



*At Home Learning  
Resources*

**Grade 6**

**Week 2**

## **Grab and Go Meals**

**Available for Lowell Public Schools**

**Students When School is Closed**

**Weekdays from March 16-March 27**

Bartlett (11-11:30am)  
79 Wannalancit St.

Moody (12-12:30pm)  
158 Rogers St.

Butler (12:45-1:30pm)  
1140 Gorham St.

Murkland (12:45-1:15pm)  
350 Adams St.

Greenhalge (10:30-11am)  
149 Ennell St.

Pawtucketville (12-12:30pm)  
425 West Meadow Rd.

Lincoln (1:30-2pm)  
300 Chelmsford St.

Robinson (11:15-11:45am)  
110 June St.

STEM Academy (Rogers)\*  
10:30am-1 pm  
43 Highland St.

*\*STEM meal service will  
be available at back door  
at the kitchen loading  
dock area off South St.*

## ELA Grades 5-8 At Home Learning Choices

### Weeks 2 & 3

*You can continue the reading, writing, and vocabulary work from Week 1 OR continue online learning using tools like iReady, Lexia, Scholastic Learn OR complete the “Choose Your Own Adventure” Learning*

“Choose Your Own Adventure”

This is a two week English Language Arts and Literacy exploration. Students will choose between 4 different options to pursue. Each option still requires daily reading. The goal of the project is to honor student growth and increase their learning with a project of their choice. There are different levels of independence, as well as choices for how to share their learning. (This work is borrowed from educator Pernille Ripp). Enjoy!

So what are the choices?

Choice	To Do
<b>Choice 1: The Independent Reading Adventure</b> On this adventure, you will use a self-chosen fiction chapter book to show your reading analysis skills. Read and either write or record your answers to questions that show your deeper understanding of the text.	See instructions below for “The Independent Reading Adventure”
<b>Choice 2: The Picture Book Read Aloud Adventure</b> On this adventure, you will listen to a picture book being read aloud every day by lots of wonderful people. Then you will write or record a response to a specific question every day.	See instructions below for “The Picture Book Read Aloud Adventure”
<b>Choice 3: The Inquiry Project Adventure</b> Ever wanted a chance to pursue a major topic of interest for yourself? Now is the chance. Craft a learning plan, learn more about your topic, and then showcase your learning when you return to school or virtually.	See instructions below for “The Inquiry Project Adventure”
<b>Choice 4: The Creative Writing Adventure</b> Want a chance to explore creative writing? Decide how you want to grow as a writer, and then start writing. Write each day and be ready to share some of your great work when you return to school or virtually.	See instructions below for “The Creative Writing Adventure”

## Choice 1: The Independent Reading Adventure

*On this adventure, you will use a self-chosen fiction chapter book to show your reading analysis skills. Read and either write or record your answers to questions that show your deeper understanding of the text.*

Connect Four boxes vertically, horizontally, or diagonally. The four boxes you choose must be included in your recorded or written response.

# Choose Your Own Adventure - The Independent Reading Adventure

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A one-pager is an analytical, creative, and written response to a novel that completely fills one side of a piece of paper. For your one-pager, you'll want to focus on the big ideas from the novel including theme, symbolism, and character change.

**Book:** Grab a chapter book to do this, if you do not have one at your house you can use Audible to listen to one or Epic Books or Libby/Overdrive.

### Choice in completion:

You can either type this out in a document: Google Doc, Word, Etc. OR record this in a video or audio-only format.

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## Details for Written Response

- Write a healthy response for each section that requires a written answer, meaning a long paragraph - not only five sentences.
- Clearly label each element of your one-pager.
- Include the title, author, genre of your book on the paper.
- Choose 4 elements to complete from the grid that are connected - they can be connected vertically, diagonally, or horizontally.
- Do this by hand by printing it out or take a picture of it.

## Required Details for Recorded Response

- Brainstorm what you want to say before you record.
- Make sure you name the book and the author in your recording.
- Start each section by saying the question you are answering.
- Make sure your response answers the questions fully.
- Choose 4 elements to complete from the grid that are connected - they can be connected vertically, diagonally, or horizontally.

Connect four boxes vertically, horizontally, or diagonally to select your other four required elements.

<p><b>Quotes:</b> Copy down 3 meaningful quotes from the book and explain the significance of each quote. What does it infer, symbolize, suggest, relate to, etc.?</p>	<p><b>Character changes:</b> How does your main character start out and how do they change throughout the story? Answer thoroughly using evidence to back up your thoughts. Add two images that symbolize your character.</p>	<p><b>Setting:</b> Draw or describe a background that shows knowledge of the setting of one or more important scenes for the characters, add one symbol at least from the story - write what it symbolizes next to it.</p>	<p><b>Song:</b> Find song lyrics that connect. Write the lyrics, including the song, artist, and a 2-3 sentence explanation of how the song related to the book.</p>
<p><b>Setting:</b> Draw or describe a background that shows knowledge of the setting of one or more important scenes for the characters, add one symbol at least from the story - write what it symbolizes next to it.</p>	<p><b>Timeline:</b> Create a timeline with 10 critical events in the book. The timeline must be linear or follow the plot diagram. Each event must be a complete sentence.</p>	<p><b>Quotes:</b> Copy down 3 meaningful quotes from the book and explain the significance of each quote. What does it infer, symbolize, suggest, relate to, etc.?</p>	<p><b>Character changes:</b> How does your main character start out and how do they change throughout the story? Answer thoroughly using evidence to back up your thoughts. Add two images that symbolize your character.</p>
<p><b>Lessons learned:</b> Add images and/or words to show lessons your main character learns throughout the book. Write about what the lessons teach them. Does this teach you any lessons?</p>	<p><b>Setting:</b> Draw or describe a background that shows knowledge of the setting of one or more important scenes for the characters, add one symbol at least from the story - write what it symbolizes next to it.</p>	<p><b>Character changes:</b> How does your main character start out and how do they change throughout the story? Answer thoroughly using evidence to back up your thoughts. Add two images that symbolize your character.</p>	<p><b>Quotes:</b> Copy down 3 meaningful quotes from the book and explain the significance of each quote. What does it infer, symbolize, suggest, relate to, etc.?</p>
<p><b>Character changes:</b> How does your main character start out and how do they change throughout the story? Answer thoroughly using evidence to back up your thoughts. Add two images that symbolize your character.</p>	<p><b>Quotes:</b> Copy down 3 meaningful quotes from the book and explain the significance of each quote. What does it infer, symbolize, suggest, relate to, etc.?</p>	<p><b>Theme:</b> What is the theme statement of your book and how do you know? Answer thoroughly using evidence to back up your thoughts. Add an image that symbolizes the theme</p>	<p><b>Setting:</b> Draw or describe a background that shows knowledge of the setting of one or more important scenes for the characters, add one symbol at least from the story - write what it symbolizes next to it.</p>

## Choice 2: The Picture Book Read Aloud Adventure

*On this adventure, you will listen to a picture book being read aloud every day by lots of wonderful people. Then you will write or record a response to a specific question every day.*

# Choose Your Own Adventure - Picture Book Read Alouds and Analysis

Love picture books being read aloud? Me too! Here is your chance to listen to a different picture book being read aloud every day and analyze the book using the question asked each day.

### Project requirement:

- Watch the video posted for each day in the table below.
- Respond either in writing or by posting a recording of your answer.

### Choice in completion:

You can either type this out in a document: Google Doc, Word, etc. OR record this in a video or audio-only format

### Details for Written Response

- Write a healthy response for each question meaning a long paragraph - not only five sentences.
- You should use evidence from the read aloud to support your analysis. You can use either a quote (stop the video to write it down) or refer to a specific section of the picture book.
- Include the title of your book on the paper.

### Details for Recorded Response

- Brainstorm what you want to say before you record.
- Make sure you name the book and the author in your recording.
- Start each recording by saying the question you are answering.
- Make sure your response answers the questions fully.

Day	Title of Picture Book	Video link	Questions to discuss
Day 1	A Tale of Two Beasts	<a href="https://www.storylineonline.net/books/tale-of-two-beasts/">https://www.storylineonline.net/books/tale-of-two-beasts/</a>	In the picture book, we see two very different versions of the same story. Why did the girl believe her version of the story was the right one? What does this remind you of in your own life?
Day 2	Each Kindness	<a href="https://www.youtube.com/watch?v=kj7Oc0ZoOjM">https://www.youtube.com/watch?v=kj7Oc0ZoOjM</a>	What is the theme of <u>Each Kindness</u> ? How do you know?

Day 3	The Heart and the Bottle	<a href="https://www.youtube.com/watch?v=8FSuy-J_Pzk">https://www.youtube.com/watch?v=8FSuy-J_Pzk</a>	What does placing her heart in a bottle symbolize? How do you know?
Day 4	The Bad Seed	<a href="https://www.youtube.com/watch?v=ugsGoiz-ufg&amp;list=PLiYzMwyBPG96EDjv7MAohaCnXoQnqiBmG&amp;index=20&amp;t=0s">https://www.youtube.com/watch?v=ugsGoiz-ufg&amp;list=PLiYzMwyBPG96EDjv7MAohaCnXoQnqiBmG&amp;index=20&amp;t=0s</a>	In the book, the people who surround our main character see a certain way - how do you think the perception of others influences him and his actions? How do you connect to this story?
Day 5	We are Water Protectors	<a href="https://youtu.be/N-zPU4iSpc0">https://youtu.be/N-zPU4iSpc0</a> AND <a href="https://bioneers.org/the-native-american-prophecy-of-the-black-snake/">https://bioneers.org/the-native-american-prophecy-of-the-black-snake/</a>	What is the black snake that is poisoning the water, plants, animals, and land? Discuss how and why the Black Snake is used as a symbol of destruction throughout the book.
Day 6	Pride: The Story of Harvey Milk and the Rainbow Flag	<a href="https://www.readbrightly.com/brightly-storytime-pride/">https://www.readbrightly.com/brightly-storytime-pride/</a>	The Rainbow Flag has been used as a symbol of hope since 1978. Why are symbols such as flags often used in movements, how can symbols pull us together around a cause?
Day 7	Wolfie the Bunny	<a href="https://www.youtube.com/watch?v=BiU0Z9P2E4s">https://www.youtube.com/watch?v=BiU0Z9P2E4s</a>	What did Dot use as evidence for her perception of Wolfie? How did her perception influence how she viewed Wolfie? How does this tie in with your own life?
Day 8	On the Day You Begin	<a href="https://www.readbrightly.com/brightly-storytime-the-day-you-begin/">https://www.readbrightly.com/brightly-storytime-the-day-you-begin/</a>	How does our main character change throughout the story? How do you know? How does this story connect with your own life?
Day 9	The True Story of The Three Little Pigs	<a href="https://www.youtube.com/watch?v=1Q01X8JU3GU">https://www.youtube.com/watch?v=1Q01X8JU3GU</a>	How does hearing the perspective from the Wolf show us what we have missed? What happens to our understanding of the world when we only believe or see one side of the story?
Day 10	Your Choice	Visit the LPS Virtual Read Aloud Page and choose a book to listen to. <a href="https://www.youtube.com/channel/UCMIqoXopDU-6yfq5pJIPRtg">https://www.youtube.com/channel/UCMIqoXopDU-6yfq5pJIPRtg</a>	What did the author want you to learn? What language stood out to you? How does the main character change throughout the story? How do you know?

### Choice 3: The Inquiry Project Adventure

Ever wanted a chance to pursue a major topic of interest for yourself? Now is the chance. Craft a learning plan, learn more about your topic, and then showcase your learning when you return to school or virtually.

# Choose Your Own Adventure - Inquiry Project

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Passionate or curious about something? Now is the chance. Craft a learning plan, learn more about your topic, and then showcase your learning when you return to school or virtually.

#### Project Requirements:

- Identify an inquiry question you want to pursue (something you want to learn more about) - remember inquiry questions are not straight "Googleable," they will need learning from many sources or experiences to answer.
- Fill in the learning plan to show what you will be learning and how you will challenge yourself.
- Do the learning on your own or with your family.
- Create a product to showcase your learning - you have many choices of what to create.

#### Independence Expectations:

- This is a project that will require a lot of discipline and focus. You are not creating a day-to-day project, so you are expected to produce a larger final product to share your learning.
- The inquiry question you choose to pursue can be one that you already know something about or one that you know very little about.
- There should be NEW learning throughout, not just a summary of what you already know.

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#### Details for End Product

- Your end product can take many forms: A podcast, a story, a presentation, a speech, a stop motion animation, a PSA, or something else you imagine.
- Your end product should showcase new learning for you, as well as be accessible to your intended audience - your peers.
- Your end product should have citations of any information you have used.
- Your end product should take at least 5 minutes for an average peer to either listen to or explore.



Day	What is your plan for learning for this day?
Day 1	
Day 2	
Day 3	
Day 4	
Day 5	
Day 6	
Day 7	
Day 8	
Day 9	
Day 10	

What is your inquiry question?

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How much do you already know about this topic?

\_\_\_\_\_ Very little

\_\_\_\_\_ Average amount - I know some stuff but not anything in-depth

\_\_\_\_\_ A lot - I have done inquiry into this

\_\_\_\_\_ Expert level (how will you challenge yourself then)

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How will this project challenge you?

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What types of resources do you plan on using?

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How will you know you have successfully learned something?

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What do you plan on creating to show off your newfound knowledge? What is your end project idea?

## Choice 4: The Creative Writing Adventure

*Want a chance to explore creative writing? Decide how you want to grow as a writer, and then start writing. Write each day and be ready to share some of your great work when you return to school or virtually.*

# Choose Your Own Adventure- Creative Writing

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Have a story to tell? Here is your chance to use dedicated time to pursue your own writing craft and put some of those sweet writing moves you have been working on into action.

### Project requirement:

- Identify your areas of strength as a writer - what do you already do well in writing?
- Identify areas of growth in writing for yourself - how will this project challenge you?
- Produce two or more pages each day in the writing form you choose - narrative, informational, opinion or argument, essay, poem, song, graphic novel

### Independence expectations:

- This is a project that will require a lot of discipline and focus. You are not creating a day-to-day project, so you are expected to produce a larger final product to share your learning.
- The creative writing project you choose to pursue can be one that you already know something about or one that you know very little about.
- There should be NEW learning throughout, not just a summary of what you already know.

### Day-by-Day Breakdown

Day	What is your plan for learning for this day?
Day 1	
Day 2	
Day 3	
Day 4	
Day 5	
Day 6	
Day 7	
Day 8	
Day 9	
Day 10	

How solid of a writer are you already?

- On shaky ground, I have a lot of growth to do
- Fairly average
- Pretty good
- Expert level (how will you challenge yourself then?)

How will this project challenge you?

What types of specific writing lessons do you want to focus on:

- Finding ideas of what to write about
- Expanding and strengthening your original idea
- Fully developing a plot
- Adding descriptive details to help your reader visualize
- Creating worthwhile characters
- Manipulating time to move your story along
- Adding dialogue to add interest
- Making it have a turning point or some sort of climax
- Adding details
- Cutting out details
- Making it make sense
- Spelling
- Punctuation
- Other:
- Other:

How will you know you have successfully learned applicable writing skills?

## Understanding Ratio Concepts

► **Complete each problem about ratio relationships.**

- 1 Ms. Omar runs the school tennis club. She has a bin of tennis balls and rackets. For every 5 tennis balls in the bin, there are 3 tennis rackets. Draw a model to show the ratio of tennis balls to tennis rackets.

Write the following ratios.

tennis balls to tennis rackets \_\_\_\_\_

tennis balls to total pieces of tennis equipment \_\_\_\_\_

- 2 Christian has a collection of 18 shark teeth. He identified them as 6 tiger shark teeth, 8 sand shark teeth, and the rest as bull shark teeth.

What does the ratio 6 : 8 represent in this situation?

What does the ratio 4 : 18 represent in this situation? Explain your reasoning. Include a model in your explanation.

- 3 How are part-to-part ratios different from part-to-whole ratios?

# Using Equivalent Ratios

► Solve each problem.

- 1 Josie is training for a race. The ratio of the number of minutes she runs to the number of miles she runs is 24 to 3. She plans to run 10 miles. How many minutes will it take her?
- 

- 2 A chef planning for a large banquet thinks that 2 out of every 5 dinner guests will order his soup appetizer. He expects 800 guests at the banquet. Use equivalent ratios to estimate how many cups of soup he should prepare.
- 

- 3 Fred is making a fruit salad. The ratio of cups of peaches to cups of cherries is 2 to 3. How many cups of peaches will Fred need to make 60 cups of fruit salad?
- 

- 4 A community garden center hosts a plant giveaway every spring to help community members start their gardens. Last year, the giveaway supported 50 families by giving away 150 plants. Based on this ratio, how many plants will the center give away this year in order to support 65 families?
- 

- 5 The first week of January, there are 49 dogs and 28 cats in an animal shelter. Throughout the month, the ratio of dogs to cats remains the same. The last week of January, there are 20 cats in the shelter. How many dogs are there?
- 

- 6 A wedding planner uses 72 ivy stems for 18 centerpieces. When she arrives at the venue, she realizes she will only need 16 centerpieces. How many ivy stems should she use so that the ratio of ivy stems to centerpieces stays the same?
-

# Understanding Rate Concepts

- 1 It takes Maya 30 minutes to solve 5 logic puzzles, and it takes Amy 28 minutes to solve 4 logic puzzles. Use models to show the rate at which each student solves the puzzles, in minutes per puzzle.

If Maya and Amy had the same number of puzzles to solve, who would finish first? Explain.

- 2 A garden hose supplies 36 gallons of water in 3 minutes. Use a table of equivalent ratios to show the garden hose's water flow in *gallons per minute* and *minutes per gallon*.

How many gallons of water does the hose supply in 10 minutes? Explain.

## Understanding Rate Concepts *continued*

- 3 Max travels to see his brother's family by car. He drives 216 miles in 4 hours. What is his rate in miles per hour? Use a double number line to show your work.

Suppose he makes two stops of 10 minutes each during his journey. Will he be able to reach the town in 4 hours if he keeps the speed the same?

# Using Unit Rates to Find Equivalent Ratios

► Solve each problem. Show your work.

- 1 Rachel mows 5 lawns in 8 hours. At this rate, how many lawns can she mow in 40 hours?
- 2 A contractor charges \$1,200 for 100 square feet of roofing installed. At this rate, how much does it cost to have 1,100 square feet installed?
- 3 It takes Jill 2 hours to run 14.5 miles. At this rate, how far could she run in 3 hours?
- 4 Bobby catches 8 passes in 3 football games. At this rate, how many passes does he catch in 15 games?
- 5 Five boxes of crackers cost \$9. At this rate, how much do 20 boxes cost?
- 6 It takes a jet 2 hours to fly 1,100 miles. At this rate, how far does it fly in 8 hours?



# Using Unit Rates to Find Equivalent Ratios

*continued*

- 7 It takes Dan 32 minutes to complete 2 pages of math homework. At this rate, how many pages does he complete in 200 minutes?
  
  
  
  
  
  
  
  
  
  
- 8 Kendra gets a paycheck of \$300 after 5 days of work. At this rate, how much does she get paid for working 24 days?
  
  
  
  
  
  
  
  
  
  
- 9 Tim installs 50 square feet of his floor in 45 minutes. At this rate, how long does it take him to install 495 square feet?
  
  
  
  
  
  
  
  
  
  
- 10 Taylin buys 5 ounces of tea leaves for \$2.35. At this rate, how much money does she need to buy 12 ounces of tea leaves?
  
  
  
  
  
  
  
  
  
  
- 11 In problem 10, how would your work be different if you were asked how many ounces of tea leaves Taylin could buy with \$10?

# Using Unit Rates to Compare Ratios

► Solve each problem. Show your work.

- 1 Shawn sells 36 vehicles in 4 weeks. Brett sells 56 vehicles in 7 weeks. Who sells more vehicles per week?

- 2 The table shows the gas mileage of two vehicles. Which vehicle travels more miles per gallon?

Car	Miles	Gallons
Pickup Truck	120	8
Minivan	180	10

- 3 Joe and Chris each have a lawn mowing business. Joe charges \$40 to mow 2 acres. Chris charges \$30 to mow 1.2 acres. Who charges more per acre?

- 4 The table shows the time it took two athletes to run different races. Who ran faster?

Athlete	Seconds	Meters
Ellen	28	200
Lindsay	60	400

## Using Unit Rates to Compare Ratios *continued*

- 5 Branden and Pete each play running back. Branden carries the ball 75 times for 550 yards, and Pete has 42 carries for 380 yards. Who runs farther per carry?

- 6 The table shows the price of two cereal brands and the number of ounces per box. Which is the better price per ounce?

Cereal	Ounces	Price
Brand A	18	\$2.50
Brand B	24	\$3.50

- 7 Describe two different ways you could change the values in the table so that the answer to problem 6 is different.

# Using Unit Rates to Convert Measurements

► Solve each problem. Show your work.

- 1 Susan has a 12-inch board for constructing a wooden chair. The directions say to use a board that is 29 centimeters long. Is her board long enough to cut?  
(1 inch = 2.54 centimeters)
- 2 Kevin uses 84 fluid ounces of water to make an all-purpose cleaner. The directions call for 4 fluid ounces of concentrated soap for every 3 cups of water. How many fluid ounces of soap should he use? (1 cup = 8 fl oz)
- 3 Shannon test-drives a car in Germany and drives 95 kilometers per hour. What is her speed in miles per hour? (1 kilometer  $\approx$  0.62 mile)
- 4 Keith works 8 hours per day for 5 days per week. Melba works 2,250 minutes each week. Who spends more time at work?

## Using Unit Rates to Convert Measurements *continued*

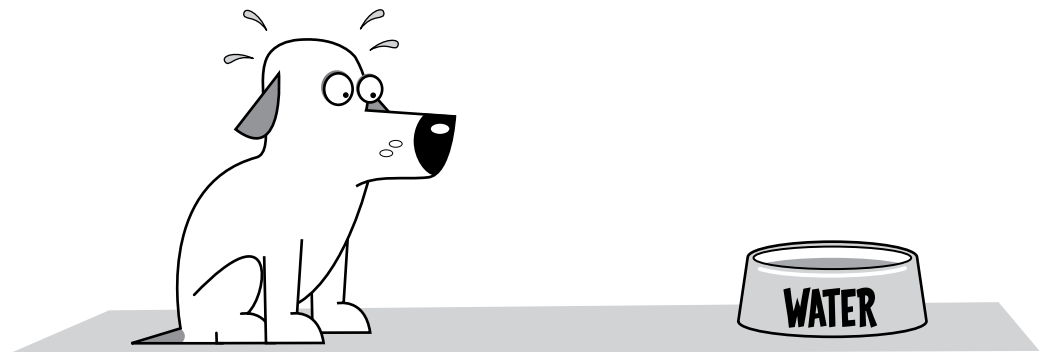
- 5 Jason runs 440 yards in 75 seconds. At this rate, how many minutes does it take him to run a mile? (1 mile = 1,760 yards)
- 6 Boxes of granola are on sale at a price of 2 for \$4.50. There are 12 ounces of granola in each box. What is the unit price in dollars per pound?
- 7 Sam is delivering two refrigerators that each weigh 105 kilograms. There is an elevator with a weight limit of 1,000 pounds. Can he take both refrigerators on the elevator in one trip? (1 kilogram  $\approx$  2.2 pounds)
- 8 For every 140 feet that Kelly rides on her bicycle, the wheels turn 20 times. About how many times do the wheels turn in 5 miles? (1 mile = 5,280 feet)

# FED UP

**Give me food and I will live. Give me water and I will die. What am I?**

Figure out each of these and write the answer. Then find each answer in the puzzle below and shade the matching letter. The remaining letters will spell the answer.

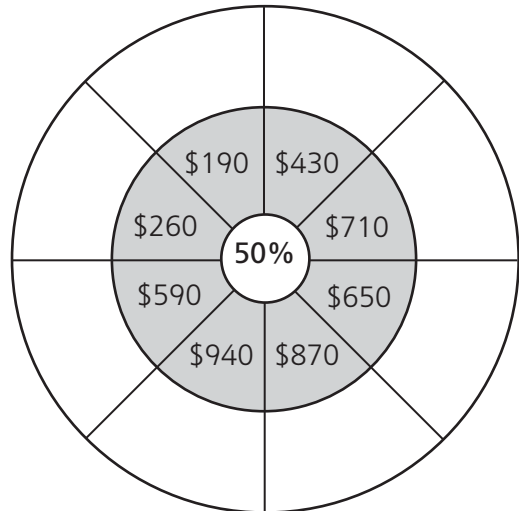
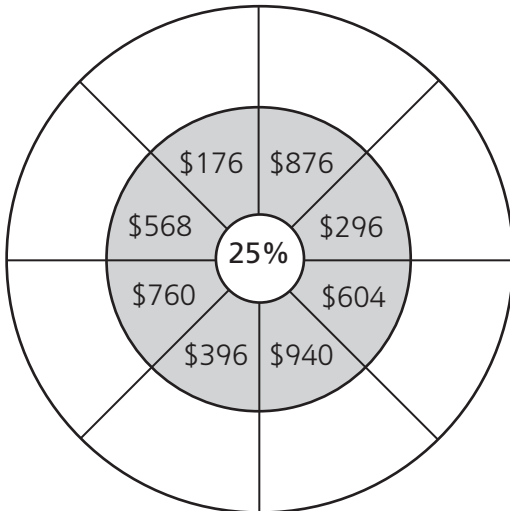
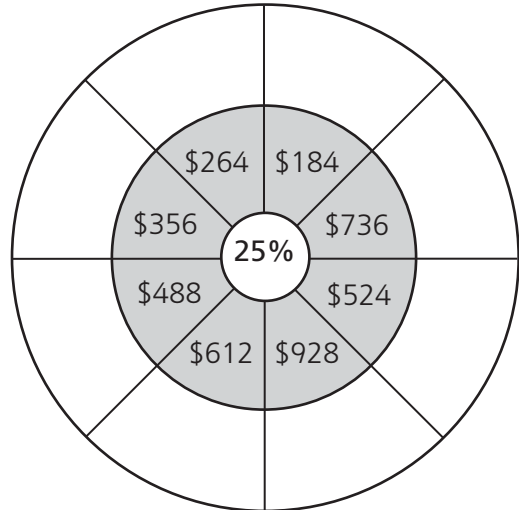
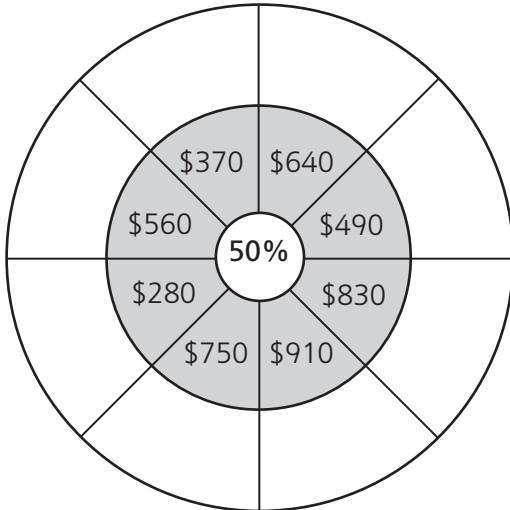
- |                           |                           |                           |
|---------------------------|---------------------------|---------------------------|
| $10\% \times 80 =$ _____  | $5\% \times 60 =$ _____   | $10\% \times 110 =$ _____ |
| $5\% \times 400 =$ _____  | $10\% \times 480 =$ _____ | $5\% \times 260 =$ _____  |
| $10\% \times 510 =$ _____ | $5\% \times 280 =$ _____  | $10\% \times 630 =$ _____ |
| $5\% \times 180 =$ _____  | $10\% \times 700 =$ _____ | $5\% \times 540 =$ _____  |
| $10\% \times 900 =$ _____ | $5\% \times 420 =$ _____  | $10\% \times 290 =$ _____ |
| $5\% \times 360 =$ _____  | $10\% \times 840 =$ _____ | $5\% \times 80 =$ _____   |
| $10\% \times 350 =$ _____ | $5\% \times 760 =$ _____  | $10\% \times 70 =$ _____  |



# CHAMPIONS

**What can run for years without getting anywhere?**

Figure out these and write the answers around the outside. Then find each answer in the grid below and cross out the letter above. Write the remaining letters at the bottom of the page.



Write the letters in order from the \* to the bottom-right corner.



W	R	I	T	E	R	F	I	R	E	S
\$142	\$475	\$185	\$235	\$214	\$232	\$124	\$66	\$96	\$95	\$455
R	I	V	E	R	G	H	O	S	T	S
\$375	\$42	\$325	\$44	\$89	\$144	\$470	\$415	\$219	\$130	\$215
C	R	A	Z	E	S	T	R	E	A	M
\$122	\$190	\$184	\$280	\$282	\$320	\$74	\$234	\$355	\$216	\$46
T	A	P	M	O	V	I	E	R	U	N
\$76	\$245	\$295	\$151	\$135	\$435	\$131	\$140	\$88	\$99	\$153

# Science Grade 6

## Butterfly Vision

An experiment sheds light on how butterflies find their way  
From Scholastic ScienceWorld, [JANUARY 20, 2020](#) By Jacqueline Adams



**AS YOU READ, THINK ABOUT** how animals use their senses to navigate.

COURTESY OF ZACHARY MACDONALD

Butterflies bob and weave as they flutter through the air, going one way and then, all of a sudden, another. To a person, this flight can appear aimless. But butterflies really are trying to get somewhere: They're searching for the ideal habitat to live, feed, and reproduce.

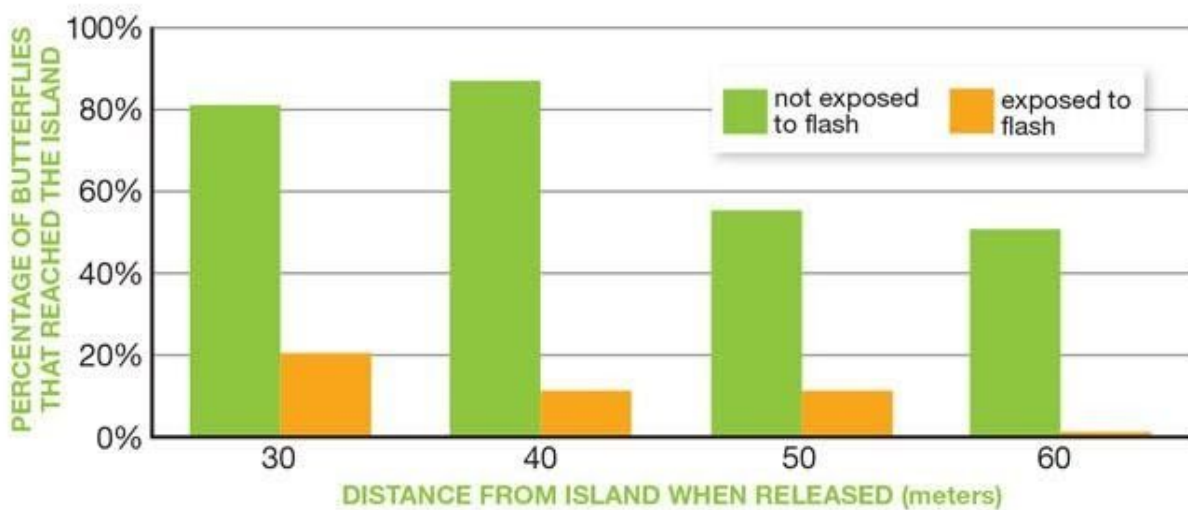
How, exactly, do seemingly bumbling butterflies navigate? That's what Zachary MacDonald, a biology graduate student at the University of Alberta in Canada, wanted to find out. Other species don't always perceive the world the way humans do. He knew it would be a challenge to determine whether butterflies rely on vision or other senses—like smell—to find a suitable home. Luckily, MacDonald had a flash of inspiration about how to investigate the mystery.

One day, MacDonald was taking close-up photos of butterflies he was studying. He wondered if the camera's flash was blinding them. If you've ever had a bright light flashed in your eyes, you may have seen spots afterward that made it hard to see. This temporary loss of vision is called *flash blindness*. It occurs when light overwhelms the light-detecting *photoreceptor* cells in your eyes. MacDonald thought he might be able to use the same phenomenon to learn whether butterflies depend on their eyes to find their way.



### INSECTS ON THE MOVE

The graph below shows the percentage of butterflies that reached a nearby island after being exposed to camera flashes compared with butterflies that weren't exposed. Did distance from the island affect the butterflies' success?



### CATCH AND RELEASE

For his experiment, MacDonald used nets to catch dozens of wild *Speyeria cybele* and *Speyeria atlantis* butterflies. He placed them in a dark cooler to keep them calm. Then he boarded a boat and took the cooler to a spot in a nearby lake where only one island was visible.

For half of the butterflies, MacDonald triggered intense camera flashes above, below, in front of, behind, and on both sides of their eyes. Insects' *compound eyes* consist of thousands of units called ommatidia. "They face in almost all directions," says MacDonald. "So, we wanted to make sure that we exposed all of them to the flash." Then he released all the butterflies— those that had been exposed to camera flashes and those that hadn't—one by one.

LARRY WEST/FLPA  
 FINDING MY WAY: A *Speyeria cybele* butterfly  
**LAND AHOY!**



Most of the butterflies that hadn't been exposed to flashes soon spotted the island. "You could tell

when they found it, because they just flew directly to it," says MacDonald. But the flashed butterflies fluttered around randomly. The few that did find the island seemed to do so by chance.

MacDonald repeated the experiment farther from the island with similar results. The butterflies were navigating mainly by sight. We can never know exactly what it's like to be a butterfly, says MacDonald, but science can provide clues to how these organisms experience the world.

Continue the Learning Journey

- Think about how you use your senses to navigate the world. Then imagine a place you know very well, like your home, your school, or your favorite park. Describe that place using as many sensory details as possible. Think about what that place looks, smells, and sounds like. When you're done, consider how animals use their senses in different ways. Pick an animal that you know about, and describe that same place from that animal's perspective. Consider how they use their senses to navigate. How are the descriptions you wrote similar or different?
- Butterflies have what are called compound eyes. You can make a model of a compound eye at home by using straws or paper. If you have straws, take 6 and cut them in half. Bundle them together. Then, hold the straws upright and wrap a long piece of tape all the way around them. If you don't have straws, you can use paper instead! Rip or cut a piece of paper to the size of an index card. Wrap the paper tightly around a pencil or pen, and secure it with tape or your finger. Then, slide out the pencil. You've made your compound eye! Look around your room until you find an object that's interesting to look at. Draw what you see in your notebook. Next, look at the same object through your model compound eye. Draw what you see. How do your two drawings compare?

# Hmong Story Cloth

Students use printmaking and fabric designs to create a story cloth in the style of the Hmong from southeastern Asia.

**H**mong (pronounced “Mung”) women sew beautiful designs on fabric, using appliqué, embroidery, batik, and cross-stitch. The Pa Ndau, or story cloth, is a traditional means of recording personal and cultural oral history. The designs incorporate elements of nature in the form of birds, fish, humans, trees, animals, plants, and crops. Traditionally, Pa Ndau were given as gifts to celebrate special occasions and were believed to offer love and protection to those who received them. Pa Ndau worn by babies, for example, disguised them as flowers and protected them from evil. It is their Pa Ndau that allow the Hmong to be recognized by ancestors in the afterlife, and then reincarnated as Hmong. Despite the development of a written language, contemporary Hmong continue to use this art form as a way of recording their personal histories and the story of their people.

Hmong means “free man,” although the Hmong have suffered a brutal history and many forced relocations. Originally from Siberia and Central Asia, the Hmong have been forced by oppression, ethnic violence, and war into Myanmar, Vietnam, Thailand, and Laos. Many have immigrated to the United States; a large population now lives in the city of Fresno, California.



## Materials

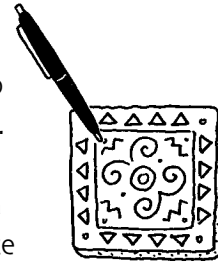
- ◆ photographs of Hmong designs and story cloth
- ◆ pencils
- ◆ sketch paper
- ◆ clean Styrofoam trays or foam board cut into 3-inch squares
- ◆ ballpoint pen
- ◆ 3½-inch cardboard square
- ◆ white glue
- ◆ water-based markers
- ◆ 12-inch white paper square
- ◆ paper towels
- ◆ 6-inch felt or fabric square
- ◆ scissors
- ◆ felt or fabric scraps

## Getting Started

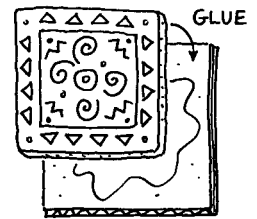
Point out Myanmar, Vietnam, Laos, and Cambodia and review the information on page 2 with students. Show students photographs of Hmong designs and story cloths. Have them refer to these photographs as they work on their projects. Demonstrate the steps as students follow along.

## Directions

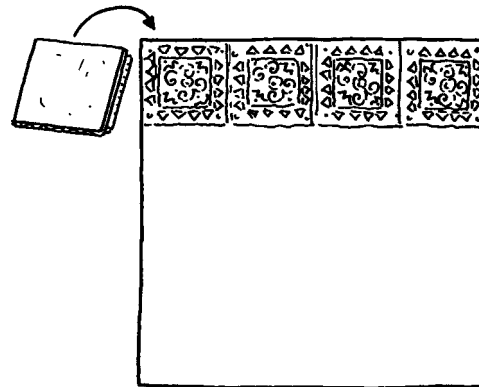
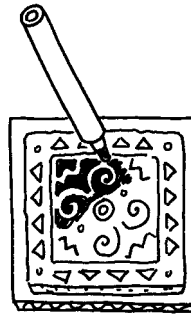
**1** Sketch a design that you will use to print on the border of your project. Using a ballpoint pen, draw the design on the three-inch Styrofoam square. Press into the foam to create an imprint.



**2** Glue the foam square onto a cardboard square.



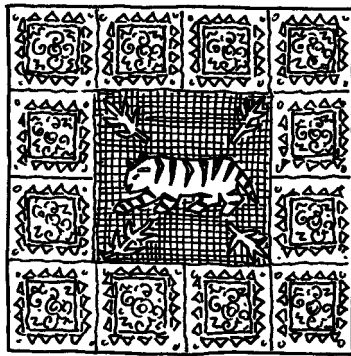
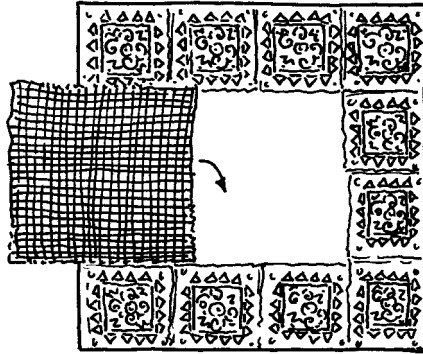
**3** Choose a marker and color the entire foam square. Press the foam square into the corner of the 12-inch paper to print. Continue printing by reapplying color each time before you print. To change colors, wipe the foam with a paper towel. Continue to print until the border is complete.



### TIP

If ink seeps into the imprinted areas on the stamps, use a dull pencil to imprint those areas again.

- 4 Glue the six-inch fabric square to the center of the paper so that the border frames it.
- 5 Choose an image from nature to depict on the fabric. First, draw an outline of the image on scrap paper. Cut out the shape.
- 6 Trace the shape onto a piece of fabric and cut it out. Glue the shape onto the fabric square. Glue on additional fabric pieces to add details.



### More Ideas

Compare and contrast symbols and traditions of Hmong textile designs with those of Native American or African cultures.

## Resources

### For Teachers

*Hmong Textile Designs* by Anthony Chan (Stemmer House, 1990). A reference of the designs and symbols in Hmong story cloths.

### For Students

*Dia's Story Cloth* by Dia Cha (Lee & Low Books, 1996). A story cloth chronicles the significant and traumatic events in the lives of the author and her family, as they move from Laos to a refugee camp in Thailand to the United States.

Directions: Cut out the strips and make new sentences. Practice saying them and writing them.

It's your birthday,	isn't it?
You don't play an instrument,	do you?
I'm helping you,	aren't I?
Moby doesn't want to read,	does he?
You're hungry now,	aren't you?
We have a gift for Nikki,	don't we?
They don't speak Spanish,	do they?
Our teacher's daughter walks to school,	doesn't she?
It isn't his letter,	is it?
You play baseball,	don't you?
We aren't going to the party,	are we?
The train goes fast,	doesn't it?
There aren't any pictures in the book,	are there?
I never do homework on Sunday,	do I?
Moby's very funny,	isn't he?
Ben's mom doesn't like rock music,	does she?



# Word Search

Directions: Find the verbs listed below hidden in the puzzle and circle them.  
Then write the three forms of the verb in the table.

F T V X N L Y A J F F G K O  
U D A I C R E A T E D U L M  
H L B K Q U R G F I Y B N E  
S P O K E N H N B L H E L A  
V C R X D N E M H B S M D N  
R Q O O W T E P C O R E T T  
W U S O T A Z Y H U Y Q X N  
G K N I O E Q C Z O I H W G  
G K R E U Q C A R Y Q D U S  
U W C O I K G T J D X Z I U  
G B F P F M S F E R Z N R N  
N M E A T E N K S D D Q F G  
C G Q T D U A P R N T X D J  
Z Q F W F B K H K D T K V A

	Verb	Past	Past Participle
1.	take		
2.	destroy		
3.	choose		
4.	create		
5.	eat		
6.	protect		
7.	bake		
8.	write		
9.	know		
10.	speak		
11.	sing		
12.	mean		