

Building a Letter

Background: In the book *Albert's Alphabet*, Albert designs and builds all the letters of the alphabet, using tools and scraps. A playground and path are then lined with the letters.

Design Challenge: Design and build a letter of the alphabet that will stand by itself. You will present your work to the class.

Criteria: Your letter must be

- freestanding
- taller than a standard 12-inch ruler.



Materials: Select from the list below.	Tools: Select from the list below.
<ul style="list-style-type: none">• aluminum foil• boxes• cardboard• glue• newspaper• paper towel tubes• paper fasteners• recyclables• scrap paper• tape• string• wood and wooden dowels	<ul style="list-style-type: none">• drawing and writing tools• hole punch• safety glasses• scissors/cutting tools• stapler• straightedge/12-inch ruler

Targeted Standard of Learning: English K.7a

Supporting SOL: English K.1, K.2, K.3, K.5, K.6, K.7, K.8, K.10;
Science K.1, K.4; Mathematics K.8

Targeted Standard for Technological Literacy: 8

Supporting STL: 5, 9, 10, 11, 12

Tips for Teachers

Targeted Standard of Learning:

- English K.7a The student will develop an understanding of basic phonetic principles.
- a) Identify and name the uppercase and lowercase letters of the alphabet.

Supporting SOL: English K.1, K.2, K.3, K.5, K.6, K.7, K.8, K.10; Science K.1, K.4; Mathematics K.8

Targeted Standard for Technological Literacy:

- 8 Students will develop an understanding of the attributes of design.

Supporting STL: 5, 9, 10, 11, 12

Prior Knowledge & Skill	Materials & Preparation	Safety Issues	Class Management	Materials Provided	Design Process
<ul style="list-style-type: none"> • Shapes of letters • Uppercase and lowercase letters • Using a ruler • Comparative language 	<ul style="list-style-type: none"> • <i>Albert's Alphabet</i> by Leslie Tryon • <i>Alphabet Under Construction</i> by Denise Fleming • Check Design Brief for suggested materials. 	<ul style="list-style-type: none"> • Correct use of cutting tools 	<ul style="list-style-type: none"> • Small groups or individual 	<ul style="list-style-type: none"> • Design Brief • Guided Portfolio (adapt as appropriate/ optional) • Rubric Assessments 	Follow the Design Process: <ul style="list-style-type: none"> • Restate the problem. • Brainstorm solutions. • Create the best solution. • Test the solution. • Evaluate the solution.

Guided Portfolio

Name _____

Group Members _____



1. What is the problem? State the problem in your own words.

Guided Portfolio, p2

Name _____



2. Brainstorm solutions. Sketch and/or describe some possible solutions.

Guided Portfolio, p3

Name _____

3. Create the solution you think is best.

Keep notes about your problems and how you solve them. Make sketches if they help.

Guided Portfolio, p4

Name _____

4. Test your solution.

What letter did you build? _____

Does your letter stand by itself?

YES

NO

SOMETIMES

5. Evaluate your solution.

Was it the best solution? Why or why not?

What would you have done differently?

Rubric for Building a Letter

Name _____ Date _____

0—no evidence; 1—limited understanding; 2—some understanding with room for improvement; 3—good understanding with room for improvement; 4—substantial understanding

Student Evaluation	0	1	2	3	4
Oral Presentation: The student <ul style="list-style-type: none"> used complete sentences used descriptive words. 					
Guided Portfolio: The student participated in <ul style="list-style-type: none"> restating the problem brainstorming solutions creating a solution testing the solution evaluating the solution. 					
Team Skills: The student <ul style="list-style-type: none"> used appropriate voice encouraged team members listened to team members was involved in all aspects of the project respected team members. 					

Tested Criteria	YES	NO
The design clearly represents a letter of the alphabet.		
The letter is freestanding.		
The student used materials and tools listed in the design brief.		

Standards of Learning

English (2010)

Oral Language

- K.1 The student will demonstrate growth in the use of oral language.
- Listen to a variety of literary forms, including stories and poems.
 - Participate in a variety of oral language activities including choral and echo speaking and recitation of short poems, rhymes, songs, and stories with repeated word order patterns.
 - Participate in oral generation of language experience narratives.
 - Participate in creative dramatics.
 - Use complete sentences that include subject, verb, and object.
- K.2 The student will expand understanding and use of word meanings.
- Increase listening and speaking vocabularies.
 - Use number words.
 - Use words to describe/name people, places, and things.
 - Use words to describe/name location, size, color, and shape.
 - Use words to describe/name actions.
 - Ask about words not understood.
 - Use vocabulary from other content areas.
- K.3 The student will build oral communication skills.
- Express ideas in complete sentences and express needs through direct requests.
 - Begin to initiate conversations.
 - Begin to follow implicit rules for conversation, including taking turns and staying on topic.
 - Listen and speak in informal conversations with peers and adults.
 - Participate in group and partner discussions about various texts and topics.
 - Begin to use voice level, phrasing, and intonation appropriate for various language situations.
 - Follow one- and two-step directions.
 - Begin to ask how and why questions.

Reading

- K.5 The student will understand how print is organized and read.
- Hold print materials in the correct position.
 - Identify the front cover, back cover, and title page of a book.

- c) Distinguish between print and pictures.
- d) Follow words from left to right and from top to bottom on a printed page.
- e) Match voice with print. (concept of word).

K.6 The student will demonstrate an understanding that print conveys meaning.

- a) Identify common signs and logos.
- b) Explain that printed materials provide information.
- c) Read and explain own writing and drawings.
- d) Read his/her name and read fifteen meaningful, concrete words.

K.7 The student will develop an understanding of basic phonetic principles.

- a) Identify and name the uppercase and lowercase letters of the alphabet.
- b) Match consonant, short vowel, and initial consonant digraph sounds to appropriate letters.
- c) Demonstrate a speech-to-print match through accurate finger-point reading in familiar text that includes words with more than one syllable.
- d) Identify beginning consonant sounds in single-syllable words.

K.8 The student will expand vocabulary.

- a) Discuss meanings of words.
- b) Develop vocabulary by listening to a variety of texts read aloud.

K.10 The student will demonstrate comprehension of nonfiction texts.

- a) Use pictures to identify topic and make predictions.
- b) Identify text features specific to the topic, such as titles, headings, and pictures.

Mathematics (2009)

Measurement

K.8 The student will identify the instruments used to measure length (ruler), weight (scale), time (clock: digital and analog; calendar: day, month, and season), and temperature (thermometer).

Science (2010)

Scientific Investigation, Reasoning, and Logic

K.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which

- a) basic characteristics or properties of objects are identified by direct observation;
- b) observations are made from multiple positions to achieve different perspectives;
- c) a set of objects is sequenced according to size;

- d) a set of objects is separated into two groups based on a single physical characteristic;
- e) nonstandard units are used to measure the length, mass, and volume of common objects;
- f) observations and predictions are made for an unseen member in a sequence of objects;
- g) a question is developed and predictions are made from one or more observations;
- h) observations are recorded;
- i) picture graphs are constructed;
- j) unusual or unexpected results in an activity are recognized; and
- k) objects are described both pictorially and verbally.

Matter

- K.4 The student will investigate and understand that the position, motion, and physical properties of an object can be described. Key concepts include
- a) colors of objects;
 - b) shapes and forms of objects;
 - c) textures and feel of objects;
 - d) relative sizes and weights of objects; and
 - e) relative positions and speed of objects.

Standards for Technological Literacy

Standard 5: Students will develop an understanding of the effects of technology on the environment.

Standard 8: Students will develop an understanding of the attributes of design.

Standard 9: Students will develop an understanding of engineering design.

Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

Standard 11: Students will develop abilities to apply the design process.

Standard 12: Students will develop the ability to use and maintain technological products and systems.

Please give us some feedback.

Complete the form below to let us know how this design brief worked for you and your students. Please be specific so that we might use your suggestions to improve the activity. *You can fill this out on your computer, or you can print it, fill it out manually, and scan it.*

Teacher: _____

School: _____

School division: _____

Design brief title: _____

Background	<i>Put an X in the appropriate column:</i>			Needs to be rewritten	Needs minor adjustment	Is ready for classroom use
Does it set the context for the activity?						
Is it age-appropriate in language, length, and complexity?						
Does it reference prior learning and/or research that the students did that will facilitate designing a solution to a problem?						
Is it detailed enough that an adult will understand the purpose for the design brief?						
COMMENTS. <i>If any of the questions above are marked other than “ready for classroom use,” please provide suggestions here.</i>						

Design Challenge	Needs to be rewritten	Needs minor adjustment	Is ready for classroom use
Does the challenge support your curriculum?			
Is it age-appropriate in language, length, and complexity?			
Is it detailed enough that an adult will understand the purpose for the design brief?			
<p>COMMENTS. <i>If any of the questions above are marked other than “ready for classroom use,” please provide suggestions here.</i></p>			

Criteria Criteria are part of the challenge. They set the limitations for the design. They are not directions.	Needs to be rewritten	Needs minor adjustment	Is ready for classroom use	N/A
Are the limitations age-appropriate?				
Do the limitations encourage critical thinking?				
Is the application of mathematic knowledge/skills integrated into the criteria? If not, should the skill area be addressed?				
Is the application of science knowledge/skills integrated into the criteria? If not, should the skill area be addressed?				
Is the application of social studies knowledge/skills integrated into the criteria? If not, should the skill area be addressed?				
Are language skills integrated into the criteria? If not, should the skill area be addressed?				
<p>COMMENTS. <i>If any of the questions above are marked other than “ready for classroom use,” please provide suggestions here.</i></p>				

Materials Materials help set the limitations for the design. The list should include materials that might work.	Needs to be rewritten	Needs minor adjustment	Is ready for classroom use	N/A
Does the materials list encourage a variety of design solutions?				
Does the materials list include a variety of choices for joining items?				
Does the materials list include materials that force students to make decisions?				
COMMENTS. <i>If any of the questions above are marked other than “ready for classroom use,” please provide suggestions here.</i>				

Tools Tools can be used in the construction of the designed product. They are used to manipulate materials. They cannot become part of the product.	Needs to be rewritten	Needs minor adjustment	Is ready for classroom use
Are the tools listed age appropriate?			
Are all tools needed for the activity included?			
COMMENTS. <i>If any of the questions above are marked other than “ready for classroom use,” please provide suggestions here.</i>			

Standards of Learning	Yes	No
Does the design brief reinforce the targeted Standard of Learning(s)?		
Are the supporting Standards of Learning appropriate?		
What Standards of Learning would you add or remove?		

Standards for Technological Literacy	Yes	No
Does the design brief reinforce the targeted Standard(s) for Technological Literacy?		
Are the supporting Standards for Technological Literacy appropriate?		
What Standards for Technological Literacy would you add or remove?		

Tips for Teachers	Yes	No
Are the tips listed in the chart helpful for a first-time teacher?		
What tips would you add?		

Guided Portfolio	Needs to be rewritten	Needs minor adjustment	Is ready for classroom use
Are the instructions and questions age appropriate and clear?			
In the “Test your solution” section, do the questions force students to thoroughly test their solutions?			
In the “Evaluate your solution” section, do the questions force students to honestly evaluate their solutions			
<p>COMMENTS. <i>If any of the questions above are marked other than “ready for classroom use,” please provide suggestions here.</i></p>			

<p>Additional Comments Please use this area to provide general suggestions for improving this design brief.</p>
Empty space for additional comments