

INTRODUCTION

A. Welcome Message. Welcome to the Gifted and Talented Teacher Toolkit CD! The Texas Education Agency (TEA) has compiled these resources to help you teach research skills to your students. The CD includes links to websites and documents that provide background information on knowledge formation, specific resources for the four core content areas, tips for differentiating instruction for gifted learners, techniques for conducting research, and sample scope and sequence documents.

i. Purpose of the Toolkit. This toolkit is meant for teachers of gifted students who want to ensure that students undertake professional research and develop high quality products in concordance with the State Goal for Services for Gifted Students. Schools should use gifted education in grades K-8 as a formative experience—the knowledge, skills, and processes practiced and acquired at this level will lead to the development of more complex and sophisticated student products in the upper grades. Gifted education in grades 9-12 should reflect professional-level processes and performances. As educators, we need to consider how we can move gifted students from those early formative experiences to become developers of creative, unique, and advanced products. TEA hopes that this toolkit can help you in this journey.

ii. How To Use the CD.

The CD was developed for use on computers running current versions of Windows and Macintosh OSX operating systems. Some features require the Adobe Acrobat PDF Reader software which can be downloaded for free from www.adobe.com if it is not already installed on the computer. For PC users, the CD should start automatically. If it does not, choose “Explore CD” from the explorer menu, navigate to the file “GT_Teacher_Toolkit.exe” and double-click it to start the program. Macintosh users will need to follow the steps in the “Read_Me” file in the “Macintosh_Version” folder for instructions on running the program on the Macintosh computer. Additionally, for optimal viewing, the recommended display settings are a resolution of 1024 x 768 or higher.

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In the development of this toolkit, we have relied on a variety of valuable experts and resources. Every effort has been made to give sources proper credit. If any sources were omitted, please notify us for acknowledgements in future publications.

v. Contact Information. For additional information or copies of the toolkit, contact your regional education service center GT specialist (see <http://www.tea.state.tx.us/ESC/>) or Kelly Callaway, Director of Advanced Academics/Gifted Education at kelly.callaway@tea.state.tx.us or (512) 463-1419.

TEACHING RESEARCH SKILLS TO GIFTED STUDENTS

Gifted and talented students require differentiation and special instruction in the areas of content knowledge, product development, and research processes. The links in this section provide information on learning theory, content knowledge, product development and assessment, and research processes.

A. Learning Theory. This section of the toolkit provides some background research on how gifted students learn and how to encourage students to use advanced thinking processes. See the links for more information on the work of Bloom, Bruner, and Kaplan.

i. Bloom's Taxonomy. Bloom's Taxonomy is the most common method of expanding thinking skills. Bloom's is a classification organized by complexity, and the levels include knowledge, comprehension, application, analysis, synthesis, and evaluation. The websites listed below are some good resources for Bloom's Taxonomy.

1. Basic Bloom's Information and Three Types of Learning
<http://www.nwlink.com/~donclark/hrd/bloom.html>
2. Applying Bloom's Taxonomy and Using Bloom's in Research
<http://www.teachers.ash.org.au/researchskills/Question.htm>
3. Bloom's Question Stems <http://www.kcmetro.cc.mo.us/longview/ctac/blooms.htm>
4. Bloom's and Gifted Students http://www.tki.org.nz/r/gifted/handbook/stage2/prog_blooms_e.php
5. Bloom's Revised Taxonomy <http://coe.sdsu.edu/eet/Articles/bloomrev/index.htm>
6. Bloom's and Assessment http://www.apa.org/ed/new_blooms.html

ii. Bruner's Discovery Learning. Jerome Bruner, a constructivist and learning theorist, developed the theory of Discovery Learning. Discovery Learning is an inquiry-based learning method in which Bruner asserts that student learning is an active process and a hierarchical one. Students' new learning experiences should build on their current knowledge, and students are more likely to engage in meaningful learning if they discover concepts on their own. The websites listed below provide some resources for Bruner's Discovery Learning.

1. Principles of Bruner's Theories <http://tip.psychology.org/bruner.html>
2. Bruner and the Process of Education <http://www.infed.org/thinkers/bruner.htm>
3. Discovery Learning Cycle http://www.agcharter.org/curriculum/discovery_learning.html

iii. Kaplan's Scholarly Behaviors. Sandra Kaplan is a respected researcher in the field of gifted and talented education. Kaplan has developed a set of scholarly behaviors (i.e., asking questions, using many tools and resources) and what teachers and students who exhibit scholarly behaviors look like. The websites listed below provide resources on Kaplan's work.

1. Posters Adapted from Kaplan's Work <http://www.lbusd.k12.ca.us/curriculum/GATE/teachres.htm>
2. Kaplan's Scholarly Behaviors <http://www.georgetownisd.org/frost/scholarlybehaviors.htm>
3. Elements of Depth and Complexity
<http://www.georgetownisd.org/frost/elements%20of%20depth%20and%20complexity.htm>

iv. Differentiating Instruction. Differentiating instruction allows teachers to provide specialized instruction for gifted students within the regular classroom; it is a way of individualizing instruction to meet the needs of all students—students who are identified as gifted and other students as well. When teachers differentiate, they assign gifted students different tasks that lead to learning that is meaningful for them. Differentiation for gifted students should focus on production, allowing students to exhibit their learning through abstract and concrete products. Some books that might be particularly helpful tools for teachers include:

- Tomlinson, C. A., Kaplan, S. N., Renzulli, J. S., Purcell, J., Leppien, J., & Burns, D. (2002). *The parallel curriculum: A design to develop high potential and challenge high-ability learners*. Thousand Oaks, CA: Corwin Press, Inc.
- Winebrenner, S. (2001.) *Teaching gifted kids in the regular classroom*. Minneapolis, MN: Free Spirit Publishing, Inc.

The websites listed below provide resources for differentiating instruction.

1. Strategies for Powerful Teaching and Learning—What Differentiated Instruction Does and Does Not Look Like (See IV.) <http://www.bham.wednet.edu/learning/SevenEssentialStrategies.htm>
2. How To Adjust Teaching Styles to Learning Styles <http://www.teachnet.org/ntol/howto/adjust/>
3. Step by Step: Planning for Differentiated Instruction <http://www.wilmette39.org/CD39/planning.html>
4. Multiple Menu Model of Differentiation <http://www.gifted.uconn.edu/mmm/mmmart01.html>
5. Layered Curriculum Sample Lessons—Across Grade Levels and Content Areas <http://www.help4teachers.com/samples.htm>
6. Curriculum Differentiation: An Overview http://www.k12.hi.us/~gtstate/differentiation_resources.htm
7. Instructional Strategies That Support Differentiation <http://www.mcps.k12.md.us/curriculum/science/instr/differstrategies.htm>
8. Four Ways to Differentiate Instruction <http://members.shaw.ca/priscillatheroux/differentiating.html>
9. Electronic Resources for Differentiating Instruction, including a compacting contract <http://www.sde.com/Conferences/Differentiated-Instruction/DIResources.htm>

B. Content Knowledge. Content consists of the facts, concepts, and principles that govern a body of study. The following are some ways to differentiate content for gifted learners:

- **Pacing** is modification of the rate at which students advance through the content. Some examples of pacing include allowing the gifted student to:
 - learn or become familiar with new content knowledge early, and
 - perform more in-depth and longer explorations of specific topics.
- **Enrichment** is an elaboration on the basic concepts taught in the regular education program. Some examples of enrichment include allowing students to:
 - reason from concrete to abstract, familiar to unfamiliar, and known to the unknown;
 - explore the discipline by going beyond memorization of facts and concepts into exploring generalizations, principles, theories, and laws; and
 - investigate the many layers within a discipline through details, patterns, trends, unanswered questions, and ethical considerations.
- **Sophistication** is access to a larger system of ideas and concepts related to the basic content knowledge. Some examples of sophistication include allowing students to:
 - extend content within, between, and across disciplines through the study of themes, problems, and issues;
 - discover relationships between and among ideas; and
 - examine relationships from multiple points of view.
- **Novelty** is exposure to completely different material than any material in the regular curriculum. Some examples of novelty include allowing students to:
 - develop relevant and individualized meaning of unique concepts and themes;
 - express ideas in original, creative ways; and
 - provide students with a completely original curriculum.

Listed below is a sample of resources for instruction in the four core content areas. There are many other good resources available on the Internet—for all content areas and all grades levels.

English Language Arts

- A Lesson Plan Bank for English Language Arts
<http://www.readwritethink.org/lessons/index.asp?grade=0&strand=0&engagement=0>

Mathematics

- Teacher Resources for Advanced Mathematics <http://www.nku.edu/~mathed/tr.html>

Science

- Differentiated Elementary Science Lessons
<http://www.mcps.k12.md.us/curriculum/science/elem/modeldiff.htm>

Social Studies

- Teaching and Learning in the Social Studies <http://emsc33.nysed.gov/guides/social/partI1.pdf>

C. Product Development. Products are ways for students to communicate what they have learned through the synthesis and application of knowledge, concepts, and skills. In their product development, gifted students should challenge existing ideas and construct original ideas, techniques, and materials. Students in the lower grades will need more teacher guidance in the product development process; however, high school students should be largely independent and reflect the work of professionals in the field. Examples of professional products include 1) the use of writing skills to product technical documents and proposals, and 2) the use of research skills to investigate and experiment and then present findings to a committee of professionals.

i. Developing Advanced Products. Advanced products that gifted students develop should reflect professional quality, address meaningful problems, be based on information from a variety of sources, and include self-evaluation and peer-evaluation. The websites listed below are some good resources for developing advanced products.

1. Activities To Elicit Sophisticated Products <http://www.adifferentplace.org/products.htm>
2. Student Products as the Link between Schools and Communities <http://gifted-children.families.com/classroom-to-community>
3. Advanced Projects <http://www.texaspsp.org/exit/projects.php>
4. How To Develop New Products—The SCAMPER Technique
http://www.mindtools.com/pages/article/newCT_02.htm

ii. Preparing and Making Oral Presentations. Part of the learning process for gifted students should be sharing their findings with others. The websites listed below are some good resources for developing oral presentations.

1. Communication Skills <http://lorien.ncl.ac.uk/ming/Dept/Tips/present/comms.htm>
2. How To Design an Effective Presentation
http://www.ruf.rice.edu/~riceowl/oral_presentations.htm
3. Tips for Oral Presentations, including planning sheets
<http://set.lanl.gov/programs/cif/Resource/Presentation/GenTips.htm>
4. Making Effective Oral Presentations, including a checklist
<http://web.cba.neu.edu/~ewertheim/skills/oral.htm#outline>
5. Making PowerPoint presentations <http://www.actden.com/pp/>
6. Managing Nervousness <http://www.nvcc.edu/home/npeck/spd100/blueprintfiles/nervous.htm>

D. Research Processes. Research skills relate to the student's chosen subject or course of study. Processes include, but are not limited to, content area knowledge, creative and critical thinking skills, research skills, and attitudes toward learning. Programs for gifted students should include instruction in those process areas.

i. Conducting Quantitative Research. Quantitative research is a way to study relationships through the numerical representation of information. This might include assessment scores, income levels, or survey responses. Quantitative research aims to link pieces of information through the use of numbers. Pieces of data are collected through structured sources such as surveys, lists of classroom test scores, or existing databases created by large organizations such as state education agencies or the census bureau.

Quantitative analysis can be either descriptive or inferential. Descriptive analysis means that the data are summarized and presented as a description of the population or sample of people or things. Inferential analysis means that inferences about the results of the analysis on the sample can be made to the larger population. Charts and tables are often used to present the correspondence between two or more pieces of information.

Samples are often used because an entire population is too large to study, and so a smaller group of subjects is chosen to represent the population. Thus, a survey might be given to a sample of one-fourth of the students in a school, or the test scores from a sample of one class at each grade level might be analyzed, rather than using all the students (the population) of the school. In a case where a sample is used, it is important that the sample be representative of the population, and if inferences about the population are to be made, the sample must be large.

A website that further explains quantitative research is
<http://www.fortunecity.com/greenfield/grizzly/432/rra2.htm>.

ii. Conducting Qualitative Research. Qualitative research is a way to study people or systems by interacting with and observing them. Qualitative research strategies include observations, interviews, focus groups, and document review. Sometimes data can be interpreted both qualitatively and quantitatively. Qualitative research relies heavily on written or spoken narrative information from observations of, or conversations with, one or more subjects. Because the data collection is so time-consuming, the sample, or number of subjects, is usually small. The data gathered are often rich, detailed and unique to the persons or things involved in the study. Qualitative research can thus provide a more complex picture of the research subjects. Qualitative research on a sample of subjects is seldom used to make inferences about a larger population because of the small sample size.

Qualitative data are reported in a descriptive manner and are often summarized with important points reiterated. Or, a narrative can be coded for certain words or points that are of interest to the researcher, and descriptions of the coded data presented in charts or tables.

A website which further explains qualitative research is
<http://www.fortunecity.com/greenfield/grizzly/432/rra3.htm>.

iii. Combining Quantitative and Qualitative Research, or Using Mixed Methods. Whether a student uses quantitative or qualitative methods depends on the research questions and how the data are analyzed. Many research projects combine qualitative and quantitative research. A researcher might be interested in the favorite color of students in a school. A sample of students that is representative of the school would be chosen. If classes are not ability grouped, this could be one class at each grade level. Quantitative data may be gathered through a survey, asking the students in the sample classes what their favorite color is. Qualitative data could be included to support the results of the survey through a subset of the survey participants selected for interviews to provide more detailed information about what shade of the particular color they like best, why they chose that particular color, etc. The Quantitative results would be presented as a bar chart showing the number of students (y axis) choosing each color (x axis). The Qualitative results would be presented in a narrative summary of the interviews.

The South Carolina Department of Education website contains a helpful example of a scope and sequence for Gifted and Talented students. Goal 3, Inquiry skills, presents scope and sequence for research. This website is located at

http://www.myschools.com/offices/cso/Gifted_Talented/documents/scope_and_sequence.doc.

iv. Basic Research Skills. The Texas Essential Knowledge and Skills—throughout all grades—outline research expectations for students. Students need to be able to perform such tasks as asking questions, using multiple resources, analyzing information, and drawing conclusions. This document shows a suggested scaffolding of TEKS research skills across the elementary, middle, and high school levels. This suggested scaffolding emphasizes the growing ability of gifted students to conduct in-depth research independently. The chart includes optional student and teacher responsibilities and teacher considerations.

- [A Suggested Scaffolding of Research Skills \(PDF\)](#)

Additional Research Resources

Some websites that are resources for developing and asking questions include:

1. A Questioning Toolkit <http://www.fno.org/nov97/toolkit.html>
2. Using Questions To Enhance Learning <http://www.stedwards.edu/cte/resources/blooms.htm>

Some websites that are resources for note taking include:

1. Skills for Taking Notes in Class <http://www.ucc.vt.edu/stdysk/notetake.html>
2. Note-taking Methods <http://www.sas.calpoly.edu/asc/ssl/notetaking.systems.html>
3. Lesson Plans for Teaching Note Taking http://www.education-world.com/a_lesson/lesson/lesson322.shtml
4. How To Paraphrase http://www.turnitin.com/research_site/paraphrasing.html
5. Quoting, Paraphrasing, and Summarizing <http://www.uhv.edu/ac/research/write/quote.html>
6. Tools and Techniques for Organizing Information <http://www.englishcompanion.com/Tools/notemaking.html>

Some websites that are resources for primary and secondary sources include:

1. Primary Versus Secondary Sources <http://www.bgsu.edu/colleges/library/infosrv/lue/primary.html>
2. Finding Primary Sources <http://www.lib.berkeley.edu/TeachingLib/Guides/PrimarySources.html>
3. Distinguish between Primary and Secondary Sources <http://library.ucsc.edu/ref/howto/primarysecondary.html>
4. Identifying Primary, Secondary, and Tertiary Sources <http://library.uncwil.edu/is/infocycle.htm>
5. United States National Archives <http://www.archives.gov/index.html>

Some websites that are resources for evaluating sources include:

1. Evaluating Sources of Information http://owl.english.purdue.edu/handouts/research/r_evalsource.html
2. Critically Analyzing Information Sources <http://www.library.cornell.edu/olinuris/ref/research/skill26.htm>
3. Critical Evaluation of Resources <http://www.lib.berkeley.edu/TeachingLib/Guides/Evaluation.html>
4. Evaluating Information Found on the Internet <http://www.library.jhu.edu/researchhelp/general/evaluating/>
5. Evaluation Criteria <http://lib.nmsu.edu/instruction/evalcrit.html>

Some websites that are resources for developing research proposals include:

1. Guide to Writing a Research Proposal
<http://www.education.uts.edu.au/research/degrees/guide.html>
2. How To Write a Research Proposal
http://www.meaning.ca/articles/writing_research_proposal_may02.htm
3. Proposal Development Guides <http://www.jmu.edu/sponsprog/writingtips.html>
4. Writing Tools for Non-Profits <http://www.npguides.org/guide/index.html>
5. Short Course on Proposal Writing <http://fdncenter.org/learn/shortcourse/prop1.html>

Some websites that are resources for using graphic organizers include:

1. Learning Resources: Graphic Organizers <http://eduscapes.com/tap/topic73.htm>
2. Printable Graphic Organizers <http://www.teachervision.fen.com/page/6293.html>
3. PDF Graphic Organizers <http://www.eduplace.com/graphicorganizer/>
4. Matrix of Graphic Organizers <http://www.graphic.org/goindex.html>
5. Five Types of Graphic Organizers <http://www.writedesigonline.com/organizers/>
6. Graphic Organizers <http://www.ncrel.org/sdrs/areas/issues/students/learning/lr1grorg.htm>
7. Thinking Maps <http://www.thinkingmaps.com/htthinkmapx.php3>

Some websites that are resources for documenting and citing sources include:

1. Resources for Documenting Sources
http://owl.english.purdue.edu/handouts/research/r_docsources.html
2. Social Sciences: Documenting Sources
http://www.dianahacker.com/resdoc/social_sciences/intext.html
3. Assembling a Works Cited List http://www.lib.duke.edu/libguide/cite/works_cited.htm
4. Sources <http://www.dartmouth.edu/~sources/contents.html>
5. How To Cite Electronic Sources <http://memory.loc.gov/ammem/ndlpedu/start/cite/>

Some websites that are resources for writing a research paper include:

1. Guide to Grammar and Writing <http://grammar.ccc.commnet.edu/grammar/index.htm>
2. Writing a Research Paper <http://owl.english.purdue.edu/workshops/hypertext/ResearchW/>
3. Research & Writing <http://www.ipl.org/div/teen/aplus/toc.htm>
4. Technical Writing <http://www.ruf.rice.edu/~bioslabs/tools/report/reportform.html>

v. Models of Inquiry. Gifted students should use inquiry techniques to generate ideas about a topic, issue, or question. Some models include using creative problem solving, inquiry processes, and/or advanced thinking skills. These processes include understanding what the student already knows about the topic, discovering the known facts about the topic, brainstorming ideas about the topic, synthesizing and evaluating information, and establishing conclusions.

Some websites that are resources for creative problem solving include:

1. Creative Problem Solving Process Manual <http://www.ideastream.com/create/>
2. Steps in Creative Problem Solving/Decision Making
<http://gaia.ecs.csus.edu/~dabaghil/creative.html>
3. Solving Open-ended Problems <http://www.engin.umich.edu/~cre/probsolv/open/first/first.htm>
4. Problem-solving Processes <http://www.palgrave.com/skills4study/html/studyskills/problem.htm>

Some websites that are resources for inquiry processes include:

1. Methods of Inquiry <http://www.aldridgeshs.eq.edu.au/sose/skills/inquiry.htm>
2. Science Teaching and Inquiry <http://scied.gsu.edu/Hassard/mos/1.7.html>
3. Inquiry Models of Teaching <http://scied.gsu.edu/Hassard/mos/7.4.html>

4. Thinker Tools Inquiry Curricula <http://thinkertools.soe.berkeley.edu/Pages/curricula.html>
5. Cultural Inquiry Process Steps <http://classweb.gmu.edu/cip/g/gs/gs-top.htm>

Some websites that are resources for advanced thinking skills include:

1. Strategies for Teaching Thinking and Promoting Intellectual Development
<http://academic.pg.cc.md.us/~wpeirce/MCCCTR/ttol.html#I>. [Online Strategies for Teaching](#)
2. Affective Skills <http://www.affectiveskill.com/>
3. Habits of Mind <http://www.habits-of-mind.net/>