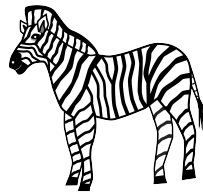


# Math Project: Design a Zoo

## Notes to Teacher



This is a fun project for students to practice real world math. Your students will use area, perimeter, and critical thinking skills to design a layout for a zoo. Students should already be familiar with the concepts of area and perimeter before working on this project.

There are many options for how you can have students complete this project:

- Use it as a whole class project to wrap up your area and perimeter unit.
- Allow students who have mastered area and perimeter to work on it independent while you work in small groups with students who need extra help.
- Have students keep a math project in their folder to work on when they finish other tasks early.
- The art extension projects are great for the end of the year, after “the test,” or can even be used as creative home projects. I tried to include a nice variety so that students would have an interesting choice, but you may also have students suggest their own project ideas.

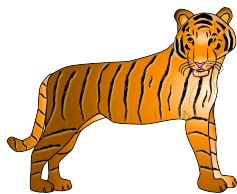
### Introducing the project:

Go over the guidelines and requirements with students. Encourage them to be creative with their zoo names and animals choices. Explain the difference between a blueprint and a map. You may want to show students pictures of actual blueprints. If you do a Google search, a ton show up. A blueprint is often birds-eye-view and usually just shows the outlines of the buildings. A map, especially a visitor’s map for a zoo or theme park, is much more detailed and colorful.

### Creative Art Extensions:

I included extension ideas to integrate the “A” into STEAM. You may have students choose an option, or you may assign a particular one. They are purposefully open-ended so students can be as creative as possible. You may even allow students to suggest their own creative option. These are bonus ideas that can be used in addition to the math portion of the project if you have time. You may also choose to use these as extra credit options or as fun rewards for your more artistic students.

- ☐ Design an advertisement for your zoo that persuades people to come and visit.
- ☐ Design an interactive animal presentation for preschoolers. Write out the transcript of the presentation.
- ☐ Design a commercial for your zoo using technology of your choice.
- ☐ Design a zoo billboard that will be visible from the highway.
- ☐ Design a T-shirt that people can buy at your zoo.
- ☐ Design a full color visitor’s map of your zoo.
- ☐ Compose a jingle that could play on the radio to advertise your zoo.
- ☐ Create a 3-D scale model of your zoo.



# Math Project: Design a Zoo

## Materials Included



- **Detailed notes to teachers**
- **List of included pages**
- **Examples: Completed blueprint, Zoo Planning sheet, and Area and Perimeter page**
- **Directions page for students with requirements** This page gives an overview of the project as well as specific requirements for students to follow. It also encourages students to think of the logistics of a zoo like which animals can and cannot be housed together.
- **Drawing Tips for Students** This will guide students as they draw their blueprint.
- **List of zoo animals and square footage required** This is for students to use as a guide when planning their exhibits. All are multiples of 100 since the directions state that one square of graph paper = 100 square feet.
- **Zoo Planning sheet** This is for students to list their exhibits and the amount of square footage needed.
- **Area and Perimeter sheet** On this page, students will calculate the area and perimeter of each exhibit after they draw the blueprint. (Area will be based on the animal's requirements. Perimeter will be based on the shape they decide to draw on the graph paper.)
- **Grading checklist** You can use this to grade the assignment. You may even show to students ahead of time so they know what is expected of them.
- **Bonus Arts STEAM Extension Ideas** Optional ideas and projects for students to complete to add art into this project. Assign a project, let students choose, or save these for early finishers or extra credit.
- **Printable Grid Paper** You may choose to print this, or you may also choose to use graph paper. The squares will be smaller, and students will be able to fit more on the page. Also, some students may need two sheets depending on the size of their exhibits.
- **Credits**

### What to Print:

-You will need to print ① ② ③ ④ ⑤ ⑥

-**Optional:** Print STEAM Extension project ideas and grid paper.

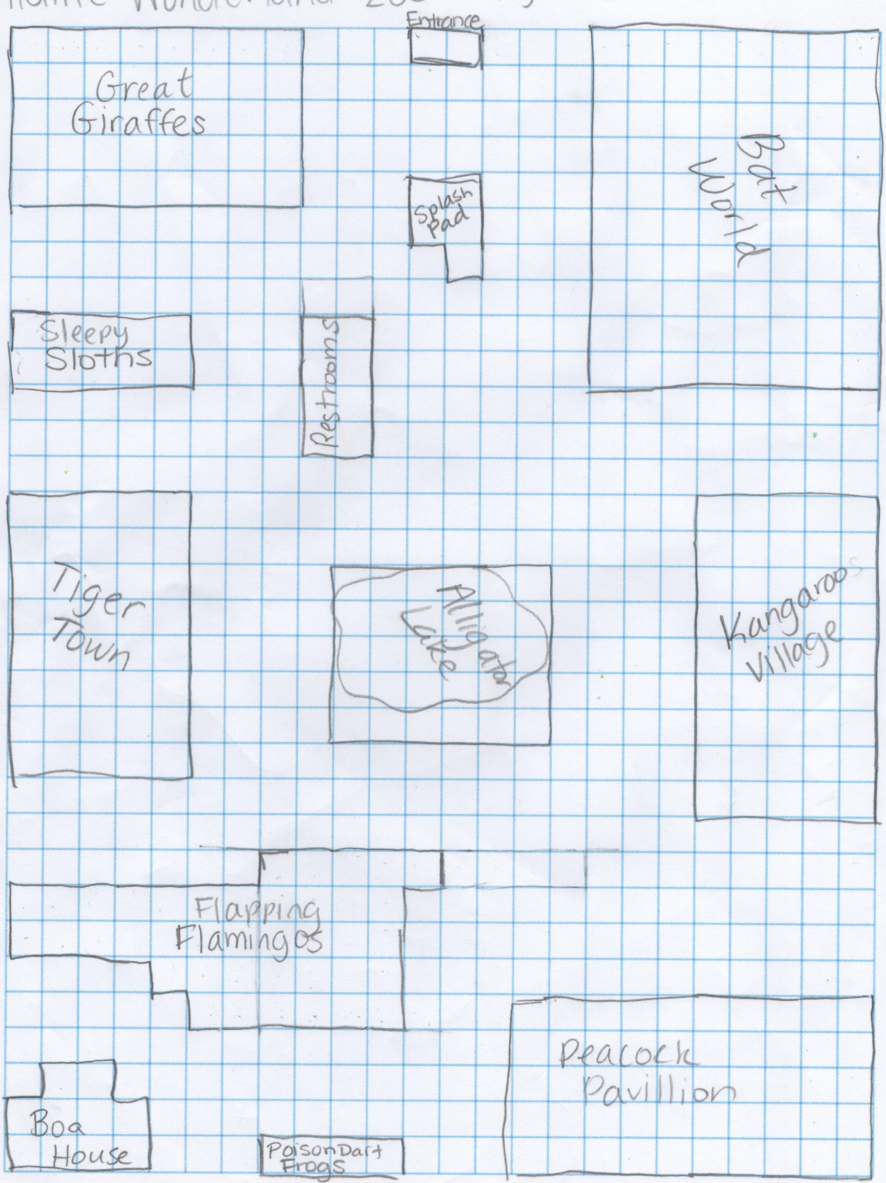
### Paper Saving Printing Option:

Print ③ ④ for everyone, and print a couple of copies of the other pages to post in the classroom or keep in plastic sleeves in a binder.



Here is a sample completed blueprint, planning sheet, and area and perimeter page:

Wildlife Wonderland Zoo by Sarah B.



Name Sarah B.  
**Zoo Planning Sheet**  
Use this chart to plan what animals to include in your zoo. Use the back of this page if needed. Include at least 10 different animals and two of each animal that you choose. For the "Special Considerations" column, consider things that this animal would need to make a realistic habitat. For example, a snapping turtle needs a pond, and you probably want to put your snakes in an enclosure that they can't escape from. Giraffes will require acacia trees, and koalas need eucalyptus. You need to research your animals to make their habitats as realistic as possible.

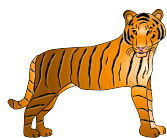
Animal	Quantity	Sq. Footage Needed	Special Habitat Considerations
giraffe	2	4,000	needs acacia trees
bats	4	8,000	
peacock	5	5,000	needs lake, and also dry land
alligator	3	3,000	needs large glass enclosure
boa	2	1,000	aquarium
poison dart frog	4	400	spend most of their time in trees
sloth	2	1,000	need very tall fence
kangaroo	3	4,500	must have pond
tiger	2	4,000	need water to wade in
flamingos	4	4,000	

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Name Sarah B.  
**Area and Perimeter**  
Use this chart after you draw your blueprint to record the area and perimeter of each exhibit. The type of animal is the exhibit, so you may have a giraffe exhibit. Be sure to name your exhibit. For example: "Playful Penguins" or "Wild and Crazy Gorillas." Also include your "Extras" here such as restrooms, concession stands, etc....

Exhibit	Area	Perimeter
Great Giraffes	4,000 ft <sup>2</sup>	260 ft
Sleepy Sloths	1,000 ft <sup>2</sup>	140 ft
Tiger Town	4,000 ft <sup>2</sup>	260 ft
Flapping Flamingos	4,000 ft <sup>2</sup>	340 ft
Boa House	1,000 ft <sup>2</sup>	140 ft
Splash Pad	500 ft <sup>2</sup>	100 ft
Restrooms	8,000 ft <sup>2</sup>	120 ft
Bat World	8,000 ft <sup>2</sup>	360 ft
Kangaroo Village	4,500 ft <sup>2</sup>	280 ft
Peacock Pavillion	5,000 ft <sup>2</sup>	300 ft

Name \_\_\_\_\_



# Math Project: Design Your Own Zoo



Due \_\_\_\_\_

You have been chosen as a member of a design team to create plans for a new zoo in your town. Use the checklist and guidelines to design your zoo.

## Design a Zoo Checklist

- ☐ 1. Choose at least 10 animals to include in your zoo.
- ☐ 2. Research the animals to learn specific habitat requirements.
- ☐ 3. Use the provided charts to determine the amount of square footage required.
- ☐ 4. Complete the "Zoo Planning Sheet."
- ☐ 5. Use grid paper to draw a blueprint of the animal exhibits.
- ☐ 6. Add at least 2 "Extras."
- ☐ 7. Label all Exhibits and Extras.
- ☐ 8. Write the title on your blueprint.
- ☐ 9. Complete the "Area and Perimeter" sheet.

## Design a Zoo Requirements and Notes

- You must include at least 10 different types of animals, and you may include more.
- You must include at least two of each animal, but you may use as many as you like. (For example, if you choose giraffe as one of your animals, you must have at least two giraffes.)
- When planning your zoo, be sure to include a path that is at least 30 feet wide between all exhibits. **Hint:** If each square is 100 square feet, then each side of the square is 10 feet.

### Here are some logistics to consider. (Hint--You may need to do additional research!)

- Some animals should not be in the same vicinity as others. Just because they are in the same family does not mean they can be housed together.
- Some animals will need particular items in their habitat such as a body of water or trees.
- Some animals will need a controlled climate (very cold, hot, or wet).
- Some animals will need cages or aquariums, while others will need large open spaces.

\*Please note, the area suggestions are just numbers for your project purposes only. Animals in the wild or in a carefully designed realistic zoo habitat would require a much larger space in most cases!





# Math Project: Design Your Own Zoo



Use the following list of animals to help plan your zoo. The square footage is per individual animal. For instance, if one zebra requires 2,000 square feet, then two zebras would require 4,000. You may also use animals that are not on this list. Just make a reasonable estimate for the area required.

Mammals		Birds	
Animal	Area (sq. ft.)	Animal	Area (sq. ft.)
zebra	2,000	peacock	1,000
elephant	2,000	ostrich	2,000
giraffe	2,000	owl	1,000
hippo	2,000	toucan	1,000
rhinoceros	2,000	stork	1,000
anteater	1,500	emu	2,000
kangaroo	1,500	flamingo	1,000
camel	1,500	macaw	1,000
llama	1,000	eagle	2,000
hyena	1,000	vulture	1,500
warthog	1,000	Reptiles	
sloth	500	Animal	Area (sq. ft.)
koala	500	alligator	1,000
red panda	1,000	Galapagos tortoise	1,000
porcupine	500	alligator snapping turtle	500
bats	2,000	crocodile	1,000
chimpanzee	1,500	anaconda	500
orangutan	1,000	boa	500
gorilla	2,00	Gila Monster	200
lemur	1,000	Green Iguana	200
lion	2,000	Amphibians	
tiger	2,000	Animal	Area (sq. ft.)
leopard	2,500	poison dart frog	100
cheetah	2,500	bullfrog	100
panther	2,500	toad	100
black bear	1,500	fire-bellied newt	100
panda bear	1,500	salamander	100



# Zoo Planning Sheet



Use this chart to plan what animals to include in your zoo. Use the back of this page if necessary. You must include at least 10 different animal and two of each animal that you choose. For the “Special Habitat Considerations” column, consider things that this animal would need to make a realistic habitat. For instance, a snapping turtle needs a pond, and you probably want to put your snakes in an a glass enclosure that they can’t escape from. Giraffes will require acacia trees, and koalas need eucalyptus trees. You will need to research your animals to make their habitats as realistic as possible.

Animal	Quantity	Sq. Footage Needed	Special Habitat Considerations

Name\_\_\_\_\_



## Area and Perimeter

Use this chart after you draw your blueprint to record the area and perimeter of each exhibit. The type of animal is the exhibit, so you may have a giraffe exhibit. Be sure to name your exhibit. For example: "Playful Penguins" or "Wild and Crazy Gorillas." Also include your "Extras" here such as restrooms, concession stands, etc...

[illegible]



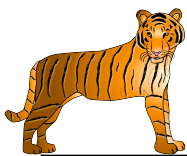
Name \_\_\_\_\_

## Tips Drawing your Zoo Blueprint

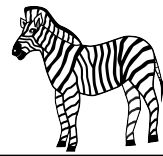
1. Use your "Zoo Planning Sheet" as a guide.
2. Remember that the "Square Footage Required" is a minimum, and your area may be larger.
3. Be sure to leave space for pathways. They should be 30 feet or 3 squares wide.
4. You must also choose at least 2 "bonus" non-animal areas to your zoo. Your patrons would appreciate a restroom 😊.
5. Label each area and exhibit or use a key.

Bonus Areas	Area (sq. ft.)
restroom	800
kiddie splash pad	500
auditorium	2,500
concession stand	1,000
gift shop	1,000
playground	1,000
zoo equipment room	500

Name \_\_\_\_\_



# Design a Zoo Grading Checklist



	<i>Points Possible</i>	<i>Points Earned</i>
<b>Planning</b>	<b>10 points</b>	
Planning sheet is completed and accurate.	2 points	
At least 10 animals are included.	2 points	
At least 2 of each animal is included.	2 points	
Student completed research to correctly identify special habitat considerations.	4 points	
<b>Blueprint</b>	<b>18 points</b>	
Blueprint matches planning sheet.	2 points	
There is a pathway between all exhibits that is 30 feet wide.	2 points	
There are at least 10 animal exhibits.	2 points	
There are at least 2 zoo extras.	2 points	
The zoo plan is realistic, functional, and could be applied to a real zoo plan.	2 points	
The exhibits are labeled or indicated on a key.	2 points	
Zoo has a unique and creative name.	2 points	
The overall blueprint product is neat, polished, and complete.	4 points	
<b>Math Connections</b>	<b>12 points</b>	
Area is calculated correctly.	4 points	
Perimeter is calculated correctly.	4 points	
Quantity of animals matches the square footage required and is calculated correctly.	4 points	
<b>Total</b>	<b>40 points</b>	
Comments		<b>Grade</b>

Name \_\_\_\_\_

### Design a Zoo Creative Extension Options

Choose a creative bonus project to complete that will incorporate technology, language arts, or creative arts to your project.

- ☐ Design an advertisement for your zoo that persuades people to come and visit.
- ☐ Design an interactive animal presentation for preschoolers. Write out the transcript of the presentation.
- ☐ Design a commercial for your zoo using technology of your choice.
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Name \_\_\_\_\_

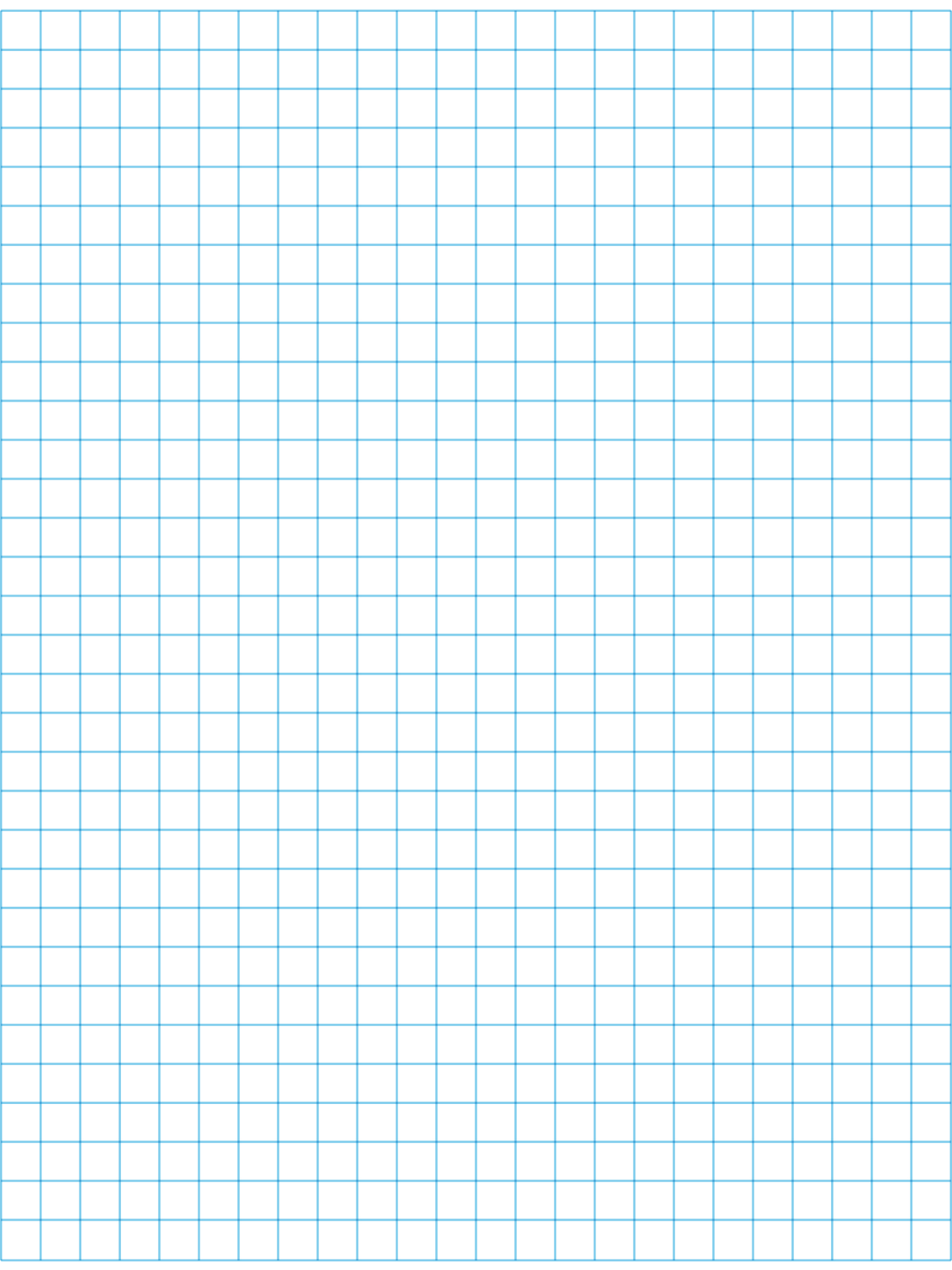
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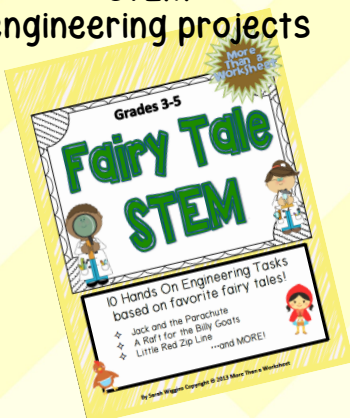
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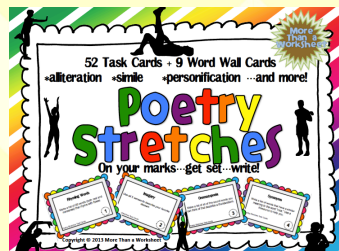
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