

Pet Store

Brief Overview:

It is essential for third and fourth graders to continue to practice basic addition and subtractions skills, and be able to recognize patterns to help them solve multi-step problems. This unit helps illustrate how students use these skills to function in the real world. In the following lessons, students will practice algebraic skills by finding missing variables using story clues, and practice applying math skills to real world situations as they make purchases and calculate change. The kinetic and visual activities that follow involve having students create, stock, and run their own pet stores over the four-day period that this unit takes place. They will practice flexibility and algebraic thinking as they continue to explore problems with unknown variables and multiple answers.

NCTM Content Standard/National Science Education Standards:

Understand patterns, relations, and functions

- Describe, extend, and make generalizations about geometric and numeric patterns.
- Represent and analyze patterns and functions, using words, tables, and graphs.

Represent and analyze mathematical situations and structures using algebraic symbols

- Represent the idea of a variable as an unknown quantity using a letter or a symbol.
- Express mathematical relationships using equations.

Use mathematical models to represent and understand quantitative relationships

- Model problem situations with objects and use representations such as graphs, tables, and equations to draw conclusions.

Understand numbers, ways of representing numbers, relationships among numbers, and number systems

- Understand the place-value structure of the base-ten number system and be able to represent and compare whole numbers and decimals.

Grade/Level:

Third and Fourth Grade

Duration/Length:

4 days (60 minutes each day)

Student Outcomes:

Students will:

- Use story cues to determine missing variables and solve addition and subtraction problems.
- Recognize patterns in solving problems with one or more variables.
- Apply knowledge of the value of money to make monetary transactions with peers.

Materials and Resources:

Lesson 1

- **Book- Monster Money by Grace MacCarone and Marilyn Burns**
- ***Student Resource Sheet 1- Stock the Pet Store (3 pages)***
- ***Student Resource Sheet 2- Mystery Pets***
- ***Teacher Resource Sheet 1 -Daily Observations/Assessments***
- **Crayons**
- **Snap cubes/counters**
- **Folder for each pair of students**

Lesson 2

- *Student Resource Sheet 3- Filling Tanks*
- *Student Resource Sheet 4- Missing Variable Equivalencies*
- Calculator and math journals for each pair of students
- Three bags of goldfish crackers- one original, one cheddar, one pretzel
- Calculator for each pair of students
- *Student Resource Sheet 5- Aquarium*
- *Teacher Resource Sheet 1- Daily Observations/Assessments*
- Glue
- Crayons
- Tape (for displaying aquariums)

Lesson 3

- Index Card for each pair of students
- Tape (for displaying index cards)
- *Student Resource Sheet 6- Prices for Fish*
- *Student Resource Sheet 7- Fish Purchases (Table)*
- *Student Resource Sheet 8- Fishy Values*
- *Teacher Resource Sheet 1 -Daily Observations/Assessments*
- Math journals and calculator for each pair of students

Lesson 4

- *Student Resource Sheet 9- Buying Pets and Making Change*
- One Number Generator per group of four
- Play money (\$20, \$10, \$5, \$1, \$.25, \$.10, \$.05)
- Paper and Pencil
- *Student Resource Sheet 10- Making Change for a Dollar*
- *Teacher Resource Sheet 1 -Daily Observations/Assessments*
- *Teacher Resource Sheet 2- Pet Price List*

Post Unit Student Assessment

- *Student Resource Sheet 11- Selected Responses and Brief Constructed Responses*

Development/Procedures:

Lesson 1- Introduction to Variables

Pre-assessment

Note: This unit should take place when students are practicing and becoming comfortable with doubling and halving numbers, addition and subtraction of one- and two-digit numbers, as well as addition and subtraction of money. Concepts of halving and doubling should have been introduced one or two days prior to beginning this unit.

- Display the following on the board:
 1. I have two more jellybeans than Suzie. Suzie has three jellybeans. How many jellybeans do I have?
 2. I have half as many lollipops as John. John has 8 lollipops. How many lollipops do I have?
 3. I have twice as many cookies as Peter. Peter has 5 cookies. How many cookies do I have?
 4. I have one less gumdrop than Jane. Jane has 14 gumdrops. How many gumdrops do I have?
- Have students copy the questions and write their answers.
- Ask the students what the unknown information is in each problem, and make a note of this beside each problem. Do not erase the board!

Launch

- Read Monster Money by Grace MacCarone and Marilyn Burns to the class.

- While reading, discuss the prices of the pets, as well as the variety of pets in the store. Let the children help answer money questions within the story.
- When you finish reading, ask students questions about the characters, regarding what pets they bought and what pets they could buy with the money they had. Ask the students if there was any unknown information in the problems represented in the story.
- Introduce the term “variable” to the students. Explain that a variable represents an unknown in an equation, or even in a math story. When you come across a problem with variables, you need to use what you know to solve the “mystery of the unknown”.
- Explain that variables can be represented in problems with letters or “?” symbols. Show a few examples, such as $4 + a = 15$, or $16 - 8 = ?$
- Give the students an example of a problem with a variable, and model how you use what you know to solve the problem. For example, “I want to buy twice as many apples as oranges. I have 4 oranges. What can I use to figure this out?” Model your thought processes aloud, and let students help you.

Teacher Facilitation

- Refer back to the pre-assessment problems. Ask the students what the “variables” were in each problem.
- Model how you can set up an equation to solve these problems. Look back at the first problem:

I have two more jellybeans than Suzie. Suzie has three jellybeans. How many jellybeans do I have?

Ask students to help you record what you know. Think aloud, “I know Suzie has three jellybeans, so I will write a three on the board. How many more jellybeans do I have than Suzie?” (Wait for student response) “Yes, two, very good! So I can write $3+2=$ what?” (Wait for response) “Five! Excellent. So which number was the variable in my problem?” Etc.

Repeat with all of the problems from the pre-assessment, asking students to help you rewrite the problems as equations with variables.

- Tell the class they can apply their mystery solving skills to all sorts of real world situations. Give examples of certain situations, and model where and how you would find variables in these circumstances. Ask the students to give more examples, telling what the variable is in each problem, and what clues they can use to solve the mystery.
- Refer back to Monster Money. Ask if the pet storeowner had to work with variables. Discuss these variables, and the math problems the pet owner had to work with on a daily basis.
- As a class, create a pet store. Write the name of your store on the blackboard.
- Tell the class you have already bought 5 lizards. Write this information on the board. Tell them you have 16 more rabbits than lizards. How many more lizards do I need to buy to have an equal amount of rabbits and lizards? Have the class help write an equation for this, including a variable. They can use a letter or a question mark to represent the variable (i.e. $5 + L = 16$ or $5 + ? = 16$). Ask the students how they might solve this problem.
- Show students how to solve this problem, since the variable is in the middle. Model your thought processes. "I need to figure out what plus five will give me 16. I could take a guess, but there is an easier way. I need to use the numbers I can see to help me figure this out. How can I use 5 and 16 to figure out the missing number? I can subtract five from 16, which gives me 11. Now let me plug that 11 into where my variable was, like this: $5 + 11 = 16$. Let me check my work. Does five plus eleven equal sixteen? Yes, it does! So the answer must be 11!"
- Next, tell the students you want three less turtles than rabbits. Write this equation on the board with their help, and solve this as a class, modeling and explaining each step.
- Ask them why it is useful to know how to figure out missing information. Students should be able to explain how these

skills are faster than counting, and cite examples of situations where these skills are important.

Student Application

- Have students work in pairs. Tell them that they will now create their *own* pet stores. Let them name their store. Give each pair a piece of paper and some markers to design the logo for their store.
- Distribute *Student Resource Sheets 1 and 1a- Stock the Pet Store*. Allow students to work with their partner to complete these worksheets. Distribute snap cubes, counters, or other manipulatives to help students solve problems involving counting, adding, doubling, and/or halving.
- Have students keep all finished work in a folder labeled "Pet Store".
- Ask students to describe the strategies they used today to explain how they were able to solve the problems in this activity.

Embedded Assessment

- Students will complete *Student Resource Sheet 2- Mystery Pets* on their own. The teacher should circulate the room and observe how students are solving the problems. Teachers can use *Teacher Resource Sheet 1- Daily Observations/Assessments* to document student performance.

Reteaching/Extension

- Reteaching- Revisit concepts in Monster Money, and ask students to solve the problems by setting them up into equations. Talk about situations in which they have had to fill in missing variables or solve math mysteries with only a few clues.

- **Extension-** Ask students to solve math mysteries within the classroom. For example, ask students to figure out how many more people are wearing blue than pink, how many legs are in the classroom, how many more boys than girls, etc.

Lesson 2- Fish and Variables

Pre-Assessment

- Have students write their own problems with unknown information, applying it to their pet store. Tell them to exchange sheets with a partner.
- Ask students to solve each other's problem, and have them check each other's work for accuracy.
- Allow a few students to share their mysteries and their answers, asking them how they solved each problem.

Launch

- Have students pair up with the same partner as yesterday. Distribute the pet store folders to each pair. Distribute *Student Resource Sheet 3- Filling Tanks* to each pair.
- Circulate the room and observe how students set up the equations using variables, and how they use these equations to solve the problems.

Teacher Facilitation

- Write the following equation on the board:

$$3 + x = 7$$

$$\text{Could } x = 5?$$

Ask students if this is correct. Why not? Plug "5" in for the value of "x" and add 3 plus 5. The answer is NOT seven.

- Explain to students that both sides of the equation have to be equal for an equation to be true. Write the following on the board.

$$4 - y = 1$$

Ask students what the only answer “y” could be in order for both sides of the equation to be equal.

- Write the following problem on the board.

$$Z + Z = 6$$

Ask students how they can figure out what Z is. Ask how they figured out the answer, and have them check their work. Are both sides of the equation equal?

- Give students one last problem:

$$4 + 5 = 9$$

How can you write out this problem using letters instead of numbers, if $A=4$ and $B=5$?

Allow students to write the answer, $A+B=9$. Ask questions to check for understanding.

- Distribute *Student Resource Sheet 4- Missing Variable Equivalencies* to each pair. Do the first problem on the board while the students work along with you on their papers. Let students do problems 2 and 3 on their own, while you circulate the room to check for accuracy and understanding.

Student Application

- Distribute *Student Resource Sheet 5- Aquarium* to each pair. Using crayons, have students decorate their aquarium with sand, plants, shells, etc...but no fish!
- Take out the three bags of goldfish crackers.
- Write on the board that each original fish costs \$1.25, each cheddar fish costs \$2.50, and each pretzel goldfish costs \$3.00.

- Tell the pairs that they have a \$15 budget. They need to buy at least 7 fish for their aquarium, with no more than three of each kind of fish. Tell them to spend as close to \$15 as possible without going over.
- Ask students to tell you what the variable(s) is/are in this problem. Tell them that it may be helpful to set up equations to help them do this activity.
- Distribute math journals for students to figure out how many fish they are able to purchase. Students may also use calculators to complete this activity.
- Once the students have determined how many of each type of fish they want to purchase, distribute those specific goldfish to them. Check their work for accuracy, ensuring they have not gone over the budget.
- Have students glue their goldfish onto their aquarium papers.
- When everyone is finished, display the aquariums somewhere in the classroom. Compare how everyone filled his or her aquariums. Discuss who spent the most money, and who spent the least. Compare who had the most fish in their aquarium, and who had the least.
- As you discuss, feel free to eat the extra goldfish!

Embedded Assessment

- Students will write in their journals how they use what they know to figure out unknown information in a problem. How would they use what they know about the each classroom to figure out how many students were in the school? The teacher should circulate the room and observe how students are using their algebra vocabulary to explain their answers. Teachers can use Teacher Resource Sheet 1- Daily Observations/Assessments to document student performance.

Reteaching/Extension

- Reteaching- Revisit the goldfish crackers activity. Ask how many different ways they can spend \$5 to fill their goldfish aquariums. Make a chart on the board with their answers. Next, ask how many ways they can fill the tank with a \$10 budget. Make a second chart. Ask the students if they notice any patterns between or within the charts.
- Extension- Have students compare their pet store aquariums. Find out who spent the most money, and who spent the least. Find out which pet store has the most fish, and which pet store has the most varieties of fish. Ask students which pet store they would be more likely to visit, based on the aquarium display. Why?

Lesson 3 -\$100 Aquariums

Pre-Assessment

- Observe students during the launch activity.

Launch

- Write the following problem on the board:

Two goldfish (G) costs the same as one bass (B). Set up this equation.

Circulate and check that each student has set up the equation correctly; $G + \quad \quad \quad G = B$.

- Next, tell the student that one bass costs \$3. Have them plug this number into their equations, and tell them to solve to find out how much one goldfish costs. They should come up with \$1.50. Check for understanding by looking at their work, as well as asking questions about how they solved the problem.

Teacher Facilitation

- Write the goldfish prices from yesterday's activity on the board again:

Each original fish (O) costs \$1.25, each cheddar fish (C) costs \$2.50, and each pretzel goldfish (P) costs \$3.00.

- Tell students to look at their goldfish aquariums from yesterday. Distribute an index card to each pair.
- Using math journals, tell students to write out equations using O, P, and C to explain how many fish are in their aquarium, how much each type of fish cost them, etc.
- When they have finished, check their work for accuracy and understanding. Then have them write their equations neatly on their index card, and hang the cards next to the aquariums.

Student Application

- Give each pair *Student Resource Sheet 6- Prices for Fish*. Tell them that now they will be filling the aquariums to display in the window of their pet stores. Each pair has a budget of \$100. They need at least 8 varieties of fish in their aquariums, and no more than three of each kind of fish.
- Tell them to get as close to \$100 as they can without going over budget. Their aquariums need to be attractive to draw lots of customers! Allow students to use math journals and calculators to determine what combination of fish they would like to purchase.
- When students have figured out what kind of fish they want to fill their aquariums with, check their math for accuracy.
- Have students copy their fish orders neatly onto *Student Resource Sheet 7- Fish Purchases Table*. (You can use *Teacher Resource Sheet 3* to check their math).
- Compare the tables. What patterns do they see? Which type of fish did students purchase the most of? Why do you think that is?
- Have students put these tables in their pet store folders.

Embedded Assessment

- Students will complete *Student Resource Sheet 8- Fishy Values* on their own. The teacher should circulate the room and observe how students are solving the problems. Teachers can use *Teacher Resource Sheet 1- Daily Observations/Assessments* to document student performance.

Reteaching/Extension

- **Reteaching-** Revisit the goldfish crackers activity. Ask how many different ways they can spend \$5 to fill their goldfish aquariums. Make a chart on the board with their answers. Next, ask how many ways they can fill the tank with a \$10 budget. Make a second chart. Ask the students if they notice any patterns between or within the charts.
- **Extension-** Have students compare their pet store aquariums. Find out who spent the most money, and who spent the least. Find out which pet store has the most fish, and which pet store has the most varieties of fish. Ask students which pet store they would be more likely to visit, based on the aquarium display. Why?

Lesson 4 - Open for Business

Pre-Assessment

- Have students count to 100 by fives, tens, and twenties.
- Ask students, which is the fastest way to count to 100, and which way, takes the longest. If they were to give someone \$100 in change, would they use \$5 dollar bills, \$10 dollar bills, or \$20 dollar bills? Why? Which would they prefer to receive?

Launch

- Distribute the pet store folders to the pairs of students.
- Refer to the \$100 aquariums that the students created yesterday. Ask the pairs of students how much money they had left over, and tell them to write their “change” on a scrap piece of paper. Have students find the pair of students who have the closest amount of change to theirs, and have them form a group of four. (For example, if group A spent \$98 yesterday, they will have \$2 in change. They should find another pair with change closest to \$2).
- Post *Teacher Resource Sheet 2- Pet Price List* on the board, or distribute copies to the class.
- Distribute play money to each group of four as directed on *Student Resource Sheet 9 - Buying Pets and Making Change*.

Teacher Facilitation

- Distribute *Student Resource Sheet 9-Buying Pets and Making Change* to each student.
- Read the directions aloud and have the class follow along.
- Choose a student to act as the cashier for you. Roll the dice/number generators and model how this activity is done by thinking out loud (“I rolled a two and a six, so I have twenty-six dollars to spend. Let me look at the pet price list to see what I can afford...etc”).
- Talk the student through how he/she would give you change. Start with the amount paid and add on until you get to the amount given to the cashier. Check for understanding by modeling one last time, but this time ask the class to take you through the steps and help you buy your pets. Then, call on someone to make change for your purchase. Ask the class “is this the only way that change can be made?”

Student Application

- Have students follow the directions on *Student Resource Sheet 9*, and allow them to make as many transactions as time allows.

- Have students record the transactions they made in the space provided at the bottom of the resource sheet. They should write down all the pets they buy during the game, as well as how much money they spent.
- Have each student add up how much money they spent on pets today. Ask several questions for review. Find out who spent the most, and who spent the least. Who bought the most pets? Did anyone spend twice as much as the teacher? Half as much? Who bought three more pets than this student? Etc.

Embedded Assessment

- Students will complete *Student Resource Sheet 10 - Change for a Dollar?* independently. The teacher should circulate and observe how students are solving the problems. Teachers can use *Teacher Resource Sheet 1- Daily Observations/Assessments* to document student performance.

Reteaching/Extension

- Reteaching- Review the past four lessons with the class. Ask them if they can think of any examples of how being able to add, subtract, and make change can apply to daily life. Review the vocabulary they have learned (halving, doubling, variables, unknown information, etc). Ask if variables were present in today's activity. When? How?
- Extension- Ask students how they can use variables when baking. How can they use what they know to double a recipe? Make a recipe as a class (something like crock-pot applesauce is easy, fun, and allows students to participate and get hands on). (See *Teacher Resource Sheet 4* for this and other easy recipes).

Summative Assessment:

Students will demonstrate their understanding of the math concepts in this unit by completing brief constructed response items. These assessments, found on *Student Resource Sheet 11*, will review all the skills and concepts of this unit, including addition and subtraction of one- and two-digit numbers, halving, doubling, and working with variables and money. Students will also be expected to explain the importance of using clues to determine missing variables in everyday math problems.

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Teacher Resource Sheet 2- Pet Price List
Copy or post this list where students can see it

Dog- \$22.50



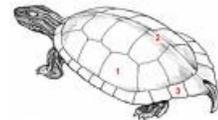
Cat- \$19.15



Rabbit- \$16.75



Turtle- \$7.35



Lizard- \$3.95



Teacher Resource Sheet 3: Prices for Multiple Fish

AQUARIUM STOCKING TABLE

	If you buy 1 fish	If you buy 2 fish	If you buy 3 fish
Goldfish	\$2.25	\$4.50	\$6.75
Bass	\$3.30	\$6.60	\$9.90
Dental Fish	\$4.95	\$9.90	\$14.85
Punk Fish	\$5.15	\$10.30	\$15.45
Rainbow Trout	\$6.40	\$12.80	\$19.20
Angelfish	\$7.05	\$14.10	\$21.15
Bubble fish	\$1.60	\$3.20	\$4.80
Daddy Fish	\$4.10	\$8.20	\$12.30
Mohawk Fish	\$8.85	\$17.70	\$26.55
Clown Fish	\$3.90	\$7.80	\$11.70
Bluegill	\$5.50	\$11.00	\$16.50
Beta	\$1.80	\$3.60	\$5.40
Guppy	\$.75	\$1.50	\$2.25

Teacher Resource Sheet 4- Easy In-Class Recipes

Crock-pot Applesauce

10 lg. cooking apples, peeled, cored & sliced or cut in chunks
1/2 c. water
1 tsp. cinnamon
1/2 to 1 c. sugar

Put all ingredients into crock-pot. Should be about 3/4 full.
Cover and cook on low 8 to 10 hours (high 3 to 4 hours).
Makes 15 small bowls.

Crock-pot Rice Pudding

1/2 gallon milk; skim, whole, or anything in between
1 c. raw rice
1 c. sugar
1/2 tsp. salt

Place all the ingredients in the crock pot. Cook on high until it simmers, stirring once in a while. When the rice no longer sinks as you stir, it is done, about 2 hours.

Add 2 teaspoons of vanilla and stir. Pour into a dish and cover the top with cinnamon. Chill. Makes 6 servings.

Peanut Butter Play-Doh

2 c. peanut butter
2 c. powdered milk
1 c. honey, or corn syrup

Mix all together, makes enough play-doh for 1-2 students.

Stock the Pet Store- Student Resource Sheet 1

Your new pet store is almost ready! Now all you need are some pets! Your boss left you specific instructions as far as how many of each type of animal you need to get. Use the clues below to figure out what he wants. Set up equations to include a variable.

Clue #1- There are twice as many cats as there are turtles.

Clue #2- The number of rabbits is equal to the number of cats plus the number of turtles.

Clue #3- There are three fewer dogs than there are rabbits.

Clue #4- There are 6 turtles.

Clue #5- There are fifty total pets in the store.

Clue #6- All of the rest of the pets are lizards.

How many Cats?

How many Dogs?

How many Rabbits?

How many Lizards?

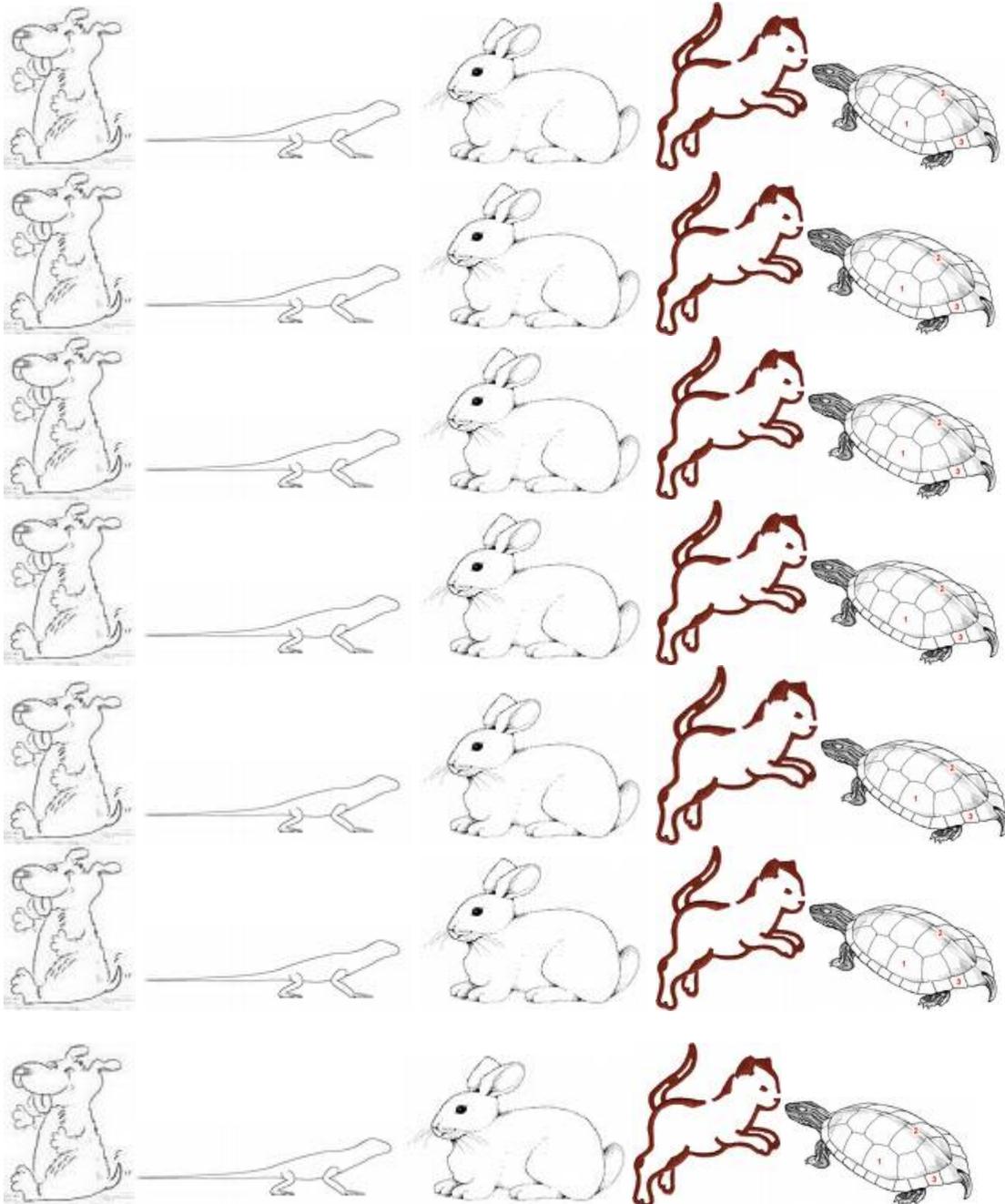
How many more Rabbits than Lizards?

What is the total number of animals with fur?

Stock the Pet Store- Student Resource Sheet 1a

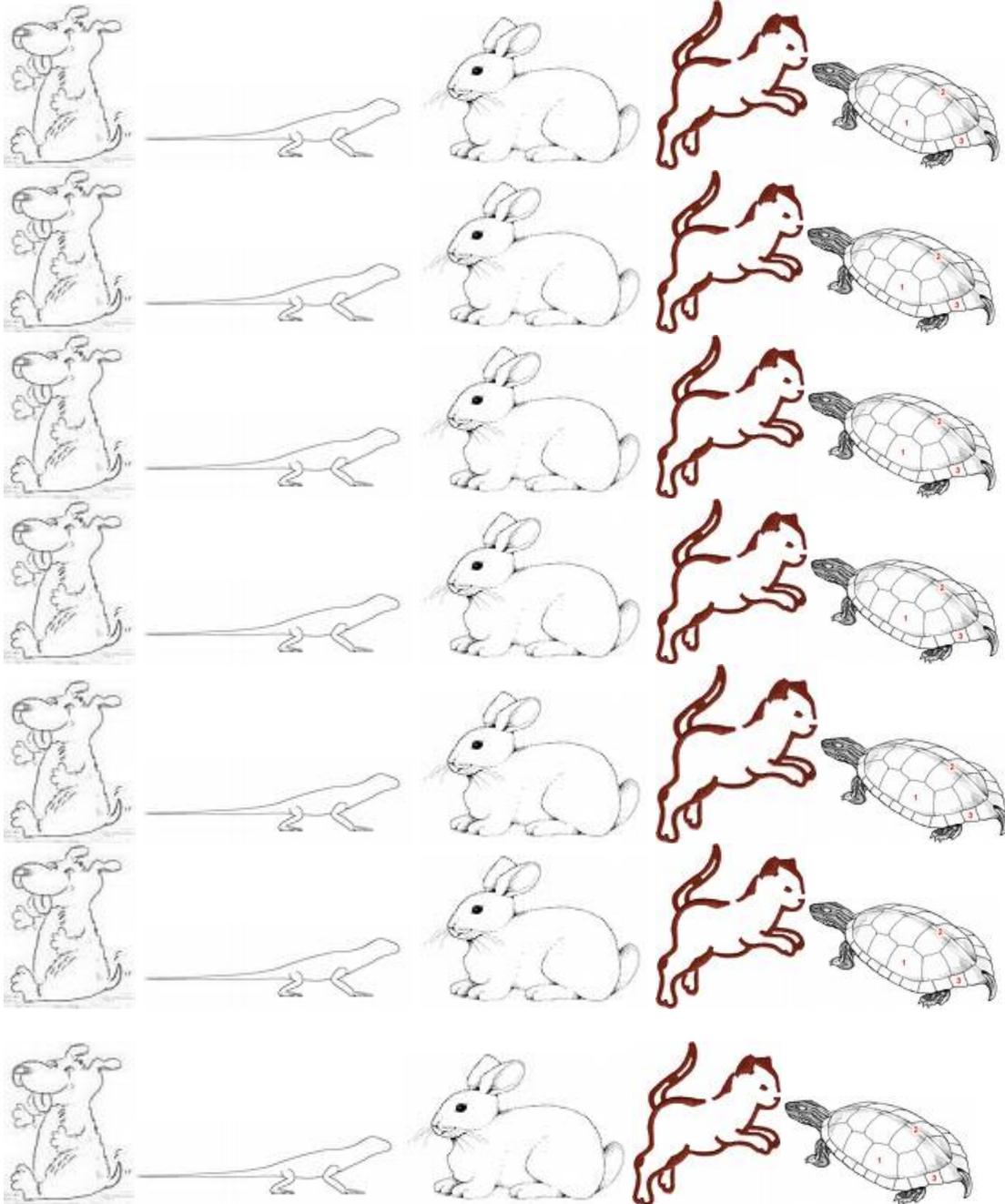
When you have figured out how many of each animal to buy, color in the appropriate number of animals below. Use crayons, take your time, and do your best!

(Example: Color in 6 of the turtles)



Stock the Pet Store- Student Resource Sheet 1a

When you have figured out how many of each animal to buy, color in the appropriate number of animals below. Use crayons, take your time, and do your best!
(Example: Color in 6 of the turtles)



Student Resource Sheet 1-Stock the Pet Store

Answer Key

Your new pet store is almost ready! Now all you need are some pets! Your boss left you specific instructions as far as how many of each type of animal you need to get. Use the clues below to figure out what he wants.

Clue #1- There are twice as many cats as there are turtles.

$$T + T = C$$

$$6 + 6 = C$$

Clue #2- The number of rabbits is equal to the number of cats plus the number of turtles.

$$C + T = R$$

$$12 + 6 = R$$

Clue #3- There are three fewer dogs than there are rabbits.

$$R - 3 = D$$

$$18 - 3 = D$$

Clue #4- There are 6 turtles.

$$6 = T$$

Clue #5- There are sixty total pets in the store.

Clue #6- All of the rest of the pets are lizards.

$$D + C + R + T = ?$$

$$60 - ? = L$$

How many Cats? 12

How many Dogs? 15

How many Rabbits? 18

How many Lizards? 9

How many more Rabbits than Lizards? 9

What is the total number of animals with fur? 45

Mystery Pets- Student Resource Sheet 2

1. There are 22 pets in all. There are five more dogs than cats. There are 3 turtles. How many dogs and cats are there?

2. There are three fewer turtles than rabbits. There are half as many rabbits as gerbils. There are 14 gerbils. How many turtles and rabbits are there?

How many pets in all?

3. There are 40 pets in the whole store. Half of the pets have fur. Half of the furry pets are dogs. How many dogs are there?

4. One cage will hold 2 animals. There are 9 cages. How many animals will fit in all of the cages?

5. There are three cages with 8 lizards in each cage. There is one more cat than there are lizards. How many cats and lizards are in the store?

Mystery Pets- Student Resource Sheet 2

Answer Key

1. There are 22 pets in all. There are five more dogs than cats. There are 3 turtles. How many dogs and cats are there?

12 dogs and 7 cats

2. There are three fewer turtles than rabbits. There are half as many rabbits as gerbils. There are 14 gerbils. How many turtles and rabbits are there?

7 rabbits and 4 turtles
How many pets in all?

There are 25 pets in all.

3. There are 40 pets in the whole store. Half of the pets have fur. Half of the furry pets are dogs. How many dogs are there?

There are 10 dogs

4. One cage will hold 2 animals. There are 9 cages. How many animals will fit in all of the cages?

18 animals

5. There are three cages with 8 lizards in each cage. There is one more cat than there are lizards. How many cats and lizards are in the store?

There are 24 lizards and 25 cats

Student Resource Sheet 3- Filling Tanks

Set up each equation using a variable to represent the unknown information, then solve each problem.

1. The small tank has 13 fish. The big tank has 9 more fish than the small tank. How many fish are in the big tank?
2. One fish tank has 8 Guppies. The owner needs to move half of the guppies to a smaller tank. How many fish will he move?
3. The small tank has 25 Angelfish. The big tank has twice as many Angelfish. How many fish are in the big tank?
4. The biggest tank has 14 Bass. I buy 8 bass. How many fish are left in the tank?

Solve the following equations.

5. $16 + a = 30$

6. $65 - 27 = b$

7. $c + c = 14$

Student Resource Sheet 3- Filling Tanks

Answer Key

Set up each equation using a variable to represent the unknown information, then solve each problem.

1. The small tank has 13 fish. The big tank has 9 more fish than the small tank. How many fish are in the big tank?

$$13 + 9 = f \qquad f = 22$$

2. One fish tank has 8 Guppies. The owner needs to move half of the guppies to a smaller tank. How many fish will he move?

$$? + ? = 8 \qquad ? = 4$$

3. The small tank has 25 Angelfish. The big tank has twice as many Angelfish. How many fish are in the big tank?

$$25 + 25 = b \qquad b = 50$$

4. The biggest tank has 14 Bass. I buy 8 bass. How many fish are left in the tank?

$$14 - 8 = ? \qquad ? = 6$$

Solve the following equations.

5. $16 + a = 30$ $a = 14$

6. $65 - 27 = b$ $b = 38$

7. $c + c = 14$ $c = 7$

Student Resource Sheet 4-Missing Variable Equivalencies

Use this information to solve the problems below. Write out your answers using variables, not numbers!!!

Fish A = \$5

Fish B = \$4

Fish C = \$3

Fish D = \$2

Fish E = \$1

1. Jack wants to fill his fish tank with \$5 worth of fish. Write out the different combinations of fish he could buy.
2. Sally wants to fill her aquarium with \$9 worth of fish. Write out the different combination of fish she could buy.
3. Do you see a pattern in the combinations in questions 1 and 2? What is it?
4. Fred's Fish Store wants to fill their aquarium with the following fish:

5 As

3 Bs

4 Cs

12 Ds

7 Es

How much will this cost? Write out the equation(s) that will help you solve this problem.

Student Resource Sheet 4-Missing Variable Equivalencies

Answer Key

Use this information to solve the problems below. Write out your answers using variables, not numbers!!!

$$\text{Fish A} = \$5$$

$$\text{Fish B} = \$4$$

$$\text{Fish C} = \$3$$

$$\text{Fish D} = \$2$$

$$\text{Fish E} = \$1$$

1. Jack wants to fill his fish tank with \$5 worth of fish. Write out the different combinations of fish he could buy.

$$\$5 = A$$

$$\$5 = C + D$$

$$\$5 = C + E + E$$

$$\$5 = D + E + E + E$$

$$\$5 = B + E$$

$$\$5 = D + D + E$$

$$\$5 = E + E + E + E + E$$

2. Sally wants to fill her aquarium with \$9 worth of fish. Write out the different combinations of fish she could buy.

$$\$7 = A + C$$

$$\$7 = B + D + E$$

$$\$7 = C + D + E + E$$

$$\$7 = A + E + E$$

$$\$7 = B + E + E + E$$

$$\$7 = C + E + E + E + E$$

$$\$7 = B + C$$

$$\$7 = C + D + D$$

3. Do you see a pattern in the combinations in questions 1 and 2? What is it?

4. Fred's Fish Store wants to fill their aquarium with the following fish:

5 As

3 Bs

4 Cs

12 Ds

7 Es

How much will this cost? Write out the equation that will help you solve this problem.

$$A + A + A + A + A = 5 + 5 + 5 + 5 + 5 = 25$$

$$B + B + B = 4 + 4 + 4 = 12$$

$$C + C + C + C = 3 + 3 + 3 + 3 = 12$$

$$D + D + D + D + D + D + D + D + D + D + D + D + D =$$

$$2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 +$$

$$2 = 24$$

$$E + E + E + E + E + E + E + E = 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 = 7$$

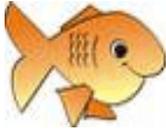
$$25 + 12 + 12 + 24 + 7 = 80$$

Aquarium- Student Resource Sheet 5



Prices for Fish- Student Resource Sheet 6

Remember- You need at least 8 varieties, and no more than 3 of each kind of fish!



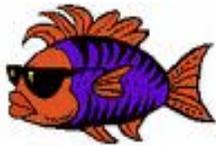
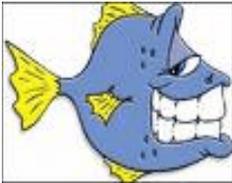
Goldfish

\$2.25



Bass

\$3.30



Dentalfish

\$4.95

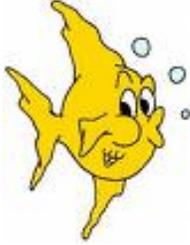


Punkfish

\$5.15

Rainbow Trout

\$6.40



Angelfish

\$7.05

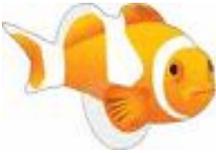


Bubblefish

\$1.60



Daddy Fish
\$4.10



Mohawk Fish

\$8.85



Clownfish

\$3.90

Bluegill

\$5.50

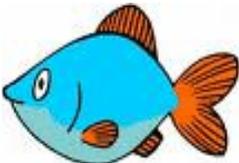
Betta

\$1.80

Guppy

\$0.75

Fish Purchases- Student Resource Sheet 7



Type of Fish	Cost per Fish	Number Purchased	Total Cost

Total Number of Fish Purchased:

Total Money Spent:

Amount of Money Remaining:

Fishy Values- Student Resource Sheet 8

1. How many Guppies can you get for the price of one Bluegill?

2. How many Betas can you get for \$5.00?

How much money would you have left over?

3. How much more does a Daddyfish cost than a Bass?

4. How many Angelfish could you buy with \$15.50?

How much would you have left over?

5. What costs more? One Goldfish or two Betas?

6. How much more does a Mohawk Fish cost than a Clownfish?

7. How many Bubblefish would you have to buy to spend \$9.60?

Fishy Values- Student Resource Sheet 8

Answer Key

1. How many Guppies can you get for the price of one Bluegill?

7 Guppies

2. How many Betas can you get for \$5.00?

2 Betas

How much money would you have left over?

\$1.40

3. How much more does a Daddyfish cost than a Bass?

\$0.80

4. How many Angelfish could you buy with \$15.50?

2 Angelfish

How much would you have left over?

\$1.40

5. What costs more? One Goldfish or two Betas?

2 Betas cost more; they add up to \$3.60

6. How much more does a Mohawk Fish cost than a Clownfish?

\$4.95

7. How many Bubblefish would you have to buy to spend \$9.60?

6 Bubblefish

Student Resource Sheet 9- Buying Pets and Making Change

Your pet stores are open for business. Students get into groups of four. Choose one person to be the cashier, while the other three act as customers. Each group should have the following play money:

3 \$20 dollar bills
6 \$10 dollar bills
14 \$5 dollar bills
9 \$1 dollar bills

8 Quarters
10 Dimes
20 Nickels

Customers:

1. Roll the number generator. It will represent the tens place. Here is an example of a roll:



This person has rolled 6 tens, so they should try to spend as close to \$60 as possible at the pet store (without going over).

2. The customer chooses the pets they would like to buy with the money they can spend, and writes down his desired purchase. Here is an example purchase:

1 dog- \$22.50 each
1 rabbit- \$16.75
2 turtles- \$7.35 each

3. The customer checks his math to make sure he is not going over budget (don't let the cashier see your work!). The customer can use play money and/or math journals to figure out the answer.

- The customer gives his order to the cashier, and hands him \$60 of play money.

Cashier:

- The cashier adds up the order. Here is the example:

1 dog- \$22.50

1 rabbit- \$16.75

1 turtle- \$7.35

1 turtle- \$7.35

$$\$22.50 + \$16.75 + \$7.35 + \$7.35 = \$53.95$$

- The cashier now has to make change from the \$60. He/she can use play money and/or the same paper to figure out how to make change, as shown below:

$$\$60 - \$53.95 = \$6.05$$

- The cashier gives the customer \$17 in change from the play money pile. A new customer steps up to roll the dice, and this is repeated until all three customers have made a purchase. Continue playing until everyone has gotten at least one turn as the cashier and 3 turns as a customer.

USE THIS SPACE TO RECORD ALL THE PETS YOU BUY TODAY!!!

Type of Pet	Number Purchased	Price Per Pet	Total

Total # of Pets:

Total Money Spent:

Student Resource Sheet 10- Change for a Dollar?

How many different ways can you make change for a dollar
using any combinations of quarters, dimes and nickels?

Complete grid below. Do you see any patterns?

QUARTERS	DIMES	NICKELS
4	0	0
3	2	
3		3
		5
2	5	
2	4	2
2		
		6
2	1	8
	0	1
1		1
	6	
	5	5
1	4	7
1		9
1	2	
		13
1		
0	10	
		2
		6
	5	
	1	18
0	0	20

Students Resource Sheet 10 - Change for a Dollar?
Answer Key

How many different ways can you make change for a dollar
using any combinations of quarters, dimes and nickels?

Complete grid below. Do you see any patterns?

QUARTERS	DIMES	NICKELS
4	0	0
3	2	1
3	1	3
3	0	5
2	5	0
2	4	2
2	3	4
2	2	6
2	1	8
2	0	10
1	7	1
1	6	3
1	5	5
1	4	7
1	3	9
1	2	11
1	1	13
1	0	15
0	10	0
0	9	2
0	8	4
0	7	6
0	6	8
0	5	10
0	4	12
0	3	14
0	2	16
0	1	18
0	0	20

**Selected Responses and Brief Constructed Responses- Student
Resource Sheet 11**

SR 1

I have one quarter, one dime, and three nickels. How much money do I have?

- A) \$0.45 B) \$1.50 C) \$0.50 D) \$1.10

BCR 1

Step A: Complete the table.

1	2
2	
3	6
	8
5	
	12
7	
8	
	18

Step B: Explain how you found your answers, using what you know about halves and doubles. Use words and numbers.

SR 2

Jane has half as many pets as Tim, and I have one more pet than Jane. Tim has 6 pets. How many pets do I have?

- A) 6 B) 2 C) 13 D) 4

BCR 2

Step A: Complete the table.

10	5
20	10
30	15
40	

Step B: What is the rule? What patterns do you see? Use words and numbers to explain your answer.