TEACHER'S GUIDE

ARTS AND ARCHITECTURE





Classroom Activity and Discussion Guide

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^{d.} The activities in this guide align with Next Generation English Language Arts Standards for grades 3–5.

By Tracy Edmunds, M.A. Ed. Reading With Pictures

Art, Architecture, and Engineering

These student pages provide different challenges in drawing and rendering.

Create a Minecraft Self-Portrait, page 3, gives students tips on using the squares-only style of Minecraft to create a self-portrait.

Drawing for Engineering, page 4, gives students examples from the *Diary of an 8-Bit Warrior* books of a diagram, a floor plan, and a rendering, and provides grid paper for them to try their hand.



Create a Minecraft Self Portrait

Use this Minecraft Self-Portrait page to draw yourself as you would appear in Minecraftia!

- 1. Count dots and lightly trace the center lines, both horizontal and vertical. Use the center lines to keep things symmetrical.
- 2. Start by sketching out the squares for your eyes, then other facial features, and work out to the outline of your face. Remember, there are no curves or circles in Minecraftia!
- 3. Once you have sketched in pencil, color and outline the squares.

Challenge: Using your diagram as a guide, use small squares of colored paper, sticky notes, building blocks, or even square crackers to make your self-portrait as a collage.

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Drawing for Engineering

The *Diary of an 8-Bit Warrior* books feature diagrams, floor plans, and architectural renderings of buildings in the story.

• Diagram: a drawing that explains something by showing how the parts relate to each other; parts and items are usually labeled

STEVE'S BASE AND WITCH BRIDGE

Floor plan: a drawing that shows the shape, size, and arrangement of a room or rooms as viewed from above



Draw a labeled diagram, floor plan, or rendering of something or someplace familiar to you. Or draw something you'd like to build in real life or in Minecraftia.



Drawing in 2D and 3D

Orthographic drawing represents a three-dimensional object by showing several flat views in two dimensions.



Isometric drawing is used by illustrators, engineers, and architects to represent three-dimensional objects in two dimensions.



PLAN DRAWINGS

Plan drawings are used by engineers and architects to show how something is built or made. Using square blocks, you will build a simple Minecraftia-style building and do a plan drawing.

- 1. Build something small with square blocks. Start simple for this first try—just a few blocks will do. Remember, in Minecraftia the blocks always fit together on their flat faces. They are not angled to each other and there are no spaces between them.
- 2. On the grid paper below, draw an orthographic view of your building looking down from above. Just draw the blocks as squares. This is your *floor plan*.

3. Draw two orthographic views of your building looking at it from the front and from the side. Again, just draw the blocks as squares. These are your elevation drawings.

4. Now try drawing your building in 3D!



HOW TO DRAW AN ISOMETRIC BLOCK

Practice drawing an isometric block using an isometric dot grid.

- 1. Draw a vertical line connecting two dots.
- 2. Draw two diagonal lines connecting the top of your vertical line to two dots above and to the side. Your drawing should look like a wide letter Y.
- 3. Draw two vertical lines connecting the top dots of your figure to the dots directly below them.
- 4. Draw two diagonal lines connecting the bottom of your cube. It should now look like an open book.
- 5. Draw two diagonal lines connecting the top of the "book" pages to the dot above and between them. A block!

Practice drawing some isometric blocks. Can you add lines to make them look transparent (see-through)?





Now try drawing your simple block building on this isometric dot grid.

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Social and Emotional Learning

The *Diary of an 8-Bit Warrior* series delves into social-emotional issues such as relationships, responsible decision-making, team building, leadership, and community. The topics and questions below can be used for small group or whole class discussion, or as writing prompts.

RELATIONSHIPS

- "Life is other people, isn't it? If there was no one else in this village . . . if it was just me and a bunch of blocks . . . how boring would that life be? The thing that matters most is the people around me" (*Crafting Alliances*, p. 66). Do you agree with this point of view? Why or why not?
- Making friends: "They're teaching us all this stuff in school, like advanced crafting, redstone circuits . . . but they never teach us anything about how to make a friend" (*Crafting Alliances*, p. 66). If you were to teach someone how to make friends, what strategies would you teach them? What strategies have worked or not worked for you?
- Fake friends: "Many students are nice to Lola because they want something from her" (*Path of the Diamond*, p. 108–116). Is this ever OK? Why or why not? What do the characters say or think about this? How do you feel about it?
- "But I didn't believe it. Didn't want to. I wanted to be angry at Pebble. I know that's immature" (*Quest Mode*, p. 198). Have you ever wanted to be angry at someone? Why? What did you do about it? What strategies could someone use to work through anger in a healthy way?

LEADERSHIP, RESPONSIBILITY, AND PRESSURE

- Runt ruminates on the pressure of responsibility: "Too much crazy stuff was happening to me at once. I'm only twelve, you know?" (*Diary of an 8-Bit Warrior*, p. 130–131). Have you ever felt the pressures of responsibility? Where or who does that pressure come from? Runt gives himself a pep talk: "I can't just freak out when faced with problems, right?" (*Diary of an 8-Bit Warrior*, p. 130). How do you handle pressure? What are some helpful coping strategies?
- Runt brings Lola into his team for her redstone talent, and then they find out she's terrible in combat. "I only saw her redstone talent, and I never considered the potential downside of letting her on my team. As soon as I agreed to be her friend, that was it. She became my responsibility, my problem" (*Path of the Diamond*, p. 169–171). Should Runt have invited Lola to join his team? Is a leader responsible for everyone in their team? Why or why not? How does personal responsibility figure in?
- During a battle, Runt saves his worst enemy (*Path of the Diamond*, p. 54). Is this a responsible thing to do? Is it good leadership? Why or why not?
- "But that seemed so quiet compared to the pounding in my chest. The more I watched them the more I felt this awful weight. It grew heavier with each smile directed my way. Only then did I begin to fully realize what this all meant, how high the bar was. The whole village was counting on me. When I glanced at Breeze, though, that feeling went away. *NO*, I thought, *they're not counting on me*... *They're counting on US*" (*Quest Mode*, p 15). How does having someone on your side or a team to work with help alleviate pressure?

BULLYING

• Runt is bullied quite a bit throughout the first few books. At one point, he gains strength in a mining competition by imagining that he is swinging his pick at the face of his biggest bully (*Diary of an 8-Bit Warrior*, p.174). What strategies do Runt and his friends use to deal with bullies in these stories? How effective are these strategies? What would you do differently?

ETHICS

Runt and his friends face a number of ethical dilemmas. Have students evaluate these and discuss or write about whether these actions are acceptable or not and why.

- In his potion brewing contest with Pebble, Runt admits that he cheated, and says, "But you know what? That guy deserved it" (*From Seeds to Swords*, p. 70).
- Runt's team signs on to Operation Snoop, in which "Razberry has been going around school and peeking at other kid's record books" (*Path of the Diamond,* p. 70).
- Some of the other teams steal ideas for tests (Path of the Diamond, p. 73).



Computer Science

This offline activity will help students begin to think like computer programmers by creating a secret maze and an algorithm to solve it.

Sticky Trap Maze

In the Tomb of the Forgotten King, Breeze and Runt encounter a sticky trap maze (*Quest Mode*, p. 164–169). The floor is covered in a grid of golden pressure plates—some of them are safe to step on, while others cause the ceiling to crash down! Breeze uses a fishing pole to test each plate and find the safe route through.

You can make your own sticky trap maze and use an algorithm to tell friends how to find their way through. An algorithm is a series of instructions.



Here is an example of a maze and the algorithm that tells how to safely go through it.

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NOW CREATE YOUR OWN MAZE AND ALGORITHM!

1. On the grid below, mark a **START** block and an **END** block. Mark your "safe" route from the **START** to **END** by putting an X on each pressure plate that is safe.

2. Create a set of symbols for your algorithm to guide someone safely through your maze. The symbols can be anything you want. Here are two examples:

EXAMPLE 1

- ↑ Move one forward
- ➡ Move one backward
- ➡ Move one left
- Move one right

EXAMPLE 2

- Move one forward
- \bigcirc Move one backward
- ★ Move one left
- $\stackrel{\wedge}{\curvearrowright}$ Move one right

MY SYMBOLS

- _____ Move one forward
- _____ Move one backward
- _____ Move one left
- _____ Move one right

3. Use your symbols to write out an algorithm for getting through your maze. Number any repeated actions, such as "2 ➡" (go right twice) or "3 ↓" (move backward three times).

ALGORITHM													

- 4. Write **START** and **END** on this blank maze map.
- 5. Give your code symbols, algorithm, and blank maze map to friends and see if they can get through safely by following your algorithm and making Xs on the map from **START** to **END**. When they finish, you can check their map against yours to see if it matches. If they didn't make it safely, work through the algorithm yourself to find and fix the problem. Then, have your friends give it another go!

GRADE 3

Mathematics

Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

[CCSS.MATH.CONTENT.3.OA.A.3]

Determine the unknown whole number in a multiplication or division equation relating three whole numbers.

[CCSS.MATH.CONTENT.3.OA.A.4]

Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div$ 5 = 8) or properties of operations. [CCSS.MATH.CONTENT.3.OA.C.7]

Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

[CCSS.MATH.CONTENT.3.OA.D.8]

Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

[CCSS.MATH.CONTENT.3.NBT.A.2]

Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9×80 , 5×60) using strategies based on place value and properties of operations. [CCSS.MATH.CONTENT.3.NBT.A.3]

Recognize area as an attribute of plane figures and understand concepts of area measurement. [CCSS.MATH.CONTENT.3.MD.C.5]

Relate area to the operations of multiplication and addition. [CCSS.MATH.CONTENT.3.MD.C.7]

Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

[CCSS.ELA-LITERACY.W.3.4]

With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. [CCSS.ELA-LITERACY.W.3.5]

writing in which the development and organization are

Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. [CCSS.ELA-LITERACY.W.3.10]

[CCCSS.MATH.CONTENT.3.MD.D.8]

English Language Arts

Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers. [CCSS.ELA-LITERACY.RL.3.1]

Describe characters in a story (e.g., their traits, motivations, or feelings) and explain how their actions contribute to the sequence of events [CCSS.ELA-LITERACY.RL.3.3]

Determine the meaning of words and phrases as they are used in a text, distinguishing literal from nonliteral language.

Write narratives to develop real or imagined

experiences or events using effective technique,

descriptive details, and clear event sequences.

With guidance and support from adults, produce

[CCSS.ELA-LITERACY.RL.3.]

[CCSS.ELA-LITERACY.W.3.3]

appropriate to task and purpose.

GRADE 4

Mathematics

Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. [CCSS.MATH.CONTENT.4.OA.A.2]

Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

[CCSS.MATH.CONTENT.4.OA.A.3]

Fluently add and subtract multi-digit whole numbers using the standard algorithm. [CCSS.MATH.CONTENT.4.NBT.B.4]

Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

[CCSS.MATH.CONTENT.3.OA.D.8]

Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

[CCSS.MATH.CONTENT.4.NBT.B.5]

Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.

[CCSS.MATH.CONTENT.4.NF.C.7]

Apply the area and perimeter formulas for rectangles in real world and mathematical problems. [CCSS.MATH.CONTENT.4.MD.A.3]

English Language Arts

Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. [CCSS.ELA-LITERACY.RL.4.1]

Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text (e.g., a character's thoughts, words, or actions). [CCSS.ELA-LITERACY.RL.4.3]

Determine the meaning of words and phrases as they are used in a text, including those that allude to significant characters found in mythology (e.g., Herculean).

[CCSS.ELA-LITERACY.RL.4.4.]

Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences. [CCSS.ELA-LITERACY.W.4.3]

Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. [CCSS.ELA-LITERACY.W.4.4]

With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. [CCSS.ELA-LITERACY.W.4.5]

Draw evidence from literary or informational texts to support analysis, reflection, and research. [CCSS.ELA-LITERACY.W.4.9]

Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. [CCSS.ELA-LITERACY.W.4.10]

STANDARDS common Core State Standards: <u>www.corestandards.org</u> MATHEMATICS/ENGLISH LANGUAGE ARTS/LITERACY

GRADE 5

Mathematics

Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.

[CCSS.MATH.CONTENT.5.OA.A.1]

Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.

[CCSS.MATH.CONTENT.5.OA.A.2]

Read, write, and compare decimals to thousandths. [CCSS.MATH.CONTENT.5.NBT.A.3]

Use place value understanding to round decimals to any place. [CCSS.MATH.CONTENT.5.NBT.A.4]

Fluently multiply multi-digit whole numbers using the standard algorithm. [CCSS.MATH.CONTENT.5.NBT.B.5]

Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. [CCSS.MATH.CONTENT.5.NBT.B.7]

Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.

[CCSS.MATH.CONTENT.5.MD.C.5]

English Language Arts

Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

[CCSS.ELA-LITERACY.RL.5.1]

Determine the meaning of words and phrases as they are used in a text, including figurative language such as metaphors and similes. [CCSS.ELA-LITERACY.RL.5.4]

Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences. [CCSS.ELA-LITERACY.W.5.3]

Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. [CCSS.ELA-LITERACY.W.5.4]

With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. [CCSS.ELA-LITERACY.W.5.5]

Draw evidence from literary or informational texts to support analysis, reflection, and research. Range of Writing: [CCSS.ELA-LITERACY.W.5.9]

Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences. [CCSS.ELA-LITERACY.W.5.10]

ALL GRADES: SOCIAL AND EMOTIONAL

CASEL Core Competencies https://casel.org/core-competencies/ Self-awareness Self-management Social awareness **Relationship skills** Responsible decision-making