ASCEND
BREAK WORK PACKET
FOR 6TH GRADE

Dear Families,

In this packet, you will find math and science activities for your scholar to complete over the break. These activities are meant to challenge your scholar's thinking, while also being fun and engaging. Please feel free to complete this work along with your scholar, asking questions and taking part in conversation as you go. This will make their experience even richer!

Your scholar will be better off if they complete their activities over time throughout the break—switching back and forth between subjects—than if they try cramming them into the last few days.

Thank you for supporting your scholar's learning. Together, we can push them to new heights!

Ascend Public Charter Schools

TABLE OF CONTENTS

6TH GRADE MATH

Name: _____

Have your child complete one page (one side), three times a week of the math packet. Please return this completed packet to your teacher after the break.

After your child has completed the math problems, if you feel like your child is still struggling on a certain concept and needs further practice, you can visit some of the websites listed on page 23.

Enjoy your summer!

Reminder - Practicing multiplication (up to 12) and division facts is VERY important!

I have checked the work completed:_____

Parent Signature

Here is what you are expected to know or be able to do:

1. Understand the meaning of division of whole numbers and how to check your answers through multiplication. Ex. 34 ÷ 5 = 6 r4, so 5 x 6 = 30 + 4 = 34.

2. Fluently multiply a multi-digit number by a two-digit number.

3. Divide up to a four-digit number by a two-digit number.

4. Understand a fraction as a statement of division. Ex. $2 \div 3 = \frac{2}{3}$

5. Multiply and divide 2 fractions.

6. Divide a fraction by a whole number and a whole number by a fraction.

7. Add and subtraction fractions using unlike denominators, using common denominators.

8. Multiply and divide by 10's, 100's and 1,000's using mental math.

9. Multiply up to 2-digits and decimals up to 2 digits.

10. Solve story problems with adding, subtracting, multiplying, dividing fractions and decimals.

11. Recognize the equivalence of 1 liter, 1,000 ml and 1,000 cm^3 and conversion between.

12. Understand volume; cubic centimeter (cm^3), cubic meter (m^3), cubic inches (in^3), cubic foot, (ft^3), and cubic yard (yd^3). Be able to compare one cubic inch to one cubic foot and one cubic centimeter to one cubic meter.

13. Convert measurements of length, weight, area, volume, and time within metric to metric and within standard measurement to standard measurement.

14. Read, interpret, and solve problems involving line graphs.

15. Construct line graphs from tables of data; including axis labels and scale.

Excellent websites for fun learning and reinforcement of math skills:

www.harcourtschool.com	Click the red box, select math, select HSPMath, select Michigan, click on the "5" ball or "6" ball for a challenge. Select a game.
www.aplusmath.com	Go under "Flashcards" or "Game Room" on the left side of the screen. They can practice adding, subtracting and multiplying. Very important to know the addition, subtraction and multiplication facts from memorization or within a couple seconds. There are also fun games to play!
www.mathisfun.com	Select games and pick a game to play.
www.aaamath.com	At the top pick "Fifth" or "Sixth" for a challenge. Choose any of the activities like multiplication then select "play" option toward the top of the screen. 20 Questions and Countdown games are good ones.
www.funbrain.com	Lots of fun games to choose from.

Other games and activities you can play:

• Take a deck of cards and remove the face cards (kings, queens, jacks). Aces are one. Divide the cards evenly among 2 players. Each player flips over a card. The first one to add the 2 numbers correctly the fastest wins the cards. After going through the pile of cards, the player with the most cards wins. You can do a multiplication version also.

6TH GRADE MATH BREAK PACKET

1. Find the products. This page should be completed in 3, no more than 4 minutes. Have someone time you. Any multiplication problem you do not know quickly, practice on flash cards

6	4	7	5	12	3	6	3	0	7	5	6	3	8
x2	x4	x2	x4	x0	x5	x3	x8	x8	x3	x5	x4	x9	x3
6	2	3	8	7	12	8	3	11	7	9	4	4	9
x5	x12	x6	x2	x5	x1	x4	x7	x4	x6	x2	x8	x6	x3
4	5	0	5	9	5	2	9	5	11	5	9	7	7
x7	x0	x3	x8	x4	x7	x1	x5	x6	x5	x9	x8	x7	x9
8	6	8	1	9	9	8	1	9	2	1	3	12	1
x8	x6	x7	x2	x6	x9	x6	x9	x1	x5	x1	x4	x3	x3
8	8	12	8	12	5	3	4	2	7	6	2	6	12
x0	x1	x4	x9	x0	x1	x2	x0	x2	x1	x8	x6	x7	x5
8	4	2	9	12	11	2	7	0	6	1	5	3	2
x5	x1	x8	x7	x8	x6	x9	x4	x2	x9	x0	x2	x3	x4
4	12	4	4	1	2	11	6	7	5	2	1	4	11
X9	x6	x2	x3	x4	x3	x7	x1	x8	x3	x7	x8	x5	x4

2. Find the quotients. This page should be completed in 3, no more than 4 minutes. Practice any problems you do not know instantly. Think of the multiplication fact family. The better you know your multiplication facts the easier division will be.

2)2	3)9	8)32	7)49	5)10	4)0	1)1	4)8	2)12	9)54	1)3	1)2	2)4
8)8	7)63	8)40	5)0	4)4	4)12	9)45	9)63	6)6	3)12	1)7	3)0	1)9
2)16	3)3	3)15	5)20	3)18	3)6	5)15	7)0	9)27	4)16	7)21	4)20	7)28
8)16	3)21	9)18	4)24	2)6	1)8	5)35	7)35	3)27	6)36	3)24	2)0	4)32
9)9	4)36	6)42	5)40	8)64	7)14	6)30	8)56	1)5	4)28	7)56	8)24	6)24

81 ÷ 9= _____	48 ÷ 6 = _____	18 ÷ 6 = _____	42 ÷ 7 = _____
10 ÷ 2 = _____	54 ÷ 6 =_____	36 ÷ 9 = _____	45 ÷ 5 = _____
72 ÷ 8 = _____	8 ÷ 2 =_____	72 ÷ 9 = _____	6 ÷ 1 =_____
25 ÷ 5 = _____	5 ÷ 5 = _____	18 ÷ 2 = _____	30 ÷ 5 =_____
12 ÷ 1 = _____	49 ÷ 7 = _____	21 ÷ 3 = _____	36 ÷ 6 = _____

Select the one best answer for each question.

3. Jennie was assigned this problem:

146
x25

She worked out the problem in this way:

146 x 2 = 292, and 146 x 5 = 730. Then she added 292 + 730. She knew that her answer was wrong because her answer seemed too small. What should she have done differently?

A. She should have multiplied 146 x 50 instead of 146 x 50.
B. She should have multiplied 146 x 20 instead of 146 x 2.
C. She should have multiplied 146 x 200 instead of 146 x 2.
D. She should have multiplied 140 x 2 instead of 146 x 2.

4. Find the product of 4,063 x 52? SHOW YOUR WORK.

5. Samantha has to read a book that is 525 pages long. She has 21 days to read the book. How many pages will she need to read each day to finish on time?

A. 21
B. 25
C. 546
D. 11,025

6. Andrew's family went on vacation driving across the United States. They traveled 515 miles every day for 17 days. How many miles did they travel in all?

A. 532
B. 4,120
C. 8,165
D. 8,755

7. Three classes of 25 students collected 8 cans of soup from each student. The cans were then to be divided between 4 charities. How many cans of soup went to each charity? *Show your work.*

8. Brent has a collection of 84 Bobble Head trophies he needs to box up for the move to his new home. He can fit 7 trophies into one box. How many boxes will Brent need? *Show your work.*

9. Kayla has 12 cousins. She received $15.00 from each cousin for her birthday. How much money did she receive in all?

A. $27
B. $120
C. $150
D. $180

10. The 5th grade is going on a trip to the state park. There are 1,012 students going. Each bus can hold 44 students. How many buses will they need? *Show your work.*

11. Find 1717 ÷ 17. *Show your work.*

A. 11
B. 101
C. 107
D. 1001

12. Solve 4806 ÷ 15. Show your work.

A. 32
B. 320 r 6
C. 320 r 4
D. 320

13. Solve 647 ÷ 21. Show your work.

A. 3 r 11
B. 3 r 21
C. 30 r 8
D. 30 r 17

14. Compare. Write < , >, or =.

1. $\frac{1}{2}$ ◯ $\frac{1}{4}$

2. $\frac{18}{3}$ ◯ $\frac{2}{3}$

3. $\frac{1}{2}$ ◯ $\frac{2}{5}$

4. $\frac{1}{5}$ ◯ $\frac{1}{10}$

5. $\frac{1}{4}$ ◯ $\frac{4}{12}$

6. $\frac{1}{2}$ ◯ $\frac{2}{7}$

15. Write each fraction in simplest form.

1. $\frac{8}{48}$

2. $\frac{18}{48}$

3. $\frac{12}{33}$

4. $\frac{4}{20}$

5. $\frac{3}{6}$

6. $\frac{14}{49}$

7. $\frac{12}{27}$

8. $\frac{5}{45}$

9. $\frac{6}{12}$

10. $\frac{10}{22}$

16. Write each improper fraction as a mixed number in simplest form.

1. $\frac{28}{11}$	2. $\frac{42}{8}$	3. $\frac{7}{2}$	4. $\frac{63}{10}$
5. $\frac{29}{7}$	6. $\frac{7}{5}$	7. $\frac{46}{12}$	8. $\frac{39}{9}$
9. $\frac{27}{4}$	10. $\frac{17}{3}$	11. $\frac{7}{6}$	12. $\frac{32}{11}$

17. Write each mixed number as an improper fraction in simplest form.

1. $1\frac{1}{3}$	2. $3\frac{4}{8}$	3. $5\frac{2}{11}$	4. $6\frac{1}{2}$
5. $2\frac{3}{10}$	6. $4\frac{11}{12}$	7. $6\frac{6}{9}$	8. $2\frac{6}{7}$
9. $3\frac{2}{5}$	10. $5\frac{3}{4}$	11. $4\frac{1}{6}$	12. $1\frac{2}{5}$

18. Find the sum. Write your answer in simplest form.

1. $2\frac{4}{7} + 5\frac{3}{7}$ = _____

2. $4\frac{1}{2} + 3\frac{1}{2}$ = _____

3. $5\frac{1}{6} + 4\frac{4}{6}$ = _____

4. $6\frac{1}{3} + 2\frac{1}{3}$ = _____

5. $3\frac{2}{5} + \frac{4}{5}$ = _____

6. $\frac{4}{9} + \frac{1}{2}$ = _____

7. $\frac{3}{7} + \frac{1}{2}$ = _____

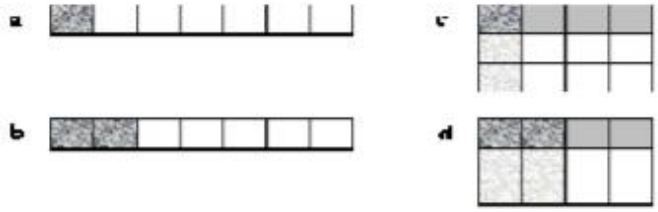
8. $\frac{1}{3} + \frac{1}{5}$ = _____

9. $\frac{2}{6} + \frac{2}{3}$ = _____

10. $\frac{3}{4} + \frac{10}{12}$ = _____

19. Which drawing would you use to find the product of these two fractions?

$$\frac{1}{4} \times \frac{1}{3} =$$



A. Drawing a
B. Drawing b
C. Drawing c
D. Drawing d

20. Solve this equation:

$$\frac{2}{3} \div 3 =$$

A. 2

B. 3

C. $\frac{2}{6}$

D. $\frac{2}{9}$

21. Model and solve the following:

$$\frac{1}{3} \div 4 =$$

A. $\frac{4}{3}$

B. $\frac{1}{7}$

C. $\frac{1}{12}$

D. 12

22. Model and solve the following equation:

$$2 \div \frac{1}{4} =$$

23. Mrs. Lovell's class is baking cookies. They need $3\frac{3}{5}$ pounds of sugar and $5\frac{1}{3}$ pounds of flour. When they mix the sugar and flour together, how many pounds will they have all together?

24. Solve.

$$\frac{7}{9} - \frac{3}{8}$$

25. Jill has ¾ of a yard of ribbon. Tammy has 4/7 of a yard. How much do they have together?

A. 7/11 of a yard
B. 40/28 of a yard
C. 1/3 of a yard
D. 37/28 of a yard

26. Paul had 3 7/8 cups of milk. He gave 1 ¾ cups of milk to his cat. How much milk did he have left? Show your work.

A. 2 cups
B. 2 1/8 cups
C. 2 4/4 cups
D. 1 7/8 cups

27. Nancy ate 1/3 of a pizza and Gabe ate ¼ of the pizza. How much of the whole pizza is left?

A. 7/12
B. 5/12
C. 2/7
D. 6/7

28. Choose the correct answer for this problem: $5/4 - 3/12 =$

A. 2/12
B. 12/12
C. 9/24
D. 2/48

29. Patty brought ½ of a cake to class, and Joe brought ¾ of a cake on the same day. How much cake did the class have altogether? Show your work.

A. ¼ cake
B. 1 cake
C. 4/6 cake
D. 1 ¼ cake

30. Don has $12.32 in his piggy bank. He collects and returns pop cans for $3.70. Approximately how much money does he have together? (Round the answer to the nearest whole dollar.)

A. $8
B. $15
C. $16
D. $17

31. Michelle earned $5.00 for every hour she babysat. Last week she babysat for 8 hours. She spent $12.00 of the money she earned. Which expression could be used to find how much money she had left?

A. $5.00 x 8 + $12.00
B. $5.00 + 8 - $12.00
C. $5.00 x 8 - $12.00
D. $5.00 x 8 ÷ $12.00

32. Ten fourth graders will each eat one – fourth of a pizza. How many pizzas need to be ordered for the ten students?

A. 2 pizzas
B. 3 pizzas
C. 4 pizzas
D. 5 pizzas

33. In the equation 1/3 + x = 5/12, what does x = ?

A. 4/9
B. 5/4
C. 1/12
D. 3/12

34. Solve for x:
11/12 – x = ¼

A. 10/12
B. 8/12
C. 10/8
D. 3/4

35. Solve for x: x + 1/3 = ¾

A. 2/1
B. 5/12
C. 4/7
D. 13/12

How much larger is one cubic foot than one cubic inch?

A. 3 times larger
B. 15 times larger
C. 144 times larger
D. 1728 times larger

Which of the following is NOT equivalent?

A. 1 ton = 2000 pounds
B. 1 mile = 5200 feet
C. 9 feet = 3 yards
D. 60 minutes = 3600 seconds

Sharon reads the juice bottle and finds that it contains 1.89 liters of juice. His cup only holds 240 milliliters so he wants to convert 1.89 liters to milliliters. The bottle contains how many milliliters?

A. 1.89 milliliters
B. 18.9 milliliters
C. 189 milliliters
D. 1890 milliliters

. Which is true?

A. 0.07 is ten times greater than 0.7
B. 0.070 is ten times greater than 0.007
C. 0.070 is equal to 0.0070
D. 0.07 is seven times greater than 0.70

Which of the following is a true statement?

A. 0.003 is 1/3 the value of 0.03
B. 0.003 is 3 times the value of 0.03
C. 0.003 is 1/10 the value of 0.03
D. 0.003 is 10 times the value of 0.03

701 - 35	68 - 27	100 - 37	63 - 47	35 -15	114 - 37	66 - 24

36.1 x 3.7	0.47 x 68	5.9 x 39	0.28 x 1.8	19 x 4.7	5.6 x 3.6	78 x .37

Philip solved the following problem incorrectly. Explain his mistake.

1659
x 21
1659
+3318
4977

Philip solved the following problem incorrectly. Explain his mistake.

1659
x 21
1659
+3318
4977

Use mental math to solve:

400 x 3 = _____ 60 x 60 = _____ 8,000 x 20 = _____

1600 ÷ 80 = _____ 250 ÷ 50 = _____ 12000 ÷ 400 = _____

113. Nancy and Gabe had a pizza with 12 pieces. Brent ate 1/3 of a pizza and Kayla ate ¼ of a pizza. How much of the whole pizza **is left?** Show your work.

_____

114. Show which is larger, smaller or equal using the less than symbol (<), the greater than symbol (>), or the equal sign (=).

1 $in.^3$ _____ 1 $ft.^3$

1 $cm.^3$ _____ 1 $m.^3$

2 $ft.^3$ _____ 1 $yd.^3$

Do the following divisions. Then check your answer. Show your work. No calculators!

A. $1524 \div 6 =$_____

Check your work:

$$\begin{array}{r} \times\ 6 \\ \hline 1524 \end{array}$$

B. $380 \div 10 =$ _____

$$\begin{array}{r} \times\ 10 \\ \hline 380 \end{array}$$

C. $4235 \div 10 =$ _____

x_____

D. $4\overline{)769}$

x_____

E. $5\overline{)765}$

x_____

Any multiplication problem you do not know quickly please practice on flash cards.

4	5	3	5	9	5	7	9	5	11	6	9	7	7
x7	x0	x3	x8	x4	x7	x1	x5	x6	x5	x6	x8	x7	x9

2)16	3)3	3)15	5)20	3)18	3)6	5)15	7)56	9)27	4)16	7)21	4)20	7)28

6	4	7	5	12	3	6	3	0	7	5	6	3	8
x2	x4	x6	x4	x12	x5	x3	x8	x8	x3	x5	x4	x9	x4

72 ÷ 8 = _____ 8 ÷ 2 =_____ 72 ÷ 9 = _____ 6 ÷ 1 =_____

8)16	3)21	9)18	4)24	2)6	1)8	5)35	7)35	3)27	6)36	3)24	2)0	4)32

6	8	4	4	1	8	11	6	7	5	2	6	4	11
X9	x8	x9	x3	x4	x3	x7	x5	x8	x3	x7	x8	x5	x4

Coordinate System

Directions: Write the point that is located at each ordered pair.

1) (6, 2) _____

2) (6, 8) _____

3) (10, 1) _____

4) (4, 5) _____

5) (9, 7) _____

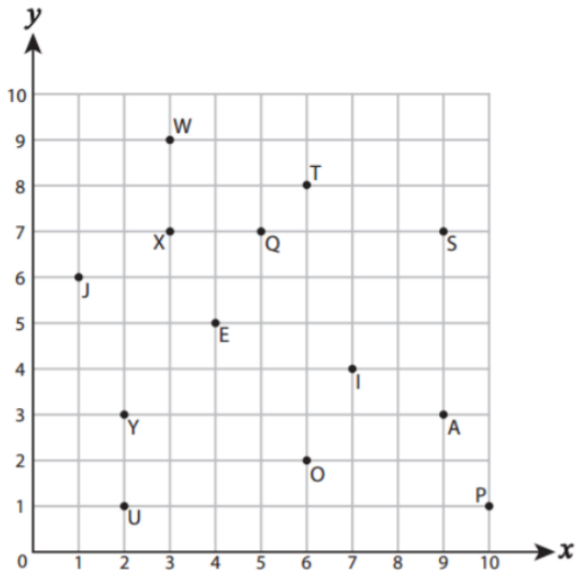
6) (2, 3) _____

7) (1, 6) _____

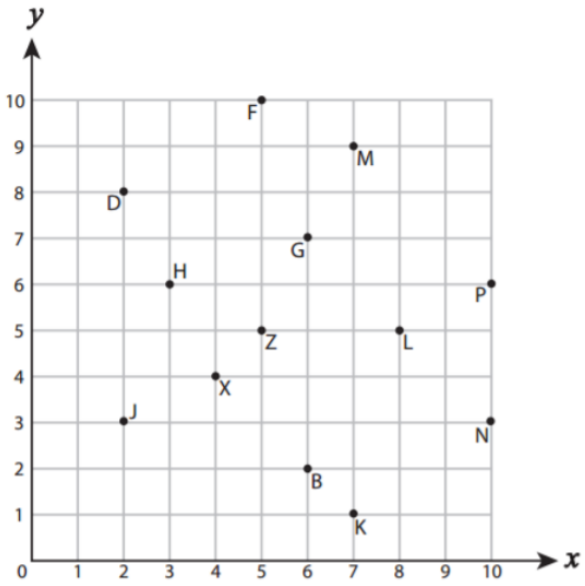
8) (5, 7) _____

9) (2, 1) _____

10) (7, 4) _____



Directions: *Write the ordered pair for each point.*



11) N (___ , ___)

12) X (___ , ___)

13) B (___ , ___)

14) L (___ , ___)

15) Z (___ , ___)

16) P (___ , ___)

17) D (___ , ___)

18) M (___ , ___)

19) J (___ , ___)

20) H (___ , ___)

Directions: *Simplify the following fractions.*

$\frac{4}{6} = \frac{2}{3}$	$\frac{2}{10} = \_\_\_$ $\quad \frac{21}{28} = \_\_\_$	$\frac{10}{15} = \_\_\_$ $\quad \frac{6}{18} = \_\_\_$
$\frac{4}{8} = \_\_\_$	$\frac{16}{20} = \_\_\_$ $\quad \frac{7}{14} = \_\_\_$	$\frac{6}{15} = \_\_\_$ $\quad \frac{12}{20} = \_\_\_$

Directions: *Solve the following problems. NO CALCULATOR! Put your answers in simplified form.*

1. $\frac{4}{7} + \frac{10}{21} =$ $\frac{12}{21} + \frac{10}{21} = \frac{22}{21} = 1\frac{1}{21}$	2. $\frac{8}{9} + \frac{1}{3} =$	3. $\frac{11}{6} + \frac{4}{9} =$
4. $\frac{6}{12} + \frac{12}{4} =$	5. $\frac{4}{5} - \frac{7}{10} =$	6. $\frac{8}{11} + \frac{12}{5} =$
7. $\frac{10}{3} - \frac{2}{12} =$	8. $\frac{11}{6} + \frac{1}{10} =$	9. $\frac{3}{5} - \frac{6}{11} =$

1. Oliver played 2 rounds of a trivia game and scored 982 points. If he gained the same number of points each round, how many points did he score per round?	2. Roger has 365 baseball cards in 5 binders. If each binder has the same number of cards, how many cards are in each binder?
3. Chloe had 472 video games. If she placed the games into 8 different stacks, how many games would be in each stack?	4. An ice machine had 480 ice cubes in it. If you were filling up 8 ice chests and each chest got the same number of cubes, how many ice cubes would each chest get?
5. Faye is making bead necklaces. She has 606 beads and is making 2 necklaces with each necklace using the same number of beads. How many beads will each necklace use?	6. There are 545 students in a school. If the school has 5 grades and each grade had the same number of students, how many students were in each grade?

1. $3 \times \frac{2}{9} =$	$4 \times \frac{3}{15} =$ 2.	$2 \times \frac{9}{19} =$ 3.
$6 \times \frac{3}{24} =$ 4.	$2 \times \frac{2}{5} =$ 5.	$1 \times \frac{5}{5} =$ 6.
$5 \times \frac{1}{7} =$ 7.	$10 \times \frac{1}{16} =$ 8.	9. $3 \times \frac{4}{9} =$
Example: $\frac{4}{5} \times \frac{2}{8} = ?$ multiply numerators, multiply denominators: $\frac{4 \times 2}{5 \times 8} = \frac{8}{40}$ (reduce) $= \frac{1}{5}$ (final answer)	$\frac{3}{6} \times \frac{3}{2} =$ 10.	11. $\frac{20}{40} \times \frac{2}{2} =$
$\frac{4}{7} \times \frac{5}{8} =$ 12.	$\frac{2}{6} \times \frac{6}{2} =$ 13.	$\frac{5}{10} \times \frac{2}{1} =$ 14.
$\frac{5}{25} \times \frac{4}{1} =$ 15.	$\frac{15}{17} \times \frac{6}{6} =$ 16.	$\frac{9}{9} \times \frac{1}{1} =$ 17.

Directions: *Simplify the following. Remember your PEMDAS rules!*

$7 \times (5 \times 10 + 4) - 7$ $7 \times (50 + 4) - 7$ $7 \times 54 - 7$ $378 - 7$ 371	1. $(8 + 23 - 3) \div (13 - 6)$
2. $(15 - 3) \times (10 + 3) - 4$	3. $(16 + 4) + (11 + 15 \div 5)$
4. $(14 + 29 - 3) \div 20 - 2$	5. $(15 + 18 - 3) \div (15 \times 2)$
6. $(8 + 4) + (10 + 14 \div 7)$	7. $(12 + 22 - 2) + 16 - 2$

Directions: Solve each of the following problems. SHOW ALL WORK!

1. Ned bought 331 pieces of candy to give to 35 of his friends. If he wants to give each friend the same amount, how many pieces would he have left over?	2. An industrial machine can make 245 crayons a day. If each box of crayons has 20 crayons in it, how many full boxes does the machine make a day?
3. A box of computer paper has 1004 sheets left in it. If each printer in a computer lab needed 39 sheets how many printers would the box fill up?	4. Robin had 771 pennies. She wanted to place the pennies into 37 stacks, with the same amount in each stack. How many more pennies would she need so all the stacks would be equal?
5. A builder needed to buy 960 nails for his latest project. If the nails he needs come in boxes of 47, how many boxes will he need to buy?	6. Sarah received 541 dollars for her birthday. Later she found some toys that cost 15 dollars each. How much money would she have left if she bought as many as she could?

Directions: *Solve the following. NO CALCULATORS!! Show all work and simplify your answer!*

Reading a Line Graph

$1\frac{2}{5} + 3\frac{6}{7} = 5\frac{9}{35}$

Rewrite as improper fractions

$1\frac{2}{5} \rightarrow \frac{7}{5}$, $3\frac{6}{7} \rightarrow \frac{27}{7}$

Find least common denominator

$\frac{7}{5} \times \frac{7}{7} = \frac{49}{35}$, $\frac{27}{7} \times \frac{5}{5} = \frac{135}{35}$

$\frac{49}{35} + \frac{135}{35} = \frac{184}{35} = 5\frac{9}{35}$

1. $3\frac{1}{4} + 4\frac{1}{2} =$

2. $2\frac{5}{6} + 5\frac{4}{7} =$

3. $2\frac{3}{5} + 6\frac{1}{4} =$

4. $4\frac{2}{3} + 4\frac{1}{6} =$

5. $3\frac{1}{2} + 3\frac{1}{5} =$

6. $23\frac{1}{2} - 18\frac{1}{6} =$

7. $19\frac{1}{2} - 4\frac{4}{5} =$

6TH GRADE SCIENCE

Activities to do over break:

- What's the Matter?
- Make invisible ink
  - Follow the directions to make invisible ink.
  - Write your friends and family messages. Make sure to give them directions on how to make the words appear.
  - Explain to your friends and family how invisible ink works.
  - Write your 6th grade science teacher a note in invisible ink.
- Predict the Weather
  - Complete the investigation over 4-6 weeks
  - Watch the news and take notes during the weather reports.
  - Write your own weather reports.
- Learn about extreme weather.
  - Read about hurricanes, earthquakes, and tornadoes.
  - Research one type of extreme weather at your local library.
  - Create a poster or informational pamphlet about this type of weather.

Science Books

Look for these great books on famous scientists at your local library

Titles	Author	Topic
Astrophysicist and Space Advocate Neil deGrasse Tyson	Marne Ventura	As a kid, Neil deGrasse Tyson was star-struck when he first visited a planetarium. The universe was calling him. Now he is a famous astrophysicist with a TV show and over 1 million twitter followers.
Electrical Wizard: How Nikola Tesla Lit Up The World	Oliver Dominguez	Learn all about Tesla who contributed to the field of electricity and technology.
Who is Jane Goodall?	Roberta Edwards	Jane Goodall always loved animals and wanted to study them in their natural habitats. So at age twenty-six, off she went to Africa! Goodall's up-close observations of chimpanzees changed what we know about them and paved the way for many female scientists who came after her.
Marie Curie: Scientist Who Made Glowing Discoveries	Mike Venezia	Presents the life and accomplishments of the Polish-born scientist whose studies of radioactivity led to the discovery of two new elements, for which she received two Nobel Prizes.

What's the Matter?

Vocabulary	
matter	quantitative
mass	qualitative
physical properties	chemical properties
property	

Matter is anything that takes up space and has mass. **Mass** is the *stuff* that matter is made of, or the amount of particles in a substance or object. Matter has physical and chemical properties and can undergo physical and chemical changes.

What are some examples of matter? Well, just look around you and everything you see, touch, smell, and breathe are examples of matter.

What is a **property**?

A property describes how an object looks, feels, or acts. Properties can be physical or chemical. Properties can also be quantitative or qualitative. A **qualitative** property of matter is observed and generally can't be measured with a numerical result. A **quantitative** property of matter is one that can be measured numerically, such as height, length, or weight.

What are examples of **physical properties**?

Physical properties can be observed. Examples of physical properties can be color, weight, volume, size, shape, density, boiling point, or freezing point.

What are examples of **chemical properties**?

A chemical property is usually one that can only be seen when a substance undergoes a chemical change. These properties cannot be observed by touching or looking. Chemical properties become apparent when the structure of the substance is altered chemically.

An example of this would be adding baking soda and vinegar and watching it bubble and give off a gas. The bubbling is an indicator that the properties of the two initial ingredients have recombined to form a new substance or substances.

substance AB +substance CD → new substance AD + new substance BC

A simple equation of what happens when you add baking soda to vinegar:

baking soda (solid) + vinegar (liquid) → carbon dioxide (gas) + water (liquid)

What is a **chemical change**?

A **chemical change** is a change that results in a new substance (or substances) being formed. The important word to remember is ***new***. A chemical change involves the making or breaking of bonds between atoms. A chemical change makes a new substance that wasn't there before.

What are examples of chemical changes?

Some examples of chemical changes are nails rusting over time, batter turning into a cake in the oven, wood or paper burning to ashes, the digestion of food, and the baking soda and vinegar example above.

What is a **physical change**?

A **physical change** is a change in a state of matter. For example, when ice melts, the H_2O molecule is going from a solid (ice) state to a liquid (water) state of matter. The actual molecule or the arrangement of the atoms has not changed—just its state of matter. A physical change can also be a change in appearance of matter. For example, a piece of paper is made of paper molecules, and when you tear the piece of paper in half, both halves are still made of paper molecules. The atoms and molecules that make up the substance are not physically changed.

Physical or Chemical Change?

Put a check to indicate whether you think the item is a physical change or a chemical change.

	Physical Change	Chemical Change
1. ice melting		
2. cutting a pineapple into pieces		
3. adding vinegar to baking soda		
4. a piece of rusting metal		
5. a campfire		
6. crumbling a piece of paper		
7. sour milk		
8. shattering a drinking glass		
9. dissolving sugar in water		
10. burning paper		
11. boiling water		
12. burning a match		

Try This Experiment

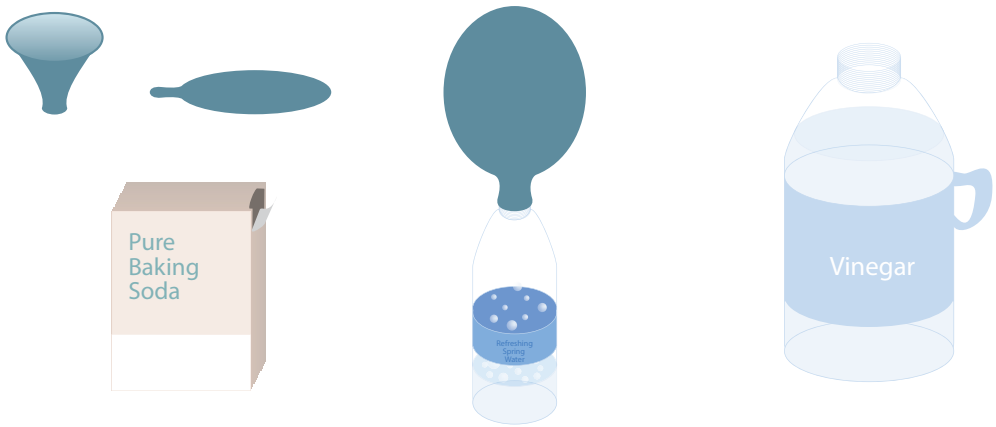
How do you know that a gas is produced as a result of mixing baking soda and vinegar?

Materials

- ¼ cup (56 grams) of baking soda
- ¼ cup (60 milliliters) of vinegar
- 1 small, empty water bottle
- 1 balloon
- 1 funnel

Procedure

1. Stretch the balloon out before using it.
2. Using the funnel, fill the balloon with the baking soda.
3. Pour the vinegar into the empty water bottle.
4. Attach the opening of the balloon to the mouth of the water bottle—be careful not to get any baking soda into the bottle.
5. Count to three and lift up the part of the balloon that contains the baking soda so that the baking soda falls into the bottle.



Questions

1. What are the physical properties of the baking soda?

2. What are the physical properties of the vinegar?

3. What happened inside the water bottle when you added the baking soda to the vinegar? What did you see in the bottle?

4. Did anything happen to the balloon? If so, what do you think caused it?

5. What type of change occurred inside the bottle when you added the baking soda to the vinegar?

6. Fill in the definitions in the vocabulary box below.

Vocabulary	
matter	
mass	
property	
qualitative	
quantitative	
physical change	
chemical change	

MAKE INVISIBLE INK

What you'll need:

- Two tablespoons of vinegar
- Water
- Cotton bud
- White paper
- Lamp

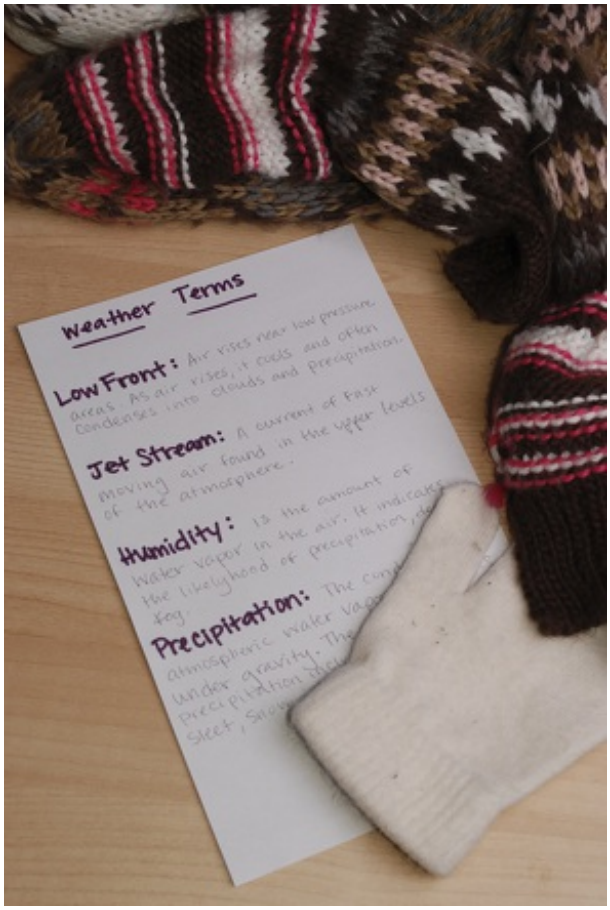
Direction:

- Mix the vinegar with a few drops of water in a bowl.
- Dip the cotton bud.
- Write your message on the white paper.
- Wait for it to dry.
- Ask somebody to read your message and take him by surprise!
- Bring the paper close to a heated bulb and see your words appear gradually on the white paper.

Why does it happen?

Vinegar is an organic substance that oxidizes and turns brown when it comes in contact with heat. You diluted the vinegar with water to make the ink even more invisible! You can alternately try the experiment with lemon juice, honey, onion juice or milk.

Predict the Weather



Do you have to pull your child away from the T.V. to get him to complete his homework? With this activity, you can let him watch T.V. and do his science homework at the same time!

This activity is to be done over the course of several days.

What You Need:

- Paper
- Pen/marker
- TV

What You Do:

Day 1

Begin by watching one segment of the weather forecast together. Just listen. When the segment is complete, ask your child to write down the terms that the meteorologist used that he recognized. Ask him to write a brief definition for each term or to look up the meanings in their textbooks. Talk about each term together. Examples include low front, jet stream, humidity, and precipitation.

Day 2-Day 3

Create a chart that looks something like the following:

	Predict Humidity	Actual Humidity	Predict Temp.	Actual Temp.	Predict Precip.	Actual Precip.
Tuesday						
Wednesday						
Thursday						
Friday						

Have your child make two charts, one for you and one for him. Your categories may vary based on the specific atmospheric properties your child is learning in his class. After you have created your chart, watch the weather forecast again. While watching, record the data given during the program.

Day 4-Day 5

Using the chart you created during Day 2 and Day 3, make a prediction for each category. Then watch the weather forecast and record the actual readings given by the meteorologist. How close did your predictions come to the real readings? Compare your predictions to the ones your child made to see who is the ultimate weather bug!

This activity can be continued for as many days as you like. Make a game out of it! See how accurate you can be in predicting the forecast or evaluating who can come the closest to the actual atmospheric readings. You'll be learning important terms while spending some time together, even if it's in front of the T.V.!

Author: Liza Jenkins

Explore Hurricanes!

phenomenal science

Anyone who has ever lived through a **hurricane** knows that they are the biggest, baddest storm nature can dish out. A large **hurricane** can grow to be *600 miles* across and packs the power of *many* nuclear bombs. These super-storms unleash high winds and rain on states like Florida and Louisiana year after year.

In contrast to the tremendous power they have when they arrive on American shores, **hurricanes** start in a simple way. A normal thunderstorm in North Africa will blow out into the Atlantic ocean, near the earth's equator. Once the storm is over the water, it will begin to gain *more* power. The water around the equator collects a lot of solar energy, which adds to the storm's power. Hot air rises up the center of the thunderstorm, cooling off as it makes contact with a colder atmosphere and dumping moisture. **All that energy only adds to the storm.**

This exchange of hot air and moisture creates a giant column of air. As the storm picks up more energy, a rotation will form, causing the storm to start spinning faster and faster, picking up wind speeds. **As soon as the winds begin to blow at 75 mph or more, a hurricane is born.**

How does a hurricane move from the Atlantic ocean to North America? Over the summer, trade winds blow from Africa to the United States. These winds *push* newly-formed **hurricanes** across the Atlantic, helping the storm build up power. By the time the storm reaches the United States, its winds will have reached speeds of 100 mph or *more*.

Once a storm hits the US, the storm can *"come undone"* or the winds can shift and blow the **hurricane** harmlessly up the coast. In worst-case scenarios, the storm will hit land and cause massive damage to land and property. The storm's strong winds are capable of ripping out trees from the ground, and producing 1-2 feet of rainwater in less than a day. Over the course of one season, a **hurricane** will often leave some towns flooded and devastated.

Historical Hurricanes

1900 — Galveston Hurricane
This hurricane hit Texas with winds of 145 mph. It is estimated about 6,000 - 12,000 people were killed.

1969 — Hurricane Camille
The 2nd of three category 5 hurricanes to make landfall in the US during the 20th century. This storm is also the first named after a person.

1992 — Hurricane Andrew
This storm caused $26.5 billion in damages across Florida and Louisiana.

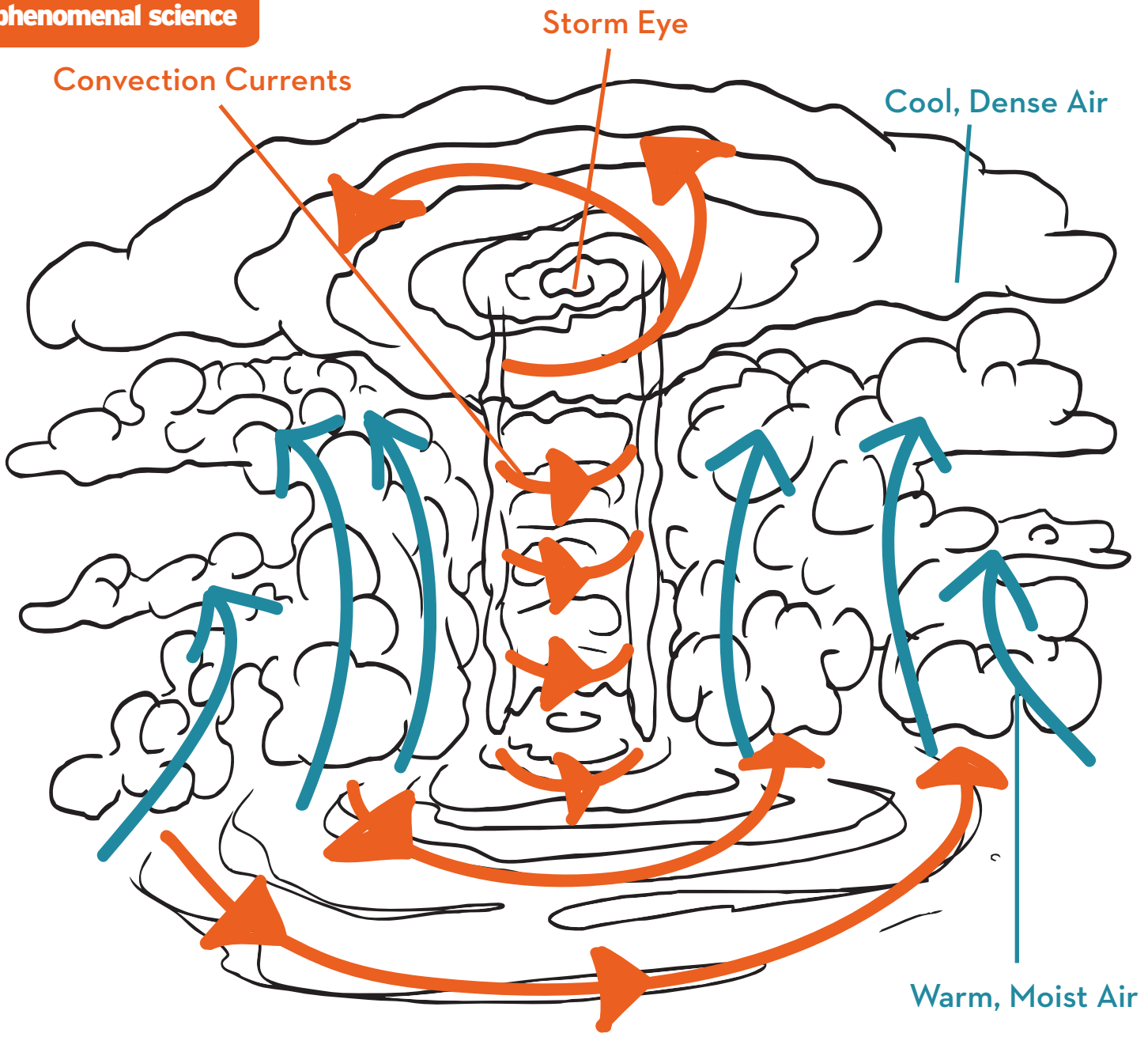
2005 — Hurricane Katrina
One of the deadliest hurricanes in US history, Katrina killed over 1,000 people and cost $81 billion in damages.

Safety Tips

1. Help your family put together a disaster kit.
2. Keep records of your valuables.
3. Plan an evacuation route with your family.
4. Keep an emergency radio.
5. During a storm, stay clear of electrical wires.
6. Research ways to secure and prepare your home.
7. If major flooding occurs, try staying above the water.

Explore Hurricanes!

phenomenal science



After reading the article on hurricanes, please answer the following questions:

Where do North American hurricanes originate? _____

What was the first US Hurricane named after a person? _____

How does a hurricane move across the Atlantic ocean? _____

Explore Earthquakes!

phenomenal science

Have you ever felt an earthquake? If you have, you'd know it's a sickening feeling. It seems impossible that the entire earth can move so dramatically, but during an **earthquake** it actually does.

So how does the ground shake and move the way it does during an **earthquake**? In order to answer that question, it's important to know exactly what is happening. An **earthquake** is a vibration that travels through the earth's crust. **A volcanic eruption**, **a large meteor impact**, or any sort of **big underground explosion** can create that vibration.

The most common cause of **earthquakes** are the earth's **tectonic plates**. These plates are in constant motion and when they bump into one another it can cause underground vibrations. Each year, more than *three million earthquakes* are an after effect of **tectonic plates** moving.

There are three different ways for plates to interact with each other. In a **normal fault**, the plates are separating. In a **reverse fault**, the plates are running into each other. In a **slip fault**, the plates move in opposite directions, with one plate sliding against the other. **Slip faults** cause the most dramatic **earthquakes**. The edges of these plates can actually lock together as they slide against each other, building up pressure. Then, in an instant, the pressure releases.

When the shift occurs in the earth's crust, the energy radiates **seismic waves**. These waves are like waves of water in a pond, but here the waves radiate through the earth and make the ground shake. There are three kinds of waves: **P waves**, **S waves**, and **L waves**. **P waves** cause the thud in the beginning of the quake, while **S waves** and **L waves** cause the most damage because they both move plate foundations.

The largest **earthquake** ever registered on earth measured 9.5 on the **Richter scale**. **Earthquakes** that register at 3 aren't usually felt by humans. For us to tfeel an **earthquake**, it must measure around 5 on the **Richter scale**.

Historical Earthquakes

1811 **Madrid Missouri Quakes**
These earthquakes happened along the Mississippi river, lasting for months. These quakes actually caused the river to run backwards.

1906 **San Francisco Earthquake**
One of the most famous US disasters, the fires started by this earthquake actually did more damage than the quake itself.

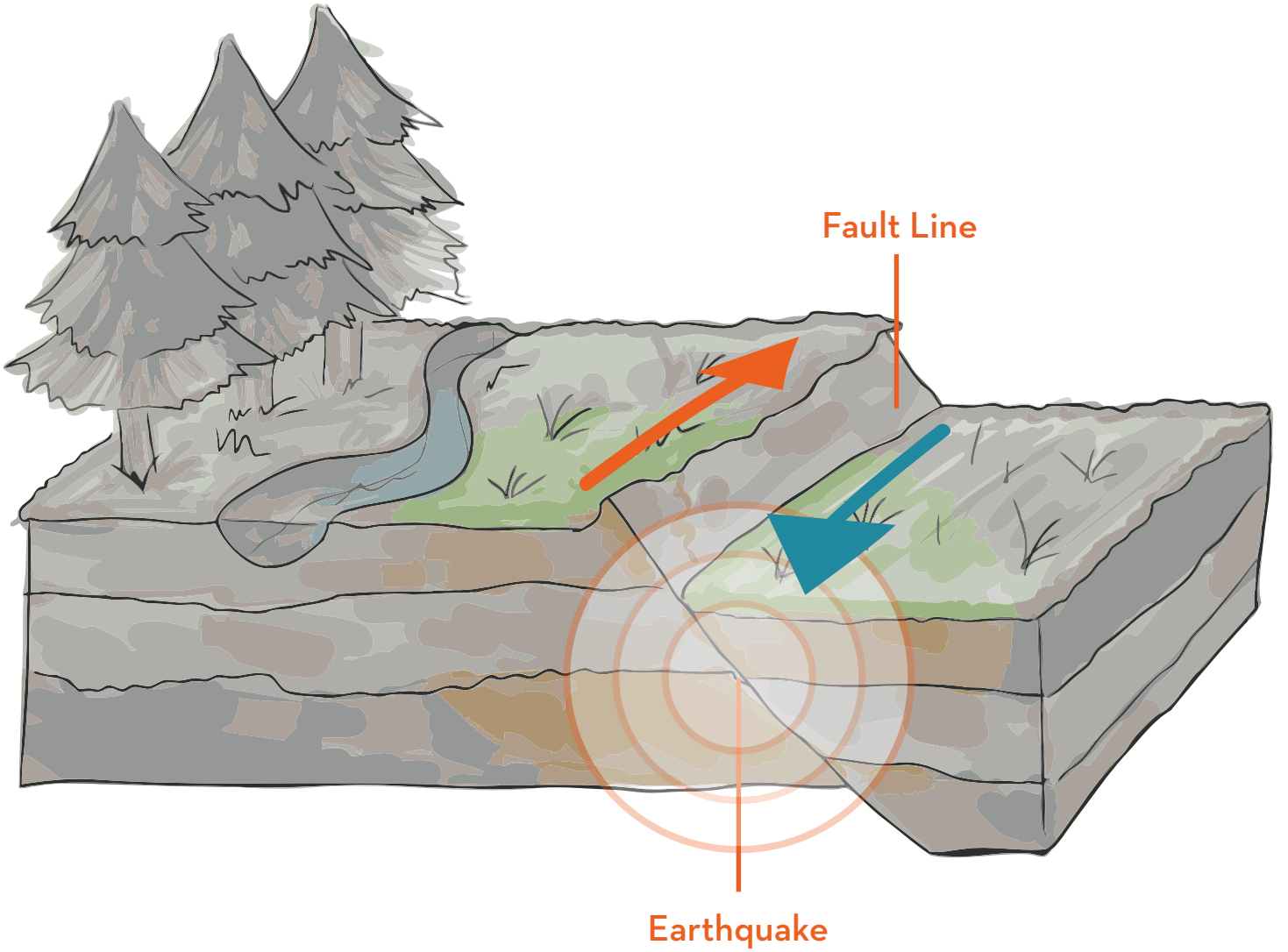
1970 **Ancash Earthquake**
One of the biggest earthquakes ever recorded, the Ancash earthquake caused landslides, destroyed homes and took away many lives. This quake hit 7.8 on the Richter scale.

Safety Tips

1. Stay away from windows.
2. Stay indoors.
3. Take cover under a sturdy piece of furniture.
4. Secure shelves and heavy objects against the wall.
5. Plan an earthquake preparation kit with your family.
6. If advised to evacuate, do so immediately.
7. Stay away from electrical wires.

Explore Earthquakes!

phenomenal science



After reading the article on tsunamis, please answer the following questions:

Name two different events that would cause an earthquake._____

What are the three ways tectonic plates interact with each other?_____

What are seismic waves?_____

Explore Tornadoes!

phenomenal science

A **tornado** is an amazing, awesome act of nature that can leave citizens dumbfounded. It's a huge, swirling, beast of a storm that can appear to have a mind of its own.

Tornadoes start with a massive thundercloud. The cloud sucks huge amounts of air up its center. In the largest clouds, called **super cells**, there is enough energy in that upswelling of air to spawn a **tornado**. As warm, wet air collides with cool, dry air, the storm will spin faster and faster. It finally twists down to the ground, creating a **tornado**.

If you've ever seen a whirlpool form in a drain, you have seen how a **tornado** works. A drain's whirlpool, also known as a **vortex**, forms because of the down draft that the drain creates in the body of water. The downward flow of water into the drain begins to rotate, and as the rotation speeds up the **vortex** forms.

Tornadoes move and devour the ground, following a path controlled by the thundercloud it came from. Sometimes the **tornado** will appear to hop. The hops occur when the **vortex** is disturbed. The **tornado's vortex** will hop, form, and collapse along the thundercloud's path.

Scientists measure **tornado** strength on the **Fujita Scale**, also known as the **F-Scale**. Wind speeds are estimated by the damage accumulated from a **tornado**. Once those wind speeds are established, a **tornado** can be placed on the **F-Scale**. The weakest **tornadoes** are rated **F-0** with wind speeds of up to 72MPH. **F-2 tornadoes** can tear roofs from houses and destroy mobile homes. **F-4 tornadoes** are able to toss cars up in the sky with winds of up to 260mph. **F-5 tornadoes** bring total devastation at over 300 mph, no faster winds have ever been recorded by scientists. An **F-5 tornado** can pick up a cow and launch it as a projectile.

Despite modern radar technology, experts cannot predict exactly when and where a **tornado** will touch down. It's important to pay attention to emergency broadcasts if you live in a **tornado zone**. Should a **tornado** happen where you live, the safest place to be is an underground storm shelter with a very strong door such as a basement or emergency shelter.

Historical Tornadoes

1840 — Great Natchez Tornado
The 2nd deadliest tornado in US history, this storm killed 317 people and injured 109.

1925 — Tri-State Tornado
This giant storm left the longest recorded track in the world at 219 miles in length.

1974 — Super Outbreak
Over 148 tornadoes hit 13 states, with nearly 30 of the tornadoes ranked on the Fujita Scale as F5.

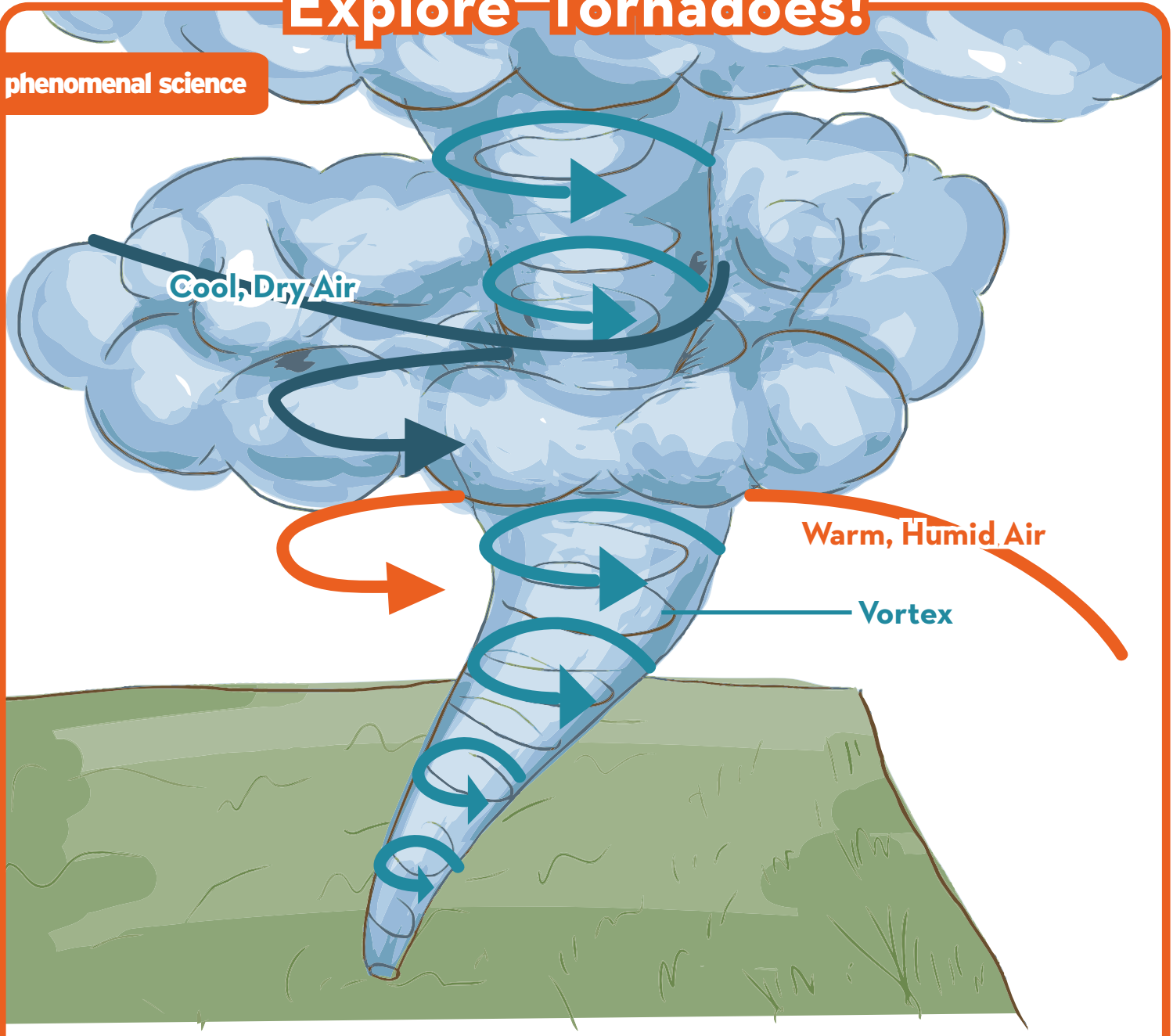
2011 — Joplin Tornado
One of the costliest single tornadoes in US history, the cost to rebuild after the Joplin disaster reached $3 billion.

Safety Tips

1. Seek shelter immediately during a tornado.
2. Keep away from windows.
3. Keep away from electric sockets and wires.
4. Keep an emergency radio.
5. Move to a basement or under a sturdy table.
6. Research ways to secure and prepare your home.
7. Lay face down on the ground and cover yourself.

Explore Tornadoes!

phenomenal science



After reading the article on tornadoes, please answer the following questions:

What makes a tornado spin? _____

_____

What is the Fujita Scale? _____

_____

Describe how a tornado moves. _____

_____