihaly Csikszentmihaly. Watch this TED talk on it, if you're interested in the idea **bit.ly/flowted**.

Learning target checklist

What I can do	Explanation
I can identify and create a simile. My initials: Teacher's:	
I can multiply by 5's up to 50. My initials: Teacher's:	
I can safely use a Bunsen burner. My initials: Teacher's:	

Menus

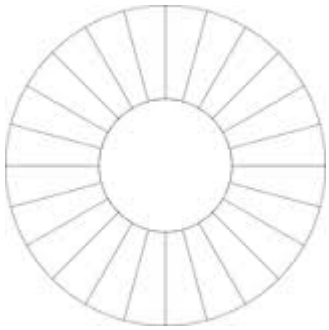
Dice:

- create six problems/practice items and correlate each one to a roll of the dice (one dot, two dots, etc.)
- divide students into groups
- students roll the die and answer the question. They may confer with the others in the group before they answer
- if the same number is rolled twice, the person can change the answer that was already answered or initial next to the answer that was given previously
- play continues until all six problems are answered.

(adapted from *Differentiating Instruction in Algebra 1* by Kelli Jurek)

Restaurant:
List possible choices as appetizers, main dishes, side dishes, and dessert (optional).

Spin a choice wheel (like Wheel of Fortune)



Tic-tac-toe (see below)

I Get Your Point!
Directions: Complete at least 20 points by selecting activities from the grid below.

5 Points	10 Points	20 Points
Draw three pictures of the setting.	Make a model of the setting in a shoe box.	Make a model of the setting as it will look in 100 years. Use at least three materials.
Draw a timeline of the history of the technology you investigated.	Create a bumper sticker about the technology you investigated.	Create a rhyming poem about the technology you investigated.
Draw a picture of two planets in our solar system, one gas, one not.	Create a model of two planets in the solar system.	Design a mobile model of two adjacent planets in the solar system.

Directions: Complete any three assignment choices that complete tic-tac-toe in any direction. (possible categories of choices are included below)

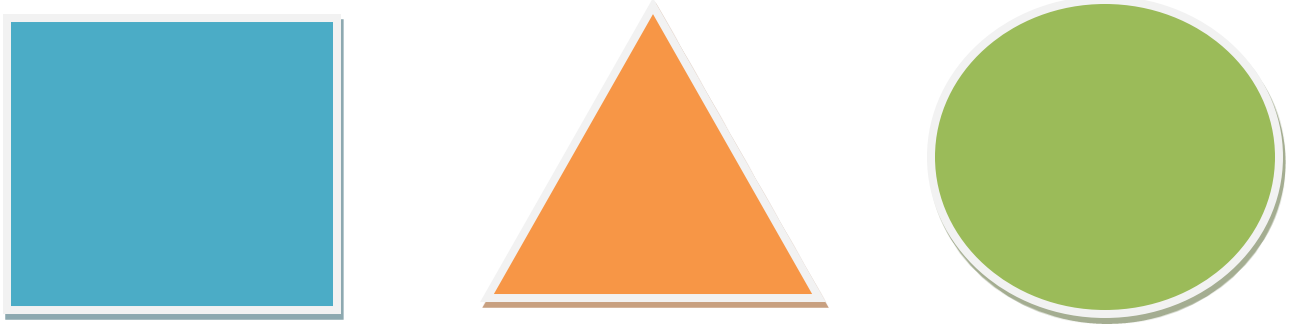
Knowledge	Comprehension	Evaluation
Application	Product	Knowledge
Analysis	Application	Extension

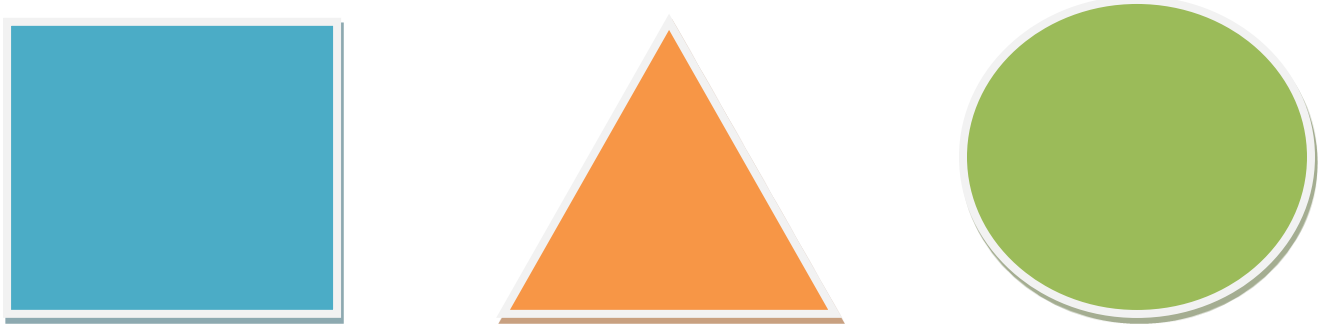
Tips & ideas:

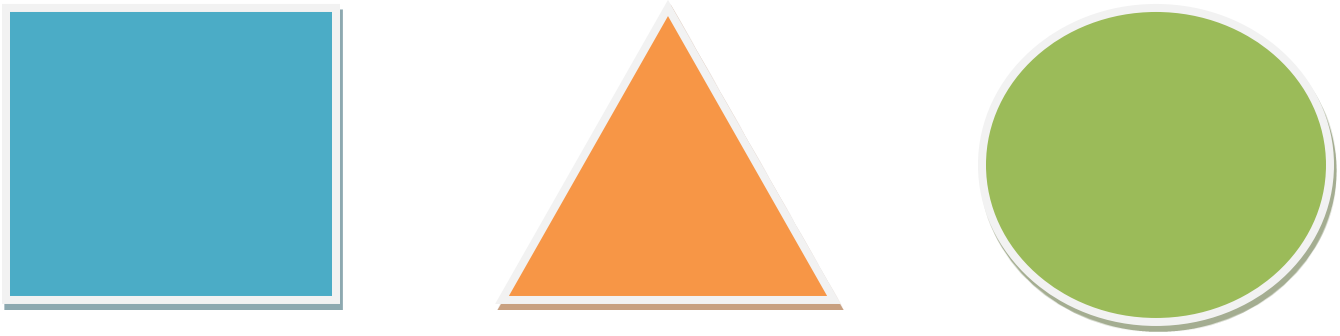
- The menus may be all product driven, or they may be a variety of products and tasks (creating something v. solving a problem)
- Check the products section of this handout for dozens of ideas to include in the menus.
- Search the internet for possible menus in your grade/content level. There is no sense re-inventing the wheel. You may find a template you really like

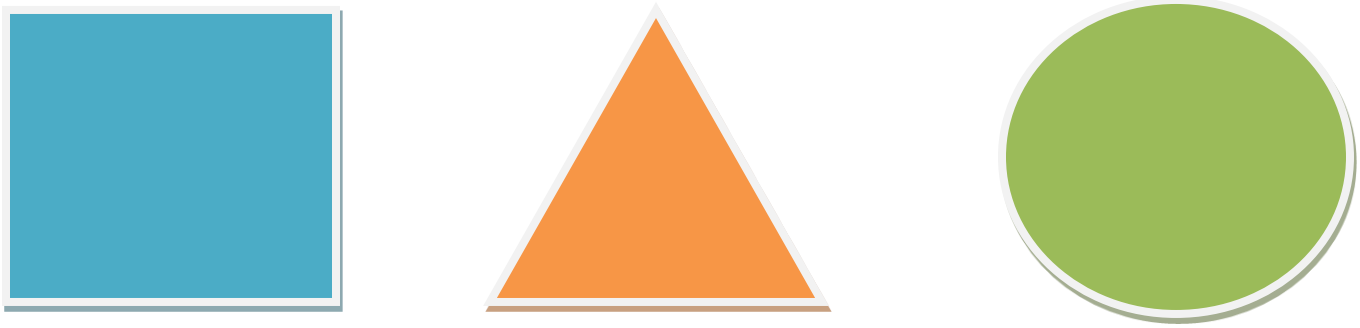
Shape Up!

Choose one activity from each shape group. Cut out your three choices and glue them on the matching shape below. Due date: _____









Tiering

Areas	Options
Groups	1. Group as whole 2. Alone 3. Paired up 4. Small group
Teacher Support	1. Teacher directing 2. Teacher helping small groups 3. Working independently
Complexity	1. Concrete (chunk it; use graphic organizers) 2. Abstract
Resources (quantity)	1. Single/limited 2. Multiple/varied (primary source documents; evaluate quality)
Resources (complexity)	1. Grade level 2. Above grade level 3. Require technology
Process Complexity	1. Pacing • typical • less repetition 2. Steps • few over short period of time • many over longer period of time
Thinking level	1. Lower levels 2. Mid level 3. High level
Product	1. Simple, right or wrong answers 2. Open-ended 3. Advanced skills necessary

How to Develop a Tiered Activity:

1. Select the activity (concept, skill)
2. Decide what you will differentiate for (readiness, interest)
3. Create activity that is high level.
4. Chart complexity of activity
5. Clone the activity along the ladder (see possibilities chart)
6. Match the version to the students (Which students will do which tier?)

Tiered Activity Examples

Subject:	Mathematics
Grade:	1
Standard:	Numbers and Operations
Key Concept:	Students understand and represent commonly used fractions such as 1/4 and 1/2.
Generalization:	Students will be able to illustrate how fractions represent part of a whole.
Background:	Fractions (halves/thirds) have been introduced and illustrated by the students with pictures. Materials: Paper circles, squares, rectangles, triangles
Tier I:	Using paper circles (pizza) and squares (sandwich), students in pairs determine how to share the food equally and illustrate by folding the paper. Have two pairs determine how they can share equally with four people. They can cut the parts and stack them to see if they match. Have the quad repeat the process for sharing a Reese's Peanut Butter Cup equally with three people.
Tier II:	Using paper circles (pizza) and squares (sandwich), have students in triads determine how to share the food equally and illustrate by folding the paper. Have two triads determine how they can share equally with six people. Have the group of six repeat the process for sharing a birthday cake with 12 people. In each case, they can cut the parts and stack to match. Have the group start with half a cake and divide equally for 3, 6, and 12 people.
Tier III:	Using paper rectangles (sandwiches) and triangles (slices of pie), have students in pairs determine how to share the food in three different ways to get two equal parts. Have them illustrate by folding the paper. Are there other different ways to divide each shape equally? How many ways are there? Have the pair determine which shapes—circles, squares, rectangles, triangles—are easier to divide evenly and illustrate why with a particular food of their choice.
Assessment:	As the students work, the teacher will circulate among the groups and note the children's abilities to divide materials into equal parts and to recognize and check for equal parts. Can children explain orally how many equal parts there are and demonstrate how they know the parts are equal? It is at the teacher's discretion to determine which children need more in-depth questioning to ascertain mastery of the concept.

Figure 4.1. **Tiered lesson in mathematics: Tiered in content according to readiness**

Subject: Language Arts

Key Concept: Book Report and Presentation

Book Reports:

Below Grade Level	Diorama Book Report Students will do different illustrations and paragraphs on paper and glue them into their box after completion. All inside sides are used except the inside top. • Back - students illustrate the setting of the book and write the book title on the picture. • Side - students illustrate the main character. • Side - students illustrate the their favorite scene. • Bottom - students summarize the plot in paragraph form.
Grade Level	Paper Bag Book Report Use a lunch size paper bag and have students create a written plan for their report, including 5 items to go on the inside as well as what will be on each part of the outside. • Inside - students will collect and put in 5 things that describe parts of the book. • Front - students write the title, author, and publisher. • Back - students illustrate their favorite scene. • Side - students summarize the plot in paragraph form. • Side - students describe the main character.
High Achievers	Folder Book Report Use 14 x 11 inch paper, preferably heavier paper, and fold it into a folder. On each side students will describe a part of the story in a different way. • Front - students illustrate any picture to describe the book. • Inside - students summarize the plot in paragraph form. • Inside - students describe and illustrate the main character. • Back - students critique the book and forward their recommendation.

Grade 6 – Mathematics Concept: Patterns
Key principle: There are rules that govern patterns.

As a result of this learning experience, students should be able to:

- Know (facts) -- Exponents, exponential growth, particular number patterns (powers of 2, squared numbers)
- Understand (principles) -- Patterns can be generalized, and mathematicians can use symbolic language (algebra) to describe patterns efficiently and in general terms
- Do (skills) -- Organize a search for patterns using a t-table

The lesson begins with a whole class activity that includes the following assignments.

- Read aloud *The King's Chessboard* (a story in which a wise man solves a problem for his king and asks as his reward that he receive one grain of rice on the first square of a chessboard and that the amount be doubled every day for the next square until all squares have been used.) Stop throughout the story so students can use their calculators to figure out the number of rice grains that have accumulated.
- Discuss with students how mathematicians reading this story would have the urge to translate this information into numerical form and then play with it to see if there is something happening that can be described mathematically.
- Using data from the story, introduce the t-table as an organizing tool to help students think, recognize, and predict patterns. Students and teacher discuss the pattern in the table and write a verbal rule for the pattern. ("It doubles each time.")
- Introduce the idea of exponents as an efficient way to show the pattern. ("It doubles every time" becomes 2 squared). Discuss the idea that mathematicians want to be able to make a general statement about the pattern they see, turning verbal rules into symbolic language of algebra, and how the t-table helps you see the pattern more easily.
- Have students write an exit card to explain how the principle in *The King's Chessboard* works. The learning experience continues with a set of tiered activities using another problem to provide opportunities for students to look for meaning in patterns using t-tables as an organizing tool. Teachers assign students to one of three groups based on readiness. All three groups
- Solve the same problem.
- Must produce a t-table.
- Must write a description of the process they followed to discover the pattern.
- Must write a description of the pattern itself, using either words or symbols.

The Locker Problem

A school has 1,000 lockers and 1,000 students. The students decide to have fun one day, so they take turns opening and closing the lockers, according to the following plan.

- The first student opens every locker.
- The second student closes every second locker.
- The third student opens every third closed locker.
- The fourth student closes every fourth open locker.
- The students continue in this manner until all 1,000 students have had their turn.

When all the students are finished, which lockers remain open?

Students work in pairs or individually (their choice) on the assigned version of the Locker Problem.

Group 1:

- Two-color counters are provided for physically modeling the open/closed sequence.
- Students receive a graphic that lets them record the open/closed position for the first 16 lockers.
- Students receive a t-table with appropriate column headings for recording information about which lockers remain open.
- Students must write a description of what they did to discover the pattern and describe the pattern in words.

Group 2:

- Students receive a graphic so they can record the open/closed position for the first 16 lockers.
- Students must produce a t-table, and no format is provided.
- Students must write a description of their process and describe the pattern in words.

Group 3:

- Only the problem is provided (no graphic, no formatted t-table).
- Students must produce a t-table.
- Students must write a description of what they did to solve the problem and must provide the generalized, algebraic rule.

After students have completed the problem, the whole class discusses how they thought about solving the problem, the tools they used, and their varied ways of solving it. Then students select from one of two homework assignments -- one requires solving

another problem that involves a pattern, t-table, and exponents, the other has students develop such a problem. *Note: adapted from* pdonline.ascd.org/pd_html/di2lessonexamp.html

Compacting:

Eight Steps for Implementing Curriculum Compacting
Identify Need for Compacting
Step One • Identify the relevant learning objectives in a given subject area of grade level
Step Two • Find or develop some means of pretesting students on one or more of these objectives prior to instruction
Step Three • Identify students who may benefit from curriculum compacting and should be pretested (may be a few students or whole class)
Step Four • Pretest students to determine their mastery levels of the chosen objectives
Compact Regular Curriculum
Step Five • Eliminate practice, drill, or instructional time for students who have demonstrated prior mastery of these objectives
Step Six • Streamline instruction of those objectives students have not yet mastered but are capable of mastering more quickly than their classmates
Provide Alternatives
Step Seven • Offer enrichment or acceleration options for students whose curriculum has been compacted
Keep Records
Step Eight • Keep records of this process and the instructional options available to "compacted" students

(source: the University of Connecticut)

Curriculum Compacting Record

Student Name _____

Class/Subject _____

Content	Evidence of Pre-knowledge	Alternate Assignment
		Evaluation:
		Evaluation:
		Evaluation:

Keep a record to show these key ideas:

- What was the content or skill being studied?
- What made you decide to compact? (the pre-assessment, etc.)
- What did the student do instead?

Permission to Read Ahead (download at **giftedguru.com/free-downloads**)

- use contract
- student should agree to avoid spoilers
- student may not participate in predictions
- student must have a plan for the gap time
- see project section for possible gap time ideas

Tiering & Compacting Resources and Lesson Plans:

- **byrdseed.com/the-differentiator**
- **bit.ly/tiered-template** (planning template)
- **daretodifferentiate.wikispaces.com/Tiering**
- **differentiationcentral.com/examples/Tiered_LeslieN.pdf**

Acceleration: nationdeceived.org

- early entry (K or 1st)
- whole-grade acceleration
- single-subject acceleration
- compacting
- telescoping
- combined grade levels
- correspondence courses
- early graduation
- dual credit/AP/IB

Some signs for early Kinder admission:

- Early verbal ability
- Strong mathematical skills
- Long attention span
- Early ability to reason abstractly
- Early interest in time

(from *A Nation Deceived)*

Acceleration is one of the most curious phenomena in the field of education. I can think of no other issue in which there is such a gulf between what research has revealed and what most practitioners believe. The research on acceleration is so uniformly positive, the benefits of appropriate acceleration so unequivocal, that it is difficult to see how an educator could oppose it.

James H. Borland, Professor, Teachers College, Columbia University Planning and Implementing Programs for the Gifted, 1989 (p. 185).

My two cents: **giftedguru.com/the-advantages-of-acceleration**

Grouping

- Cluster Grouping: The placement of several high achieving, high ability, or gifted students in a regular classroom with other students.

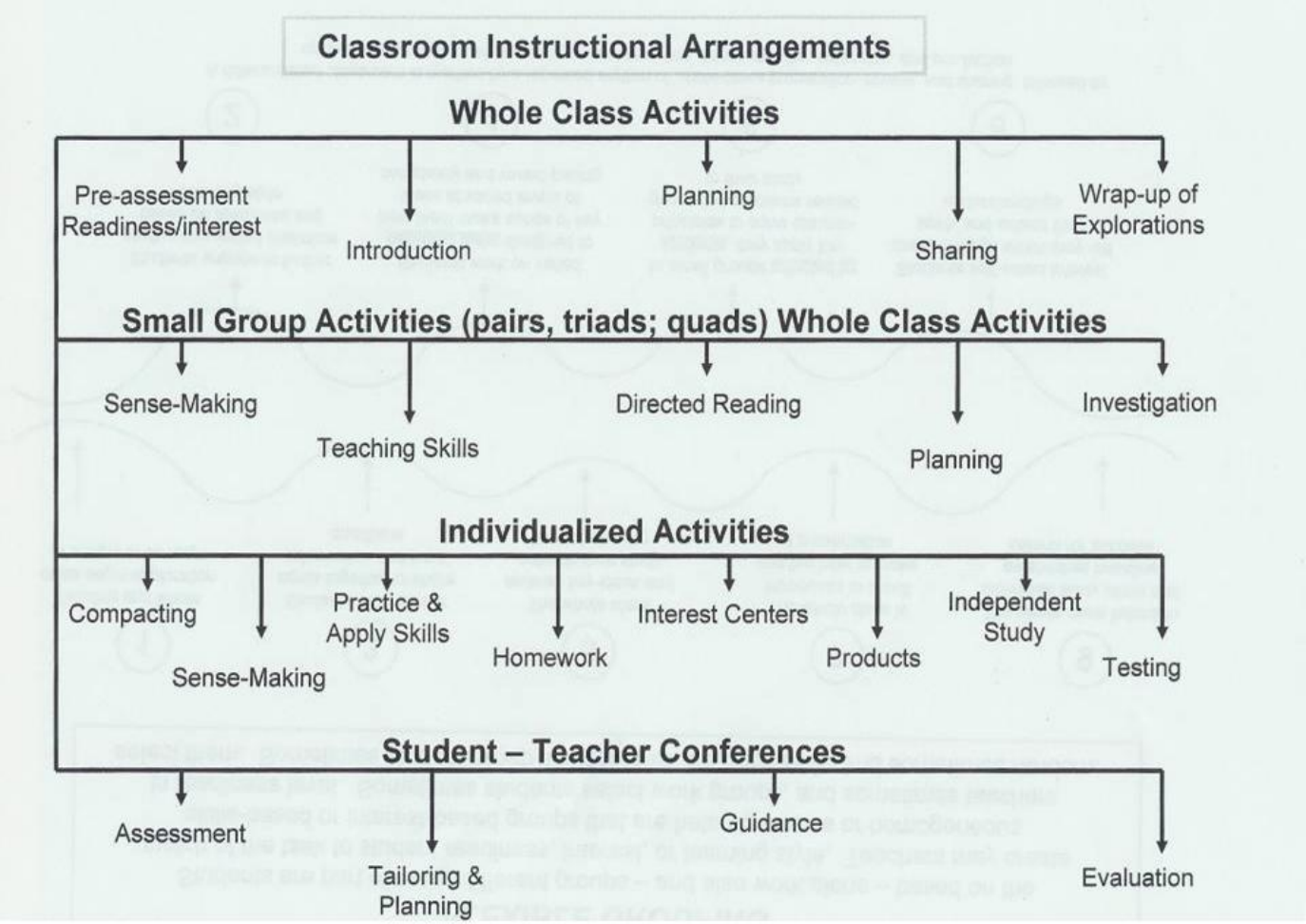
- Total School Cluster Grouping: Places students in classrooms in order to reduce the number of achievement levels in each classroom and facilitate teachers' differentiation of curriculum and instruction for all students (not restricted by age-grade tradition).

- Ability Grouping: Students are grouped for the purpose of modification of pace, instruction, and curriculum. Groups can be flexible and arranged by subject, within classes, or between classes.

- Achievement Grouping: Focuses on demonstrated levels of achievement by students and is viewed as something dynamic and changing. Groups can be arranged by subject, within classes, or between classes.

- Between-class Grouping: Students are regrouped for a subject area (usually within grade level) based on ability or achievement.

- Within-class Grouping: Different arrangements teachers use in their classes. Groups may be created by interest, skill, achievement, job, ability, self-selection - either heterogeneous or homogeneous – and can include various forms of cooperative learning grouping arrangements.



Source: http://www.kennesaw.edu/education/soap/rex/keynote.ppt#256,1, Differentiating Instruction: The Journey

Key Idea:
Don't group just to group. Be deliberate and pedagogically sound in your choice.

Notes to self:

One thing I am doing already:

One thing I can do now:

One thing I can do this year:

One thing I could think about doing in the future:

Product

General Principles

- real problems - real and relevant to the student and the activity
- real audiences - utilizing an "audience" that is appropriate for the product, which could include another student or group of students, a teacher (not necessarily the class teacher), an assembly, a mentor, or a community or specific interest group.
- real deadlines - encouraging time management skills and realistic planning
- transformations - involving original manipulation of information rather than regurgitation
- appropriate evaluation - with the product and the process of its development being both self-evaluated and evaluated by the product's audience using previously established "real world" criteria that are appropriate for such products.

(ADAPTED FROM *MEETING THE NEEDS OF GIFTED STUDENTS IN THE REGULAR CLASSROOM*)

Audience {idea: Who besides YOU?}

- Slideshare **slideshare.net**
- HaikuDeck **haikudeck.com**
- Flipsnack **flipsnack.com**
- movie **animoto.com**
- display cabinets
- tops of library shelves
- visitors to class
- school/district website
- authentic audience

Research/Independent Study Resources:

- IIM Website: **iimresearch.com**
- Library of Congress research projects: **loc.gov/preservation/scientists/projects**
- Library of Congress using primary source documents: **loc.gov/teachers/tps**
- Library of Congress general teacher site: **loc.gov/teachers**

- Envision (long-term projects): **mindvinepress.com**
- TED Connections: **bit.ly/tedconnections**
- Mensa for Kids Lesson Plans: **bit.ly/mfklessons**
- National Student Research Center - **nscresearchcenter.org**
  NSRC serves as an outlet for student investigations. This site is on-line to assist teachers and their students on how to conduct scientific research. Students can submit their research findings to this site for publication.
- *Independent Study for Gifted Learners* (The Practical Strategies Series in Gifted Education). Prufrock
- The Exploratorium's website, in four languages, is as interactive and hands-on as the museum in San Francisco! Thus, it's not surprising that the website has earned a variety of awards. Monthly, the staff presents "10 Cool Science, Art, and Education Sites." **exploratorium.edu**
- National Aeronautics and Space Administration (NASA) maintains an award-winning website that houses a special link to Cool Web Sites for Kids. Students can access a variety of interactive, hands-on activities and resources about: airplanes, the Earth, planets, space travel, stars, and galaxies. All links are chock-full! Once into the planet site, for example, students have a wide variety of options such as, Make Your Own Scale Model of Galileo, Build Your Own Martian Spacecraft, and Gravity Box, in which students compare Earth's gravity to gravity on the Moon and Mars. **nasa.gov/kids.html**
- The American Memory Historical Collection, a major component of the National Digital Library Program, is composed of multimedia collections of digitized documents, photographs, recorded sounds, moving pictures, and text. There are over 70 collections and some investigate themes such as elections, immigration, inaugurations, presidents, and women pioneers. **memory.loc.gov**
- National History Day: **nationalhistoryday.org**
- National Gallery of Art kids' section (super neat!) **nga.gov/kids/kids.htm**
- Dinosaur lover? **kidsdinos.com**
- Experiments and virtual field trips to science museums **tryscience.org**
- Learn how everything works! **howstuffworks.com** and my fave podcast **stuffyoushouldknow.com/podcasts**

Contests

- Teaching with Contests: **teachingwithcontests.com**
- Mensa Foundation Excellence in Reading: **mensaforkids.org**
- Johns Hopkins links to academic competitions: **bit.ly/jh-contests**
- Poetry Out Loud: **poetryoutloud.org**

Problem-based Learning

- Major PBL resource **bit.ly/pbl-resource**
- Seven Essentials for PBL (from ASCD): **bit.ly/ascd-pbl**
- tips for assessing PBL **bit.ly/10-pbl-tips**

ProjectPalooza!

ABC book	diary	mock Facebook page	puzzle
ad campaign	display	mock trial	sculpture
blog	graph	mural	storyboard
blueprint	graphic novel	newscast script	survey
board game	greeting card	newspaper	timeline
book cover	guidebook	obituary	Twitter post/profile
book review	interview	organize event	video
bumper sticker	journal	pamphlet/brochure	virtual fieldtrip
cartoon	letter to the editor	philosophical chairs	walking tour
chart	logo design	photo essay	webquest
collage	magazine	plan for lottery winnings	website
dance	map	poem	will & testament
debate	mask	postcard	word collage
diagram	mobile	puppet show	write a song

ADDITIONAL RESOURCES:

- Excellent Resource for ELA Lesson Plans**: readwritethink.org**
- This site has solid differentiated lesson plans for middle school and high school **bit.ly/diff-plans**
- huge site with excellent resources for integrating technology into the classroom **teach-nology.com**
- pinterest board on differentiation **pinterest.com/theocblog/differentiation**
- pinterest board on differentiation **bit.ly/pinterest-differentiation**
- wiki on differentiation **differentiationkit.wikispaces.com**

After this learning experience, how do you feel? Please take a moment to share…

On a scale of 1-10, how much do you feel you know about differentiation?

On a scale of 1-10, how open are you to this principle?

Did you get what you were most hoping to get out of today's training?

Do you feel that the two challenges to differentiation you identified in the beginning are the ones you would still identify?

On a scale of 1 – 10, how confident do you feel that you could incorporate at least one idea you learned today into your classroom without difficulty?