Something from Nothing: Math Activity

Book by Phoebe Gilman / ISBN: 978-0-590-47280-7

Lesson Author

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Standards and Benchmarks (see page 12)

Lesson Description

After listening to the story *Something from Nothing*, students use tangrams to create Joseph's blanket and the various items Grandpa makes from the material. They identify the opportunity cost of each item they create. Students fill in a graph to classify shapes according to defining attributes and color and then interpret the data.

Grade Level

1-2

Economic Concepts

Opportunity Cost

Math Concepts

Defining attributes (e.g., number of sides)

Less than

More than

Non-defining attributes (e.g., color)

Objectives

Students will

- distinguish between defining and non-defining attributes,
- represent and interpret data using a bar graph,
- define opportunity cost, and
- give examples of opportunity cost.

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Time

30 minutes

Materials

- *Something from Nothing* by Phoebe Gilman (ISBN: 978-0-590-47280-7)
- Visual 1
- Handouts 1 to 3, one copy for each student and the teacher
- Handout 4 (tangrams), one copy for each student and the teacher, with each copy cut out, laminated, and placed in an envelope
- Crayons for each student

Procedure

1. Ask the students if they have a blanket or a stuffed animal that is very important to them. (*Answers will vary.*)

2. Read the story *Something from Nothing*.

3. After reading the story, display *Visual 1: Opportunity Cost*. Review the definition.

4. Distribute a copy of *Handout 1: Tangram Mat* and a set of tangrams (cut from *Handout 4: Tangrams*) to each student.

5. Instruct the students to remove the tangram pieces from the envelopes and discuss with a seat partner the characteristics of the shapes (i.e., size, number of sides, and number of corners/angles), which are called defining attributes. Invite students to share their observations with the class. List the observations on the board. Discuss non-defining attributes of shapes—such as color—as well.

6. Tell the students to match the numbered shapes with the numbers on Handout 1.

7. Remind the students that Joseph's grandfather gave Joseph a blanket when he was a baby. Explain that all of the shapes in place create Joseph's blanket. They will remove pieces to turn the blanket into something else.

8. Display *Handout 2: Graph*. Explain to the students that after shapes are removed, they will record the shapes on the graph by coloring in the corresponding shapes. They are to begin coloring at the bottom of the page and work their way up.

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9. Discuss the following:
    - What did Grandpa make Joseph when the blanket was frazzled, worn, unsightly, and torn? (*A jacket*)
    - What was Joseph's opportunity cost of the jacket? (*The blanket*)

10. Tell the students to remove shapes 1 to 9 and place them on their desks. Discuss the following:
    - What has the blanket been turned into? (*A jacket*)
    - How many shapes were removed? (*9*)
    - How many of the removed shapes have three sides? (*8*)
    - How many of the removed shapes have four sides? (*1*)
    - How many of the removed shapes have five sides? (*Zero*)

11. Tell the students to color in the corresponding number of shapes on Handout 2. Remind them to start at the bottom and move upward one after another. When finished, they are to put the shapes back in the envelope.

12. Discuss the following:
    - What did Grandpa make Joseph when the jacket was shrunken and small and didn't fit him at all? (*A vest*)
    - What was Joseph's opportunity cost of the vest? (*The jacket*)

13. Tell the students to remove shapes 10 to 15 and place them on their desks. Discuss the following:
    - What has the jacket been turned into? (*A vest*)
    - How many shapes were removed? (*6*)
    - How many of the removed shapes have three sides? (*Zero*)
    - How many of the removed shapes have four sides? (*4*)
    - How many of the removed shapes have five sides? (*2*)

14. Tell the students to color in the corresponding number of shapes on Handout 2. Remind them to move upward one after another and then put the shapes back in the envelope.

15. Discuss the following:
    - What did Grandpa make Joseph when the vest was spotted with glue and had paint on it too? (*A tie*)

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- What was Joseph's opportunity cost of the tie? (*The vest*)

16. Tell the students to remove shapes 16 to 23 and place them on their desks. Discuss the following:
    - What has the vest been turned into? (*A tie*)
    - How many shapes were removed? (*8*)
    - How many of the removed shapes have three sides? (*2*)
    - How many of the removed shapes have four sides? (*4*)
    - How many of the removed shapes have five sides? (*2*)

17. Tell the students to color in the corresponding number of shapes on Handout 2. Remind them to move upward one after another and then put the shapes back in the envelope.

18. Discuss the following:
    - What did Grandpa make Joseph when the tie had a big stain of soup that made the sides droop? (*A handkerchief*)
    - What was Joseph's opportunity cost of the handkerchief? (*The tie*)

19. Tell the students to remove shapes 24-25 and place them on their desks. Discuss the following:
    - What has the tie been turned into? (*A handkerchief*)
    - How many shapes were removed? (*Two*)
    - How many of the removed shapes have three sides? (*Zero*)
    - How many of the removed shapes have four sides? (*1*)
    - How many of the removed shapes have five sides? (*1*)

20. Tell the students to color in the corresponding number of shapes on Handout 2. Remind them to move upward one after another and then put the shapes back in the envelope.

21. Discuss the following:
    - What did Grandpa make Joseph when the handkerchief was tattered, splotched, and splattered? (*A button*)
    - What was Joseph's opportunity cost of the button? (*The handkerchief*)

22. Tell the students to remove shapes 26 to 27 and place them on their desks. Discuss the following:

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- What has the handkerchief been turned into? (A button)
- How many shapes were removed? (2)
- How many of the removed shapes have three sides? (Zero)
- How many of the removed shapes have four sides? (Zero)
- How many of the removed shapes have five sides? (2)

23. Tell the students to color in the corresponding number of shapes on Handout 2. Remind them to move upward one after another and then put the shapes back in the envelope.

24. Discuss the following:
    - What happened to the button on Joseph's suspenders? (*He lost it*)

25. Tell the students to remove shape 28 and place it on their desks. Discuss the following:
    - How many shapes were removed? (*1*)
    - How many of the removed shapes have three sides? (*Zero*)
    - How many of the removed shapes have four sides? (*1*)
    - How many of the removed shapes have five sides? (*Zero*)

26. Tell the students to color in the corresponding shape on Handout 2. Remind them to move consecutively upward and then put the shape back in the envelope.

Closure

27. Review the important concepts in the lesson by discussing the following:
    - What is a defining attribute of a shape? (*Size, number of sides, and number of corners/angles*)
    - Is color a defining or non-defining attribute of a shape? (*Non-defining*)
    - If you can only choose one snack—either gold fish or pretzels—and you choose gold fish, what is your opportunity cost? (*Answers will vary, but the students should know that it is the snack not chosen.*)
    - What is opportunity cost? (*Opportunity cost is the value of the next-best alternative when a choice is made. It's what is given up. It's the second-best choice.*)

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Assessment

28. Distribute a copy of *Handout 3: Data Analysis* to each student. Tell the students they will work with a seat partner to answer the questions. Read each question aloud, provide students time to discuss the solution with their seat partner, and then discuss the correct answer as a class.

Handout 3: Data Analysis—Answer Key

1. How many three-sided shapes are there? (*10*)
2. How many four-sided shapes are there? (*11*)
3. How many five-sided shapes are there? (*7*)
4. How many shapes are there all together? (*28*)
5. There is *1* less three-sided shape than four-sided shapes.
6. There are *3* more three-sided shapes than five-sided shapes.
7. There are *4* more four-sided shapes than five-sided shapes.

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Visual 1: Opportunity Cost

Opportunity cost

The value of the next-best alternative when a decision is made; it's what is given up.

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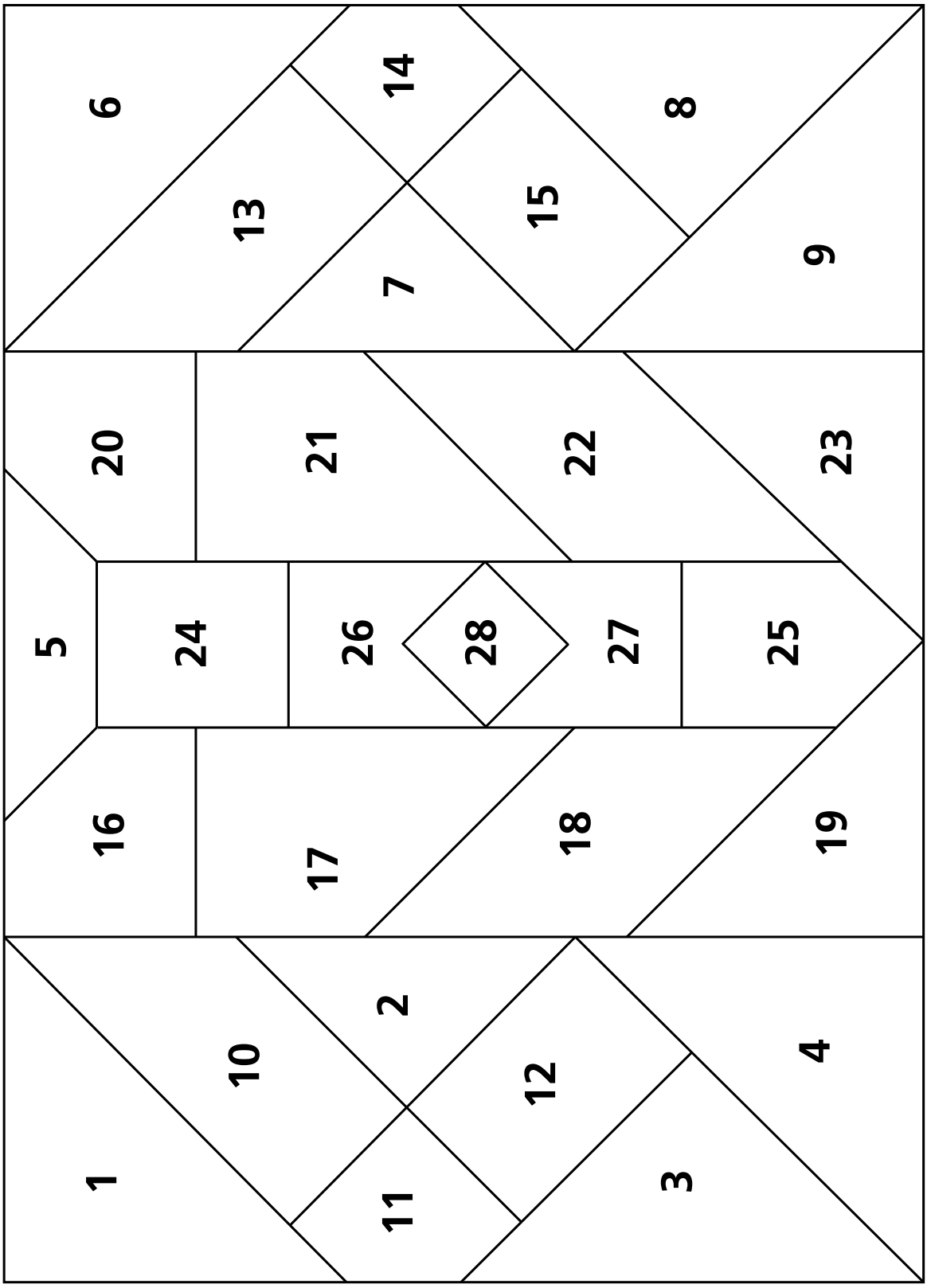
Handout 1: Tangram Mat



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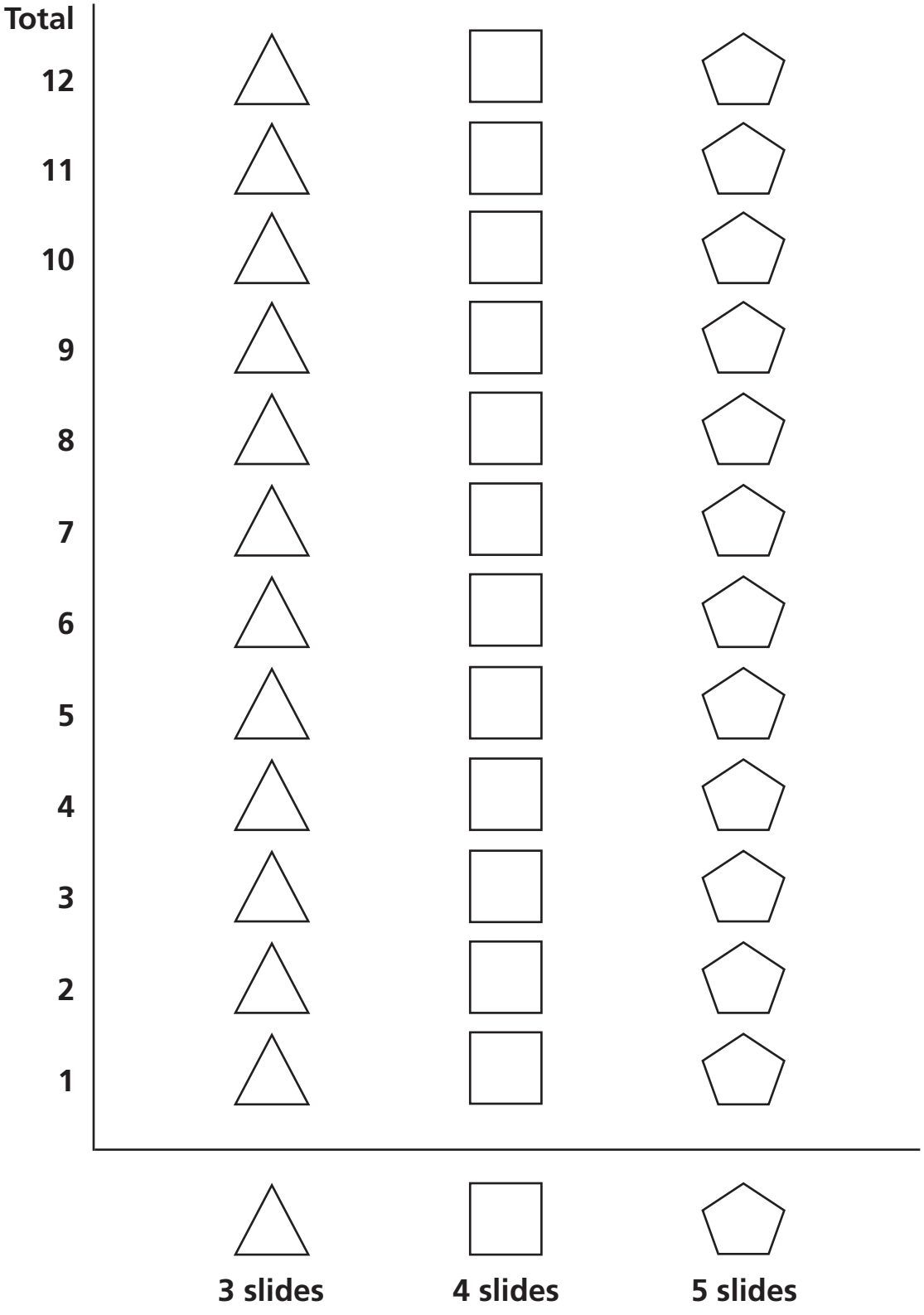
Handout 2: Graph



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Handout 3: Data Analysis

Name: _____

Direction: Answer the following questions based on the graph you created on Handout 3.

1. How many three-sided shapes are there? _____

2. How many four-sided shapes are there? _____

3. How many five-sided shapes are there? _____

4. How many shapes are there all together? _____ Show work to prove your answer:

5. There is _____ less three-sided shape than four-sided shapes. Show work to prove your answer:

6. There are _____ more three-sided shapes than five-sided shapes. Show work to prove your answer:

7. There are _____ more four-sided shapes than five-sided shapes. Show work to prove your answer:

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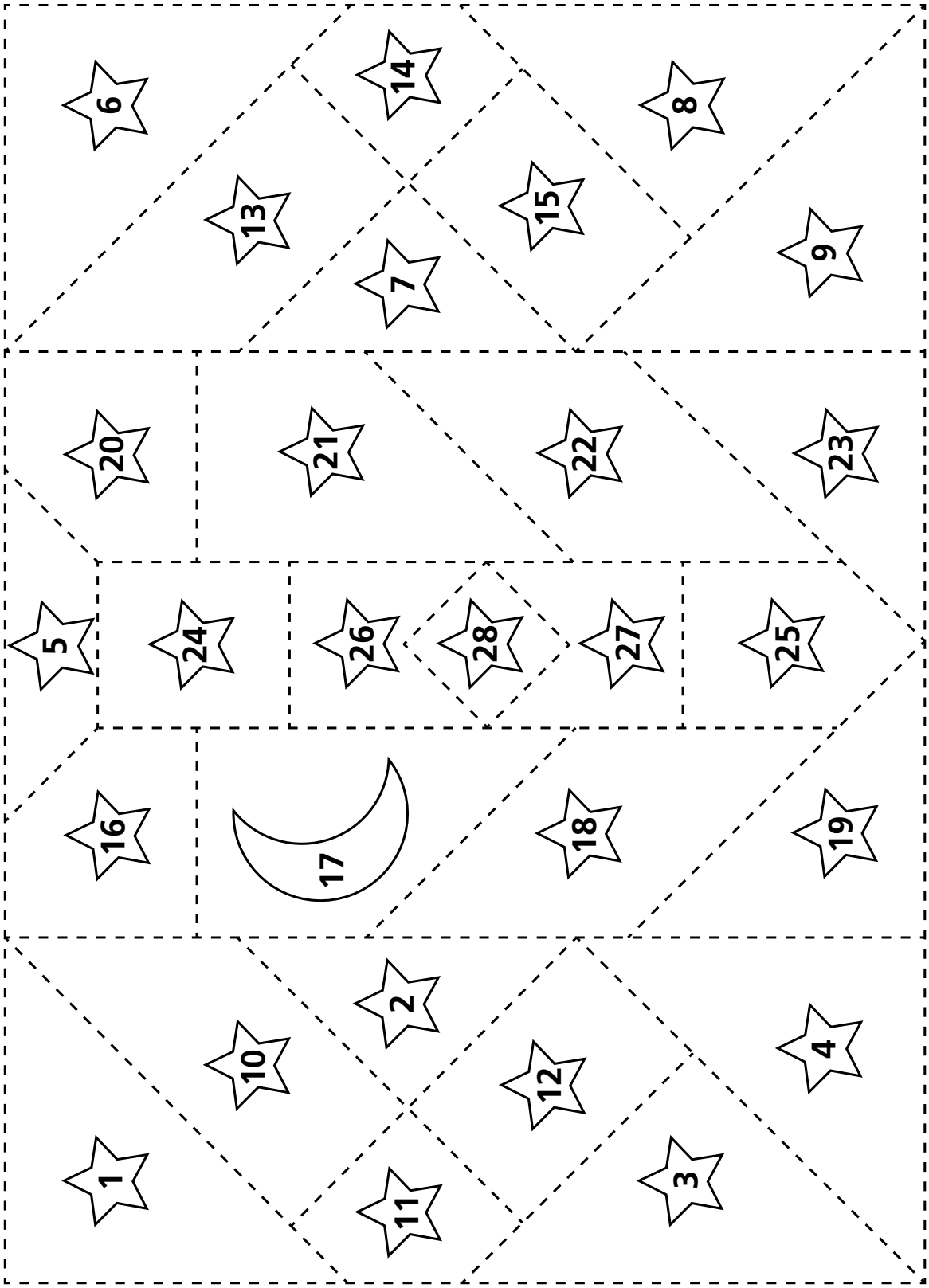
Handout 4: Tangrams



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Standards and Benchmarks

Common Core State Standards: Mathematics Standards

Measurement & Data

- Represent and Interpret Data

  CCSS.CONTENT.1.MD.C.4: Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

Geometry

- Reason with Shapes and Their Attributes

  CCSS.CONTENT.1.G.A.1: Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes.

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