

Cubing and Think Dots

Revised Bloom's Taxonomy

The Taxonomy of Educational Objectives was created by Benjamin Bloom in the 1950's as a means of expressing qualitatively different kinds of thinking. Bloom's Taxonomy has since been adapted for classroom use as a planning tool and continues to be one of the most universally applied models across all levels of schooling and in all areas of study.

The Revised Bloom's Taxonomy

During the 1990's, Lorin Anderson (a former student of Benjamin Bloom) led a team of cognitive psychologists in revisiting the taxonomy with the view to examining the relevance of the taxonomy as we enter the twenty-first century.

As a result of the investigation a number of significant improvements were made to the existing structure. Before turning to examples of how the newly revised Taxonomy may be applied, it would be appropriate at this point to make both the revisions and reasons for the changes explicit. Figure 1 below describes both the '*old*' and the '*new*' taxonomies:

REMEMBERING

Recognise, list, describe, identify retrieve, name

Can the student **RECALL** information?

UNDERSTANDING

Interpret, exemplify, summarise, infer, paraphrase

Can the student **EXPLAIN** ideas or concepts?

APPLYING

Implement, carry out, use ...

Can the student **USE** the new knowledge in another familiar situation?

ANALYSING

Compare, attribute, organise, deconstruct ...

Can the student **DIFFERENTIATE** between constituent parts?

EVALUATING

Check, critique, judge hypothesise ...

Can the student **JUSTIFY** a decision or course of action?

CREATING

Design, construct, plan, produce ...

Can the student GENERATE new products, ideas or ways of viewing things ?

Bloom's Original Taxonomy	Anderson's Revised Taxonomy
Knowledge	Remembering
Comprehension	Understanding
Application	Applying
Analysis	Analysing
Synthesis	Evaluating
Evaluation	Creating

Figure 1 – The original taxonomy and the revised taxonomy

Cubing



Rolling for Success

What is “cubing”?

- Cubing is an instructional strategy that asks students to consider a concept from a variety of different perspectives.
- The cubes are six-sided figures that have a different activity on each side of the cube.
- A student rolls the cube and does the activity that comes up.

How is Cubing differentiated?

- Not all students receive the same cube.
- You can differentiate cubes according to readiness, learning profile, or interest (see differentiated cubing examples included).

How it works:

- Students can work alone, in pairs, or in small groups with the appropriate cube.
- In pairs or small groups, each student takes a turn rolling the cube and doing the activity that comes up. Students have the choice to roll again once if they don't like the activity that turns up.
- Students each roll the cube 2-4 times, depending on the magnitude of the assignments.

Using Cubing to Hone Thinking Skills

- Cubing originally was created to have students use a variety of thinking skills to consider a single concept.
- When used this way, each side of the cube has a different prompt: describe it, compare it, associate it, analyze it, apply it, evaluate it.

Cube Sides Suggestions...



Describe it * Compare it * Associate it *
Analyze it * Apply it * Connect it * Illustrate it
* Change it * Solve it * Question it *
Rearrange it * Satirize it * Evaluate it * Relate
it to something else * Contrast it * Investigate
it * What is the significance of it? * Put it in
historical perspective * What are the
cause/effects of it * Cartoon it * Tell the parts
of it * Argue for/against it *

Example: Onomatopoeia

Side One

Find an example of **onomatopoeia** in a poem from our anthology

Side Two

Make a list of all the examples of **onomatopoeia** that you can think of in two minutes. Have your partner time you.

Side Three

Write a letter to Webster's Dictionary from **onomatopoeia** on the topic, "We are words, too! Include us!"

Side Four

Write a limerick, concrete poem, or haiku using at least one example of onomatopoeia

Side Five

Why do you think writers use onomatopoeia? What purpose does it serve?

Side Six

Research the origin of the word "onomatopoeia." Where does it come from? What do its parts mean?

Example: Fractions

Side One: Locate It

In two minutes, make a list of all of the places in which we find fractions in every day life. Have your partner time you.

Side Two: Define It

What is a fraction? How would you explain what a fraction is to a first grader?

Side Three: Solve It

Complete fraction problems 1-10 on page 65. Have your partner check your work.

Side Four: Analyze It

What are the parts of a fraction? Define each part and describe their relationships to one another.

Side Five: Think About It

When dividing fractions, why do we have to "invert and multiply"? Show your thinking on paper.

Side Six: Illustrate It

Create a children's picture book about fractions. Use "Give Me Half!" as an example.

What is the point?

- Cubing gives students who like to use their hands and move around a chance to feel like they are “playing” while learning.
- Cubing gives students a chance to look at a concept from a series of different perspectives.
- Cubing allows the teacher to differentiate for readiness in a very un-obvious way. Since all students are working with cubes, students are not aware that their neighbors might be doing something a little different.

Concerns?

- Here is one... you may have more:
 - Cubes *can* turn into glorified worksheets– but not if all activities are *purposeful* and focused on getting students to understand a concept in a multitude of ways.

Cubing Fact Sheet

What is it? Cubing is a versatile strategy, similar to a contract, which allows you to plan different activities for different students or groups of students based on student readiness, learning style, and/or interests. You will create a cube—usually different colored cubes for different groups of students. On each of its six faces, you will describe a different task related to the subject and/or concept being learned.

Why use it? Cubing provides a way for all students to explore one important topic or idea but to accomplish tasks at their readiness levels, in their preferred learning styles, and/or in areas of personal interest. All students are working on activities dictated by their cubes; the activities are differentiated for individual students or groups of students. Groups are very flexible. One cubing activity might group gifted learners for more challenging, higher-level activities; another cubing activity might group gifted and non-gifted students alike according to their interests.

How to use it? Print out the blank cube template with these instructions. Then think of many different commands which might go on the faces of a cube (describe, diagram, apply, analyze, connect, argue, evaluate, and create, for example).

Example #1: To differentiate according to different levels of student readiness, two or more different cubes could be created with the same commands but with tasks at different levels of difficulty. Using "Describe" as the command, the task might be to describe the rainforest using as much information as you can and involving as many of your senses as possible in your description. Using the same command, you might ask the students to describe how their life would change if they moved to the canopy of the rainforest, using as many of their senses as possible in their description and being sure to explain why these changes would take place.

Example #2: To differentiate an activity according to interest or learning profile, you might set up several cubes for a single review activity. Two or three faces on all the cubes might be identical. The remaining faces on one of the cubes might contain tasks appropriate for students who enjoy writing (creating a poem, writing a journal entry, creating a pun). Another cube might

be better for oral learners, with tasks such as telling a story, presenting arguments for or against, or writing a song. You might create a third cube with activities which appeal to students with spatial strengths—making models, drawing or sketching, or making a Venn diagram with pictures rather than words.

To differentiate instruction through the strategy of cubing, you will create different activities for different cubes. You would then assign students to tables with cubes that match their specific needs and abilities. Each student rolls a cube a specific number of times, and the face that points up on each roll becomes a task for a student to complete.

Where can I find more information about cubing?

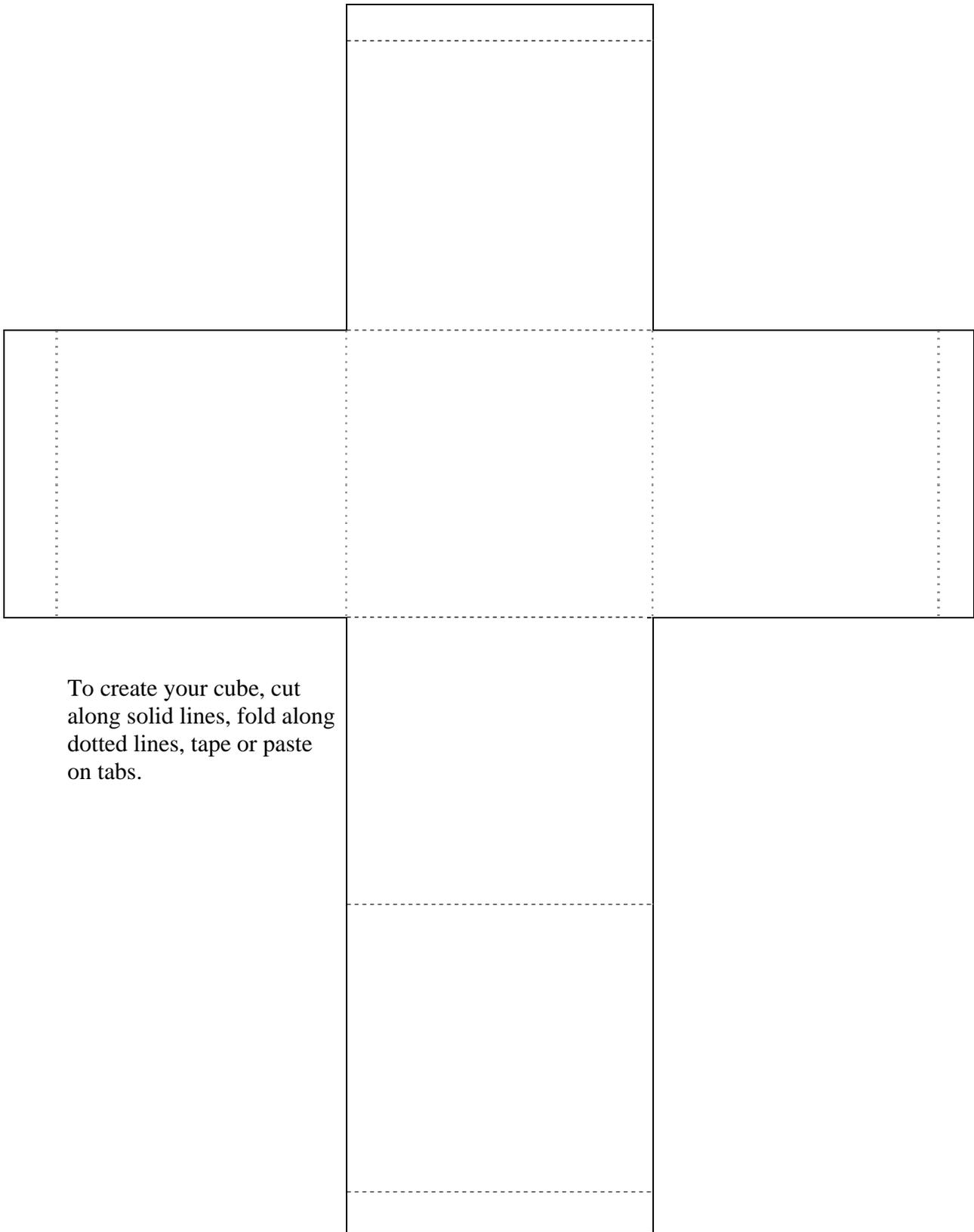
How to Differentiate Instruction in Mixed Ability Classrooms, Carol Ann Tomlinson, ASCD.

<http://www.mcps.k12.md.us/departments/eii/eiiscrapbook.html> Photographs of differentiation strategies in use; look for cubing activities

<http://www.bsu.edu/teachers/services/ctr/javits/Instruction/Cubing.htm> Examples of on-level cubing activities; you'll need to modify up and down; a template for making your cube.

Updated 3/29/02
Eulouise Williams

<file:///E:/Strategies%20Materials%20for%20Participants/Cubing.Think%20Dots%20Folder/Cubing%20article.htm>



To create your cube, cut along solid lines, fold along dotted lines, tape or paste on tabs.

ThinkDOTS©

A Versatile Strategy for Differentiation



© Kay Brimijoin, 2003



ThinkDOTS©

- After a conceptual unit has been presented and students are familiar with the ideas and associated skills, “Think DOTS” is an excellent activity for students to construct meaning for themselves about the concept they are studying. The instructor first defines readiness levels, interests or learning styles in the class, using on-going assessment.
- Each student is given a set of activity cards on a ring, a die, and an activity sheet. Each student rolls the die and completes the activity on the card that corresponds to the dots thrown on the die (that is, if a student rolls a “three,” she then finds the card with three dots on it and completes the activity written on that card). Each student then completes the activity on the activity sheet.

Materials:

1. 8 ½ x 11 inch paper or 5X7 index cards
2. Hole punch
3. Metal or plastic rings
4. Dice
5. Scissors
6. Markers or sticker dots
7. Laminating materials (optional)



Think Dots Activities

- The activities on the activity card should allow students to explore what they just learned from a variety of angles.
- You may consider having each activity card explore a concept or idea from a different level of Bloom's Revised Taxonomy*
- You can use the cards for a fun, engaging test review– put different formulas, important terms, or problems on each card

*Bloom's Revised Taxonomy is included in this packet.

ThinkDOTS ©



Construction:

1. For each readiness level, six activities should be created.
2. On an 8 ½ x 11 inch page divided into six sections (this can be done easily on the computer by creating a 2 x 3 cell table and saving it as a template), the activities should be written or typed in each section.
3. On the back of each page, dots corresponding to the dots on the faces of a die should be either drawn or affixed (you can use Avery adhesive dots) on each of the six sections of the page.
4. The pages should be laminated for durability.
5. Then each page should be cut into the six sections.
6. Use a hole punch to make holes in one corner or in the top of each activity card.
7. Use a metal or plastic ring to hold each set of six cards together (you can get 100 metal rings from office supply stores for \$9.00)
8. Create an Activity Sheet to correspond to the lesson for easy recording and management.



ThinkDOTS ©

Suggestions:

1. Use colored paper and/or colored dots to indicate different readiness levels, interests or learning styles.
2. Have students work in pairs.
3. Let students choose which activities – for example: roll the die and choose any three; create complex activities and have students choose just one to work on over a number of days.
4. After students have worked on activity cards individually, have them come together in groups by levels, interest or learning style to synthesize



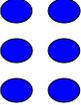
ThinkDOTS ©

Application:

1. Use “ThinkDOTS” to lead students into deeper exploration of an idea.
2. Use “ThinkDOTS” for review before assessment.
3. Use “ThinkDOTS” as an assessment.



**Science Lesson
ThinkDOTS - Matter**

<p>How do the atomic numbers in the periodic table change from the top to the bottom? From left to right across the table?</p> 	<p>Predict as many properties for potassium as you can. To make your predictions, look at the information in the box for this element and consider its location on the periodic table.</p> 	<p>Carbon is atomic number 6. How are two carbon atoms with mass numbers of 12 and 14 different? Why are these atoms called isotopes?</p> 
<p>Why do you think scientists used the term "cloud" to describe the position of electrons in an atom?</p> 	<p>There are three jars in the front of the room. Each has a substance with a strong odor. One is a solid, one is a liquid, and one is a gas. Which odor would students in the back of the room smell first? Why?</p> 	<p>Suppose you were given some sugar cubes, a grinder, some water, a pan, and a hot plate. What physical and chemical changes could you make in the sugar?</p> 

P. Goolsby & K. Brimjoin,
Amherst County Schools, 2000

High School English Unit: Prejudice

Kathy Pegues, 2000

<p align="center"><u>Prejudice</u> </p> <p>Discuss how prejudice and discrimination are not only harmful to the victim, but also to those who practice them.</p>	<p align="center"><u>Scapegoating</u> </p> <p>Imagine a group of people that could be scapegoats. List and describe stereotypes of this group and the treatments they received because of them.</p>
<p align="center"><u>Articles</u> </p> <p>Read the article. What could be reasons for the persecution? How can you justify and understand the minds of those responsible?</p>	<p align="center"><u>Photography</u> </p> <p>Photographs tell stories. Write a caption for the photo and explain why you chose it.</p>
<p align="center"><u>Genetics</u> </p> <p>Certain characteristics are blamed on genetics. Do genetics impact the characteristics of your group? Explain the reasoning behind your answer. Use your science knowledge.</p>	<p align="center"><u>Stereotypes</u> </p> <p>Your group was persecuted. Identify a group who has been persecuted in more recent years. Compare the two and give reasons why.</p>

ThinkDOTS: Vocabulary Review

<p style="text-align: center;"><u>Connect it</u> ●</p> <p>An automobile manufacturer wants to use this word as the name for its newest car. They have asked you to design the car– if this word were a car, what would it look like? Draw a picture.</p>	<p style="text-align: center;"><u>Define it</u> ● ●</p> <p>What is this word’s definition?</p>
<p style="text-align: center;"><u>Use it</u> ● ● ●</p> <p>Create a concrete poem using this word as the poem’s subject.</p>	<p style="text-align: center;"><u>Collage it</u> ● ● ● ●</p> <p>Create a collage of words and images which represents this word. Do not put the word or the definition on the front of the collage; write them on the back.</p>
<p style="text-align: center;"><u>Evaluate it</u></p> <p>In your opinion, is this word a “good” word or a “bad” word? In other words, is this word useful? Does it do a job that no other word can do?</p> <p style="text-align: center;">● ● ● ● ● ●</p>	<p style="text-align: center;">● ● ● ● ● ● ● ● <u>Personify it</u></p> <p>Give this word a personality– what do you think this word would be like if it were a person? Find another word from our list that you think would either be this word’s perfect match or worst enemy, and explain your rationale.</p>

ThinkDOTS: Probability and Statistics

<p style="text-align: center;"><u>Argue it</u></p> <p>Make an argument for which graphing method is the easiest to read: pie charts, stem-and-leaf plots, bar graphs, or line graphs. Construct a visual model to show us why.</p>	<p style="text-align: center;"><u>Conduct a survey</u></p> <p>Choose a random sample of n=15 students from this class and conduct a survey of their favorite sports team/food/rock star/ etc. (your choice!). Describe how you arrived at your random sample, and create a data display of your results.</p>
<p style="text-align: center;"><u>Call it into question</u></p> <p>Is there such thing as a truly “random sample”?</p>	<p style="text-align: center;"><u>Define it</u></p> <p>What is a random stratified sample? When would you use one?</p>
<p style="text-align: center;"><u>Evaluate it</u></p> <p>Look at today’s U.S.A Today opinion poll. What type of graph is it using to display its results? Do you feel that the data display is accurate or misleading?</p>	<p style="text-align: center;"><u>Plot it</u></p> <p>Plot the distribution of scores from last year’s final exam (Get the scores from the teacher-- sorry, all names have been removed!)</p>