



Introduction to the Scales for Identifying Gifted Students

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The *Scales for Identifying Gifted Students* (SIGS) is a norm-referenced rating scale designed to assist school districts in the identification of students as gifted. The SIGS assesses seven areas: general intellectual ability, language arts, mathematics, science, social studies, creativity, and leadership, and each area is assessed at home and at school. This chapter presents (a) definitions of gifted and talented, (b) development procedures for the SIGS, (c) description of the SIGS, and (d) uses of the SIGS.

Definitions

While there is no federal mandate for serving students identified as gifted in the public school system, many states now have either permissive or mandated legislation for identifying and developing programs for these students. The federal government recognizes that students can have exceptional gifts and talents and provides a definition to guide states. The Improving America's Schools Act of 1994 (P.L. 103-382) defined gifted and talented students as follows:

The term "gifted and talented" when used in respect to students, children or youth means students, children or youth who give evidence of high performance capability in areas such as intellectual, creative, artistic, or leadership capacity, or in specific academic fields, and who require services or activities not ordinarily provided by the school in order to fully develop such capabilities. (Title XIV, p. 388)

A government report, *National Excellence: A Case for Developing America's Talent* (U.S. Department of Education, 1993), provides a definition from a talent-development perspective:

Children and youth with outstanding talent perform or show the potential for performing at remarkably high

levels of accomplishment when compared with others of their age, experience, or environment. These children and youth exhibit high performance capability in intellectual, creative, and/or artistic areas; possess an unusual leadership capacity; or excel in specific academic fields. They require services or activities not ordinarily provided by the schools. Outstanding talents are present in children and youth from all cultural groups, across all economic strata, and in all areas of human endeavor. (§ 5)

Both definitions recognize diverse areas of giftedness (e.g., intellectual, creative, artistic, leadership, academic) and use terms that imply the need for specialized services for identified students. Likewise, the SIGS recognizes seven areas of giftedness and can help practitioners identify gifted students so that educational programs can be designed to meet their needs.

Development of the SIGS

To develop an initial pool of items for the SIGS, we conducted a review of the literature, examined other rating scales for identifying gifted and talented students, and reviewed standards developed by educational organizations in different content areas. From this we developed a list of characteristics for each of the seven areas. The initial sets of characteristics were reviewed by a number of professionals in the field of gifted education. Based on their feedback, we refined the characteristics. The SIGS norming version contained 18 items per scale, except for the Leadership scale, which contained 17 items. The norming version of the SIGS was further refined through two statistical analyses before becoming finalized. First, we examined the item discrimination characteristics and deleted items that had item discrimination coefficients below .40. Second, we used the results of our differential item functioning studies to find additional items to delete (i.e., item bias; see Chapter 3, Technical Qualities, for

more information about differential item functioning). Based on the results of these procedures, the final version of the SIGS consists of 12 items per scale. Next we present the characteristics used in writing the initial pool of items for each of the seven areas measured by the SIGS.

Characteristics of General Intellectual Ability

Many schools use an intelligence test as one instrument to identify students as gifted. To test intelligence, however, one must define it. One of the early pioneers in the field, Spearman (1923), hypothesized that there was one underlying ability common to all tests, which he called general intelligence, or *g*. More recent theorists have posited that intelligence is more than a single factor. For example, Gardner (1983) hypothesized that there are seven intelligences: linguistic, logical–mathematical, spatial, musical, bodily–kinesthetic, interpersonal, and intrapersonal. In 1999 he added an eighth intelligence, called the naturalist. Another recent theorist, Sternberg (1988), developed a triarchic theory that recognizes three types of intelligence: analytical, creative, and practical. His theory also describes information-processing components necessary for extraordinary intelligence. Professionals in the field have identified the following characteristics as those describing individuals with high general intellectual ability (Clark, 1997; Coleman & Cross, 2001; Frasier et al., 1995; Paul, 1990; Piirto, 1999b; Sternberg, 1988; Tallent-Runnels et al., 1994; Terman, 1925):

- Reaches conclusions based on sound inferences
- Deals with novel tasks quickly
- Recognizes relevant elements of a problem
- Relates new information to old information
- Has an accelerated pace of thought processes
- Has advanced comprehension
- Has strong desire for knowledge
- Reasons rapidly
- Has wide range of general information
- Is an insightful and keen observer
- Is curious
- Asks many high-level questions
- Is an effective problem solver and finder
- Has an excellent retentive memory
- Is willing to explore intellectually

The SIGS items reflect a comprehensive view of intelligence like that of Gardner (1983) and Sternberg (1988). The SIGS items also reflect the characteristics as described in the literature as those possessed by individuals with high general intellectual ability, with several items focusing on metacognitive skills.

Characteristics Related to Language Arts

Programs that serve students who are gifted in language arts develop students' spoken and written language. Because many students have uneven development in these two areas, it is important to gather information about students' talents in both written and spoken language. We reviewed the characteristics that professionals identified as those that indicate strength in language arts (Clark, 1997; Gardner, 1982; Garza & Ollmann, 1996; National Council of Teachers of English, 1996; Porath, 1996; Starko, 1989; Van Tassel-Baska, 2002):

- Has advanced vocabulary
- Writes using sophisticated syntax
- Exhibits playfulness with language
- Reads critically
- Creates meaning
- Discusses literature at an interpretive level
- Uses mature themes and vocabulary in writing
- Communicates effectively with a wide variety of audiences for different purposes
- Reads often
- Reads advanced-level books
- Has an enhanced capacity to engage in inquiry
- Enjoys discussing reading

In the Language Arts scale, the SIGS items can be rated in terms of spoken or written language. In addition, the items reflect the characteristics cited in the literature and in the National Council of Teachers of English (1996) standards.

Characteristics Related to Mathematics

The *Principles and Standards for School Mathematics* (National Council of Teachers of Mathematics, 2000) describe sound instructional programs as those that emphasize problem-solving and reasoning ability. Students who are gifted in mathematics have an increased

ability to be effective problem solvers and to generalize their findings across mathematical situations. In addition, the following characteristics have been cited by professionals as those that indicate students who are gifted in mathematics (Ablard & Tissot, 1998; Clark, 1997; Cruikshank & Sheffield, 1992; Franke & Carey, 1997; Gallagher, 1996; Greenes, 1981; House, 1987; National Council of Teachers of Mathematics, 2000; Sheffield, 2002; Stanley & Benbow, 1988):

- Uses variety of strategies to find solutions to mathematical problems
- Makes good conjectures (discovery oriented)
- Uses effective mathematical communication
- Exhibits persistence in finding a solution to problems
- Generalizes ideas and principles from one mathematical situation to another
- Sees mathematical patterns and relationships
- Acquires formal operations earlier than age peers
- Solves problems in diverse ways
- Has strong intuition concerning mathematics (perceptive, sees relationships)

Many of the SIGS items examine students' proficiency in solving mathematical problems. In addition, the SIGS items recognize that students with talent in mathematics have advanced abilities to see mathematical patterns and relationships and understand advanced-level mathematical concepts earlier than age peers.

Characteristics Related to Science

The *National Science Education Standards* (National Research Council, 1996) propose that inquiry is central to science learning. Inquiry is the process whereby students describe objects and events, construct explanations, test hypotheses, identify assumptions, and consider alternative explanations. This process promotes students' understanding of science and helps them learn to combine scientific knowledge with reasoning skills. A review of the literature supports this view, with most of the characteristics identified by professionals as describing students who are gifted in science relating to inquiry. Characteristics most often cited in the literature (Adams, 1996; Brandwein, 1955; Csikszentmihalyi, 1996; National Research Council, 1996; Piirto, 1999b; Subotnik, 1986; VanTassel-Baska, 1998; VanTassel-Baska, 2003) include the following:

- Enjoys experimenting
- Pursues inquiries beyond allotted time span
- Engages in independent science or laboratory work
- Has excellent deductive reasoning skills
- Pays careful attention to detail
- Generates potential research questions or hypotheses
- Carries out inquiry from beginning to end result
- Pursues experimental work
- Has good organizational skills for inquiry
- Relates scientific events or findings to one another
- Understands cause-and-effect relationships

The SIGS items reflect the *National Science Education Standards* and characteristics identified by professionals in the field. The items examine students' ability and enjoyment of participation in the various stages of scientific inquiry.

Characteristics Related to Social Studies

According to the curriculum standards from the National Council for the Social Studies (NCSS; 1992), the primary purpose of social studies "is to help young people develop the ability to make informed and reasoned decisions for the public good as citizens of a culturally diverse, democratic society in an interdependent world" (§ 2). Further, the NCSS believes that the study of social studies should promote civic competence. Professionals in the field concur and have identified the following characteristics as those that indicate students who are gifted in social studies (Clark, 1997; Collett, 1998; Gallagher & Gallagher, 1994; Piirto, 1999b; Scriven, 1964; VanTassel-Baska, 1998):

- Has understanding and acceptance of world cultures
- Uses advanced levels of moral and ethical judgment
- Exhibits keen interest in developing solutions to social and environmental problems
- Makes connections from past to present or from one culture to another
- Attempts to understand other points of view
- Uses sound methods to conduct historical investigations (e.g., uses trustworthy sources)

- Reads extensively about social studies topics
- Shows passion for a particular period of history

The items on the SIGS reflect the NCSS standards with many items examining students' ability to make connections among and to understand cultures and people. Other items examine students' passion for social studies and their ability to conduct sound historical investigations.

Characteristics Related to Creativity

Defining creativity is difficult because there is no single, universally accepted definition. Some definitions examine the creative act as a cognitive process; from this perspective, creativity is defined in terms of mental processes. Other definitions explain creativity from a personality perspective, which examines the attributes that enable a person to be creative. Another perspective, the social context approach, focuses on the diversity of external conditions that create an environment conducive to a person being creative. The following characteristics have been identified by professionals as important in individuals who are highly creative, and they span these three perspectives (Amabile et al., 1996; Clark, 1997; Colangelo & Davis, 2002; Csikszentmihalyi, 1996; Gardner, 1993; Perkins, 1981; Piiro, 1999a; Presburg, Bensen, Fitch, & Torrance, 1991):

- Is open to new experiences
- Is passionate about own work
- Generates original ideas and solutions
- Takes risks
- Is attracted to complexity
- Is aware of own creativity
- Is energetic
- Seeks solitude for reverie
- Likes to improvise
- Is persistent
- Is tolerant of ambiguity
- Exhibits talent in art, poetry, creative writing, handicrafts, music, dancing, computer programming, or science
- Does not conform to societal stereotypes
- Is excellent problem finder

The items on the SIGS reflect all three perspectives on creativity as described above. Some items examine cognitive processes such as problem-solving ability; several items examine personality characteristics such as risk taking; other items examine external conditions conducive to creativity such as seeking solitude.

Characteristics Related to Leadership

For many years, Galton (1869) influenced the way in which people defined leadership. He believed that leadership consisted of a universal set of characteristics or traits that individuals possess. These traits were considered to be fixed and occurring across all situations. More recent theories recognize that situations influence the emergence of leadership. Professionals in the field have identified the following personal characteristics as those that influence leadership abilities (Chan, 2003; Chauvin & Karnes, 1983; Hensel, 1991; Karnes & Bean, 1996; Piiro, 1999b; Roach & Wyman, 1999):

- Influences others
- Plans change
- Is highly sensitive
- Promotes harmony among others
- Is effective decision maker
- Is self-sufficient
- Shows empathy
- Has high level of social sensitivity
- Is goal oriented
- Is skilled in team building and working collaboratively
- Self-regulates
- Inspires others to do their best
- Is emotionally mature
- Holds high ideals

The items on the SIGS examine personal characteristics that are important for the emergence of leadership. Many of the items focus on the personal attributes listed above.

Description of the SIGS

The SIGS consists of the following four components:

1. Technical Manual
2. School Rating Scales (SRS)
3. Home Rating Scales (HRS)
4. Summary Form

Each of these components is described next.

Technical Manual

This Technical Manual includes the information the examiner needs to administer, score, and interpret the SIGS. Information relating to the standardization, reliability, and validity of the SIGS is also found in the manual.

School and Home Rating Scales

The School Rating Scales (SRS) and the Home Rating Scales (HRS) measure talent in students. The SRS can be completed by a student's teacher or other professional, such as a paraprofessional, a counselor, or any other educator who knows the student well. The HRS can be completed by the student's parent, guardian, or other caregiver who knows the student well.

The SRS and HRS assess talent in the following seven areas: general intellectual ability, language arts, mathematics, science, social studies, creativity, and leadership. Each scale consists of 12 items that are rated using a Likert scale.

The SRS and HRS can be interpreted with reference to two sets of national norms: General or Gifted. The General norms are based on a large sample of students who have not been identified by their local school districts as gifted. The Gifted norms are based on a large sample of students who have been identified by their local school district as gifted.

Summary Form

The Summary Form provides the examiner with a place to aggregate information from the SRS and HRS. In addition, there is space on the back of the form for examiners to compare a student's SIGS scores with other

quantitative and qualitative information collected on the student.

Purposes of the SIGS

There are three main purposes for using the SIGS. These are described next.

To Assist in the Identification of Students as Gifted

The primary purpose of the SIGS is to assist in the identification of students as gifted in seven areas: general intellectual ability, language arts, mathematics, science, social studies, creativity, and leadership. Because each of the seven scales provides a separate score, all scales do not need to be rated. For example, a school district that has a program for gifted students in mathematics and science would want educators and caregivers to complete the Mathematics and Science scales of the SIGS. Other sections would not need to be completed. By having only the most relevant scales completed, the examiner saves time in the data collection process.

To Monitor Progress of Gifted Students

Assessment and instruction should be clearly linked. For example, a program for gifted students should include students who exhibit the characteristics found on the assessment instrument, in this case, the SIGS. The items on the SIGS were chosen because they have been consistently identified by researchers as reflective of giftedness in seven areas. Because not all students will exhibit all characteristics to the same degree, the SIGS can be used to monitor progress in classes for gifted students. The SIGS contains clusters of characteristics that might be an important focus for gifted programming.

To Use in Research Studies

The SIGS is a well-researched, norm-referenced rating scale. Therefore, it is well suited to research giftedness in the seven areas measured by the instrument. Because it has two sets of norms and a school and home version, it can be valuable for a variety of research purposes.

BEHAVIOR	RATING				
THE STUDENT					
	<i>Never</i>	<i>Rarely</i>	<i>Some</i>	<i>Somewhat More</i>	<i>Much More</i>
Scale 1: General Intellectual Ability					
1. Has excellent reasoning ability.	0	1	2	3	(4)
2. Establishes cause-effect relationships easily.	0	1	2	(3)	4
3. Can analyze an issue from many points of view.	0	1	2	(3)	4
4. Is able to reach good conclusions based on evidence.	0	1	2	3	(4)
5. Is curious and seeks answers to questions.	0	1	2	3	(4)
6. Is an excellent planner and decision maker.	0	1	(2)	3	4
7. Gathers information to make sense of a situation.	0	1	2	(3)	4
8. Demonstrates a healthy skepticism and curiosity.	0	1	2	(3)	4
9. Asks complex questions about a topic.	0	1	2	(3)	4
10. Is able to rapidly understand novel tasks.	0	1	2	3	(4)
11. Is able to figure out what is needed to solve a problem.	0	1	2	3	(4)
12. Can easily relate new information to old information.	0	1	2	3	(4)
Total	41	=	0	+	0
			+	2	+
			+	15	+
			+	24	
Examples (if six or more 4s):	<i>Jacob is able to grasp and understand new ideas quickly. He has a genuine desire to learn.</i>				
					
Scale 3: Mathematics					
1. Recognizes mathematical patterns and relationships (e.g., extends a sequence of numbers; analyzes how two numbers "go together").	0	1	2	3	(4)
2. Applies ideas from one mathematical problem to another.	0	1	2	3	(4)
3. Is persistent in finding solutions to mathematical problems.	0	1	2	(3)	4
4. Understands mathematical principles quickly.	0	1	2	3	(4)
5. Easily distinguishes between relevant and irrelevant information in mathematical problems.	0	1	2	(3)	4
6. Uses creative or unusual strategies to solve mathematical problems.	0	1	2	3	(4)
7. Is successful with advanced-level mathematical concepts.	0	1	2	3	(4)
8. Develops multiple strategies to solve mathematical problems.	0	1	2	(3)	4
9. Uses correct mathematical language.	0	1	(2)	3	4
10. Has knowledge about a variety of mathematical topics.	0	1	(2)	3	4
11. Is discovery oriented (i.e., likes to find answers to mathematical problems).	0	1	2	3	(4)
12. Intuitively knows the answer to many mathematical problems.	0	1	2	(3)	4
Total	40	=	0	+	0
			+	4	+
			+	12	+
			+	24	
Examples (if six or more 4s):	<i>Jacob loves numbers and is able to generalize what he learned in one math problem to other math problems. He is discovery oriented.</i>				

Figure 2.1. Example of completed General Intellectual Ability and Mathematics scales.

S
I
G
S



School Rating Scales

Scales for Identifying Gifted Students

Student's Name Jacob Young

Date of Rating 2004 / 4 / 20
YEAR MONTH DAY

Date of Birth 1995 / 2 / 10
YEAR MONTH DAY

Age in Years 10

Grade K 1 2 3 4 5 6
 7 8 9 10 11 12

Rater's Name Ms. Penny Murphy
Relationship to Student mathematics teacher

Examiner's Name Dr. Leslie Howard

School Name Madison Elementary

Areas Rated

General Intellectual Ability

Language Arts

Mathematics

Science

Social Studies

Creativity

Leadership

Summary of Scores

	Raw Score	Standard Score	Percentile Rank
General Intellectual Ability	41	125	95
Language Arts			
Mathematics	40	126	96
Science			
Social Studies			
Creativity			
Leadership			

Norms Used: General Gifted

Directions

Read each statement and decide how often the student you are rating exhibits each behavior. As you respond, ask yourself, "To what degree does the student exhibit the behavior listed when compared with his or her age peers?" Please respond to **all** statements, circling one number for each.

0 = Never exhibits the behavior in comparison to his or her age peers

1 = Rarely exhibits the behavior in comparison to his or her age peers

2 = Exhibits the behavior about the same as his or her age peers

3 = Exhibits the behavior somewhat more in comparison to his or her age peers

4 = Exhibits the behavior much more in comparison to his or her age peers

If the student is rated with six or more 4s, please provide examples that demonstrate his or her strength in that area in the space provided below the scale.

Figure 2.2. Example of completed School Rating Scales form.

Quantitative and Qualitative Information About the Student from Multiple Sources

Measure	Standard Score		Minimum Score		SEM/CI		Meets Minimum with SEM			
	SRS	HRS	SRS	HRS	SRS	HRS	Yes		No	
SIGS	SRS	HRS	SRS	HRS	SRS	HRS	SRS	HRS	SRS	HRS
General Intellectual Ability	125	136	125	125	3/122-128	4/132-140	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Language Arts							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mathematics	126	136	125	125	2/124-128	3/133-139	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Science							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Social Studies							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Creativity							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leadership							<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
							Yes		No	
WISC-IV, Full Scale IQ	128		125		3/125-131		<input checked="" type="checkbox"/>		<input type="checkbox"/>	
TOMAGS	132		125		6/126-138		<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Student Interview	NA		NA		NA		<input checked="" type="checkbox"/>		<input type="checkbox"/>	
Portfolio	136		125		NA		<input checked="" type="checkbox"/>		<input type="checkbox"/>	

Qualitative information about the student provided on SIGS:

- Loves learning and numbers
- Is able to grasp new information quickly
- Has ability to generalize in mathematics

Qualitative information about the student provided on other measures:

- Wants to be mathematician
- Products demonstrate advanced mathematical thinking
- Loves to make models

Committee Members

Name Dr. Leslie Howard Title Coordinator of Gifted Program
 Name Penny Murphy Title Teacher
 Name Ingrid Li Title Assistant Principal

Figure 2.4. Example of completed Summary Form, back page.