

CAPACITY CONVERTERS

**A Thematic Unit Introducing and Reinforcing the Relationship
Between Cups, Pints, Quarts and Gallons**

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(800) 421-4246 • www.teachinteract.com
ISBN# 978-1-57336-371-6

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The nationwide movement for high standards has not only determined what students should learn, but also has mandated that students demonstrate what they know. CAPACITY CONVERTERS is a standards-based program addressing many National Mathematics Standards. CAPACITY CONVERTERS provides opportunities for both written and observational performance assessment. Students, working in measurement teams, demonstrate their understanding of cups, pints, quarts, and gallons as they make conversions from one unit to another. They use writing to explain and clarify their thinking on making conversions. The peer-teaching and cooperative problem solving required in CAPACITY CONVERTERS also addresses Applied Learning standards.

National Standards for School Mathematics

Number and Operations Standard

- Compute fluently and make reasonable estimates
 - Develop fluency in adding, subtracting, multiplying and dividing whole numbers.
 - Develop and use strategies to estimate the results of whole-number computations and to judge the reasonableness of such results.

Measurement Standard

- Understand measurable attributes of objects and the units, systems, and processes of measurement
 - Understand the need for measuring with standard units and become familiar with standard units in the customary and metric systems.
 - Carry out simple unit conversions within a system of measurement.
- Apply appropriate techniques, tools, and formulas to determine measurements
 - Develop strategies for estimating perimeters, areas, and volumes of irregular shapes.
 - Select and apply appropriate standard units and tools to measure.
 - Select and use benchmarks to estimate measurements.

Problem Solving Standard

- Build new mathematical knowledge through problem solving
- Solve problems that arise in mathematics and other contexts
- Apply and adapt a variety of appropriate strategies to solve problems

Communication Standard

- Organize and consolidate their mathematical thinking through communication
- Communicate their mathematical thinking coherently and clearly to peers, teachers, and others
- Analyze and evaluate the mathematical thinking and strategies of others

STANDARDS

Connections Standard

- Understand how mathematical ideas interconnect and build on one another to produce a coherent whole

Representation Standard

- Create and use representations to organize, record, and communicate mathematical ideas
- Select, apply, and translate among mathematical representations to solve problems

California Applied Learning Standards

Standard 2: Students will understand how to solve problems through planning and organization.

Standard 3: Students will understand how to solve problems through teaching and learning. Students will develop and implement a teaching-learning program.

Standard 6: Students will understand how to apply communication skills and techniques. Students will demonstrate ability to communicate orally and in writing.

Standard 8: Students will understand the importance of teamwork. Students will work in teams to achieve project objectives.

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STUDENT

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Teaching students how to convert cups, pints, quarts, and gallons can often be a frustrating experience. The process of how to convert from one unit to another seems to be difficult for young students to grasp and remember. CAPACITY CONVERTERS is a new approach that assists in alleviating some of these barriers.

CAPACITY CONVERTERS employs auditory, visual, and kinesthetic learning styles. Cooperative groups of students engage in peer tutoring. Students learn a specific approach that enables them to remember how to convert from one unit to another easily. CAPACITY CONVERTERS successfully stimulates student interest and enjoyment while teaching this skill. Specifically, in CAPACITY CONVERTERS your students experience the following:

Knowledge

- Different units used to measure capacity—specifically cups, pints, quarts, gallons
- Strategy for making conversions from one unit to another
- Awareness of products that are packaged in units of cups, pints, quarts, or gallons

Skills

- Identifying basic units for measuring capacity—cups, pints, quarts, gallons
- Learning the different abbreviations for cups, pints, quarts, and gallons
- Working cooperatively in groups
- Writing a summary describing how your body can help you make conversions easily
- Identifying products that are packaged in units of cups, pints, quarts, or gallons
- Estimating capacity in cups, pints, quarts, and gallons

Attitudes

- Developing a positive attitude toward working with units of capacity
- Sensing the satisfaction gained when mastering a difficult concept
- Feeling confident because of ability to make conversions from one unit to another
- Understanding the importance of teamwork

ESOPURPOSE

OVERVIEW

OVERVIEW

In CAPACITY CONVERTERS, each Measurement Team (made up of four students) is responsible for helping team members achieve success. Measurement Teams initially jigsaw into Expert Groups formed to investigate a given capacity (cups, pints, quarts, or gallons). Expert Groups work together to complete specified tasks. Upon completing the tasks, students return to their Measurement Teams and demonstrate what they have learned.

The following day the teacher demonstrates to the class a very unique and effective way of remembering how to convert cups, pints, quarts, and gallons.

CAPACITY CONVERTERS begins with a pretest and ends with a posttest. The pretest indicates the knowledge base of students. The posttest will verify student learning to students and parents. Teams that earn 90% or more on the posttest will be named *Champion Capacity Converters Teams*.

CAPACITY CONVERTERS includes the following instructional steps:

- Pretest
- Introduce cups, pints, quarts, and gallon containers and abbreviations
- Team formation
- Expert groups meet
- Experts return to their teams and share knowledge
- Teacher instruction
- Conversion practice
- Application of learning
- Posttest
- Extension activities (optional)
- Conversion to and from fluid ounces (Grade 5)

Like all Interact units, CAPACITY CONVERTERS provides differentiated instruction through its various learning opportunities. Students learn and experience the knowledge, skills, and attitudes through all domains of language (reading, writing, speaking, and listening). Adjust the level of difficulty as best fits your students. Assist special needs students in selecting activities that utilize their strengths and allow them to succeed. Work together with the Resource Specialist teacher, Gifted and Talented teacher, or other specialist to coordinate instruction.

SETUP DIRECTIONS

1. Before you Begin

Carefully read through the entire Teacher Guide so that you understand the objectives and sequence of CAPACITY CONVERTERS. Decide how you will use the unit in your classroom. Throughout the Teacher Guide, Interact employs certain editorial conventions to identify materials.

- In preparing materials, *Class set* means *one per student*.
- One *Day* on the **Unit Time Chart** is the length of a normal *class period*—45 minutes to one hour.
- All masters and student handouts are listed by name using ALL CAPITAL LETTERS.
- Teacher reference pages are named in **Bold**.
- Special events are named using *Italics* (e.g., *Popcorn Party*).

2. Timing Options

This unit as presented will take four days for grades 2, 3, and 4 and five days for grade 5. Study the **Unit Time Chart**. Shorten or extend the time depending on student skills, classroom time considerations, or extension activities selected.

3. Grouping Students

Based upon students' pretest responses and/or teacher judgment, establish Measurement Teams of four.

- Your primary goal in developing Measurement Teams is to make them as academically even as possible.
- Keep in mind that Measurement Teams that earn 90% or more on their posttests will be crowned *Champion Capacity Converters Teams*.
- Encourage students to ensure that all of their Measurement Team members understand the unit concepts.
- If you have one or more extra students you can have five on a team.

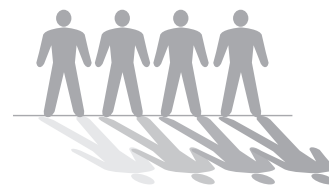
4. Assigning Roles for Jigsaw Groups

Students participate in two different groups. In the second group—a Jigsaw Expert Group—students work to master one unit of capacity measurement (cups, pints, quarts, or gallons.) “Expert” students return to their primary group (their Measurement Team) and share their expertise with other team members who have mastered different units of capacity.

- Assign one of the four students on a Measurement Team to be responsible to learn about the cup, one to learn about the pint, one the quart, and one the gallon.



Four–five days



Cooperative groups of four

If you do have five students on a team, average the individual test scores to determine aggregate team scores.

SETUP DIRECTIONS

- b. Expert Groups that include students of varying abilities will maximize the opportunity for peer teaching and learning.
- c. Encourage students to use free time during the day to practice and reinforce capacity conversions with their team members.
- d. Pints may be the most challenging Expert Group topic.

The *Jigsaw Model*, developed in the early 1970s by Dr. Elliot Aronson, sets up a peer-teaching opportunity. The Jigsaw model closely mirrors the authentic workplace where small and diverse groups of people must pull together in order to be successful.

5. Materials

Prior to Day 1 assemble all necessary materials in the quantities indicated in *Italics*.

- Blue marker or blue crayon — *class set*
- Bucket (2-gallon) — *one (It cannot have markings or lines on it indicating capacity.)*
- Clasp envelope — *one per team*
- Containers (cup, pint, quart, gallon) — *one set per team*
- Funnels (4"-5" diameter at top) — *one per team (optional)*
- Pencils — *class set*
- * Plastic washtub with water (approx. 4.5 gallons) — *one per team*
- Rulers — *one per team (to level dry contents, optional)*

*Use a rectangular dishpan-size tub.

Popcorn Party

- Napkins — *class set + extras*
- Pitchers or containers for drink mix — *several*
- Plastic cups (8-oz) — *enough for students*
- Popcorn — *enough for students*
- Powdered drink mix — *several envelopes (assorted flavors)*
- Scratch paper — *one piece per team*
- Spoon — *one or more (for mixing drink mix)*
- Sugar — *several cups*

6. Preparing Materials

Following are suggestions for how to prepare the materials you will need for this unit.

a. Capacity Containers

Be sure to have a complete set of containers (cup, pint, quart, gallon) for each Measurement Team.

b. Water Tub

Each team will need one tub to pour water into and take water out of while making conversions using their set of capacity containers.

c. **Student-donated Food Packages**

Decide if you will send out the PARENT LETTER or if you will have your students participate in the Study Trip Extension. Both activities result in students recognizing the capacities used to package food products.

7. **Reproducible Masters**

Make copies of the following handouts (listed in order used) in the quantities indicated in *Italics*.

- COOPERATIVE GROUP WORK RUBRIC — *as needed*
- PARENT LETTER — *class set (optional)*
- CAPACITY CONVERTERS FLASH CARDS — *two sets per team + one for teacher use*
- * CONVERSION KID (two pages) — *class set*
- PRETEST — *class set (optional)*
- CUPS EXPERT — *one per team*
- PINTS EXPERT — *one per team*
- QUARTS EXPERT — *one per team*
- GALLONS EXPERT — *one per team*
- TEAM INVESTIGATIONS — *class set*
- * COLOR THE KID (two pages) — *class set*
- WRITING ASSIGNMENT AND RUBRIC — *class set*
- CONVERTING TO AND FROM FLUID OUNCES — *display copy*
- CUP ICON — *class set (cut apart)*
- POSTTEST — *class set*
- CERTIFICATES — *as needed*
- MERCHANT LETTER — *as needed*
- PARENT PERMISSION LETTER — *class set*
- * STUDY TRIP WORKSHEET (two pages) — *class set, one per team, or one per student pair*

*Copy the two pages back-to-back on one sheet of paper.

8. **Classroom Environment**

a. **Wall Chart**

Laminate the 22" x 34" **Conversion Kid Wall Chart** and post in a prominent place in the classroom on Day 2.

Laminating will ensure that the chart lasts for several years.

b. **CAPACITY CONVERTERS FLASH CARDS**

For each team, photocopy two complete sets of flash cards.

- Use the Capacity Converters logo as the backs of the cards and the conversion problems as the faces of the cards.
- Colored construction paper will help to create interest.
- Cut the cards apart and bind each set with a rubber band.
- Laminate for durability (optional).



CAPACITY CONVERTERS

includes the following model letters: PARENT LETTER requesting containers from home, MERCHANT LETTER soliciting business participation in the study trip, and a PARENT PERMISSION request for student and parent participation in the study trip. You may use the samples, compose your own, or have students write these letters.

SETUP DIRECTIONS

c. **Substitutions for Tubs of Water**

If your classroom does not have a sink, or if tubs of water are a potential management problem, consider using clean sand or jumbo packages of popped corn or puffed cereal. Each team needs slightly more than one gallon of some substance to measure.

d. **Classroom Management**

Establish clear rules for how students should work responsibly with the water or dry materials that they will measure. Reinforce behavior expectations with the COOPERATIVE GROUP WORK RUBRIC.

9. **Extensions**

Decide which extension activities you will use, if any, and plan accordingly. Teaching directions for extensions follow the Daily Directions.

a. **Learning Games**

The two extension games use the CAPACITY CONVERTERS FLASH CARDS.

b. **Study Trip**

If possible, arrange with one or more local grocery stores to allow students to participate in a study trip.

- Students (individually, in pairs, or in teams) identify products that are packaged and sold in cups, pints, quarts, or gallons.
- Ample adult supervision is crucial to ensure that students and business owners are satisfied with the experience.
- It is best to contact local grocery store(s) and parent volunteers early if you plan to conduct this activity.
- See **Setup Directions, #10, Study Trip** for specific planning suggestions.

10. **Study Trip**

Step 1 — Planning

- Select potential stores and send out a written request. (Use the MERCHANT LETTER model or devise your own.)
- Inform your school administrator of your preliminary plans.
- Visit the potential store(s) and talk to the owner/manager.
- Determine a preferred date and time and any special safety rules to consider.
- Follow up this visit with a letter confirming the plans.

Step 2 — Parent Volunteers

- Parents or adult volunteers are invaluable in managing a classroom of students “working” in a store.
- These volunteers can assist students and reinforce skills.



A study trip to an actual place of business provides children the opportunity to extend their knowledge about the real world and their community through personal experience.

Step 3 — Student Preparation

- Check your school's policy regarding study trip permission forms.
- Record those returned.
- Call any parents who do not return the form by the deadline.
- Make name tags for the students and compile lists of students for each adult volunteer.

Step 4 — Publicity

- Invite a local newspaper or television station to cover the study trip.
- News organizations often give very good coverage to such positive, real-world learning experiences.

Step 5 — Study Trip

- Embark on your study trip and watch your students rise to the challenge of their real-world experience with responsible and appropriate behavior.

Step 6 — Acknowledgments

- Following the study trip, students write letters to thank the merchant(s) and parents involved in their store experience.

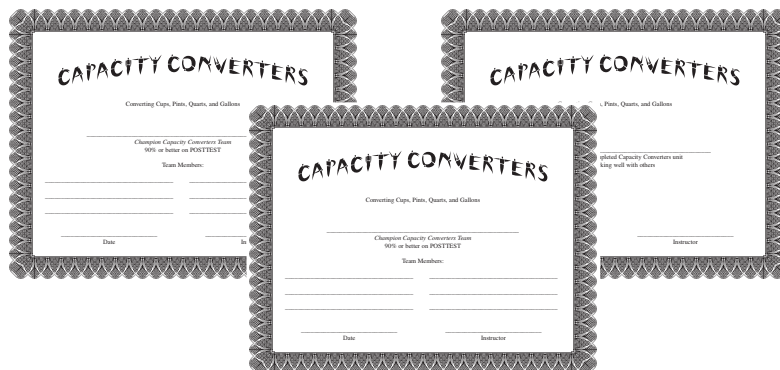
11. Incentives and Awards

a. Popcorn Party

After completing the posttest on Day 4, reward your students with a *Popcorn Party* that also serves to allow them to transfer their knowledge in a very personal way. Students measure and prepare powdered drink mix, then measure and record how much they drink and eat. They apply the concepts learned as they combine information from all measurement teams. It is also fun and tastes great.

b. Recognizing Student and Team Achievements

Duplicate and give to each student one or more of the three certificates of achievement. Notice that each Certificate honors a student for a particular achievement. Every team has the opportunity to do well and earn a *Champion Capacity Converters Team Certificate*.



Remember to acknowledge and thank all participating businesses in any newspaper or television coverage, since only one place of business will probably be photographed or filmed.



Plan carefully to adapt this activity to meet your needs. The amount of supplies will depend on how many students you have and on how much popcorn and drink you want them to have.



When you administer the POSTTEST remind students to use their bodies as a reference as they approach the problem solving. Counsel LD students to mark the larger or smaller capacities in each problem. Suggest that they ask themselves, “Am I going from small to big, or big to small?” for each problem.

CAPACITY CONVERTERS provides ample opportunity to assess student learning.

1. Determine Assessment Standards

All students will use these standard capacity measures in their daily lives as they mature. Based on your individual and state requirements, establish your own level of what “meets standard” for your grade level.

- a. “Meeting the standard” on the WRITING ASSIGNMENT includes only content. If a student has written-language difficulties, have the student explain orally her/his thinking.
- b. “Meeting the standard” on the POSTTEST of conversions has less room for latitude. Either the student knows how to convert between cups, pints, quarts, and gallons (and fluid ounces for 5th grade) or he/she does not. Students must correct mistakes, and teachers must reteach if students do not know how to do conversions correctly.
- d. Students who do not “meet the standard” on any part of the assessment must be required to redo that section. Sometimes students need more instruction and a second chance to demonstrate what they know. Consider allowing students to retake the POSTTEST after reviewing with you. Also consider allowing them to retake the test orally.

2. Performance Assessment

CAPACITY CONVERTERS includes rubrics to assess student understanding of capacity conversions and cooperative group work. Individual students, regardless of how their teams finish, may strive to achieve a score of “4” using each of these rubrics.

Always post rubrics before beginning work. Complete the Cooperative Group Work Rubric for all students at least *twice*—after Day 1 and again at the end. After the first evaluation, students generally attend to their tasks better and work to improve their rubric scores for the next evaluation.

3. What do Rubric Scores Mean?

When completing performance assessments, focus on “student work.” This work is *not* limited to written work. It includes demonstrated skills, oral exchanges, individual and cooperative group behavior, processes, strategies, and any other evidence that proves that the students have learned the targeted content or skill and can apply what they know.

4 — Exemplary — Generally this rating describes work that exceeds the standard for the activity. The descriptor includes words such as “consistently,” “complete,” “with detail,” “actively,” and “willingly.” Students who earn a “4” demonstrate leadership and knowledge during participation in the unit activities.

3 — Expected — Generally this rating describes work that meets the standard with quality. The descriptors lack some of the positive adjectives of a “4,” but this student has mastered the content or skill and can demonstrate his/her understanding in an application setting.

2 — Nearly There — Generally this rating describes work that almost meets the standard. Sometimes inconsistent effort or a misconception of the content will result in a “2” rating. This student needs to try a little harder, or needs to revise his/her work in order to meet the standards described.

1 — Incomplete — Generally this rating describes work that has not yet met the standard in content and/or skill. This student will require more instruction and another opportunity to demonstrate a knowledge or skill, or will require alternative instruction and assessment.



UNIT TIME CHART

DAY 1		DAY 2
<ul style="list-style-type: none">• Introduce and identify a cup, pint, quart, and gallon• Give brief overview of the CAPACITY CONVERTERS unit• Measurement Teams meet / Expert Groups meet• Teams investigate and solve problems• COOPERATIVE GROUP WORK RUBRIC		<ul style="list-style-type: none">• Review basics from Day 1• Teach “trick” to remember basic facts• Conversion Kid Wall Chart• CAPACITY CONVERTER FLASH CARDS• COLOR THE KID
DAY 3	DAY 4 (Grade 5)	DAY 4 (Grades 2,3,4)
<ul style="list-style-type: none">• Teams practice making conversions• CAPACITY CONVERTERS FLASH CARDS• WRITING ASSIGNMENT and RUBRIC (Grades 2, 3, and 4)• CUP ICON	<ul style="list-style-type: none">• Converting to and from fluid ounces• CONVERTING TO AND FROM FLUID OUNCES• WRITING ASSIGNMENT and RUBRIC (Grade 5)	<ul style="list-style-type: none">• Culmination• <i>Popcorn Party</i>• POSTTEST• CERTIFICATES
DAY 5 (Grade 5)	EXTENSIONS	
<ul style="list-style-type: none">• Culmination• <i>Popcorn Party</i>• POSTTEST• CERTIFICATES	<ul style="list-style-type: none">• Capacity Bee• Capacity War• Study Trip• MERCHANT LETTER• PARENT PERMISSION LETTER• STUDY TRIP WORKSHEET	

Day 1

Objectives

- Introduce unit
- Form Teams and Expert Groups
- Teams practice capacity conversions
- Students apply estimation skills

Materials

- PRETEST — *class set (optional)*
- COOPERATIVE GROUP WORK RUBRIC — *display copy + as needed*
- CUPS EXPERT — *one per team*
- PINTS EXPERT — *one per team*
- QUARTS EXPERT — *one per team*
- GALLONS EXPERT — *one per team*
- TEAM INVESTIGATIONS — *class set*
- CAPACITY CONVERTERS FLASH CARDS — *two sets per team*
- CONVERSION KID — *class set*
- Clasp envelope — *one per team*
- Containers (cup, pint, quart, gallon) — *one set per team*
- *Plastic washtub with water (approx 4.5 gallons) — *one per team*

Capacity Estimation Application Materials

- Bucket (2-gallon) — *one (It cannot have markings or lines on it indicating amounts of capacity.)*

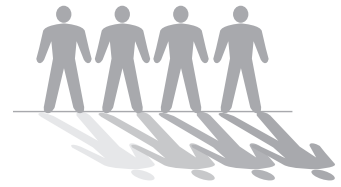
*Use a rectangular dishpan-size tub.

Setup

1. Prior to class, set up four Expert Group stations in separate corners of the room.
 - a. Provide one tub with water for each station.
 - b. Provide one set of containers for each station.
2. Four of the Measurement Teams will use these Expert Group stations. Provide one set of capacity measures for each of the remaining Measurement Teams.
 - a. Provide one tub with water for each station.
 - b. Provide one set of containers for each station.

Procedure

1. Distribute the PRETEST or give the question orally and have students write their responses on their own paper. Allow about five minutes for students to complete.



Cooperative groups of four



If your classroom does not have a sink, or if tubs of water are a potential management problem, consider using clean sand or jumbo packages of popped corn or puffed cereal. Each team needs slightly more than one gallon of some substance to measure.

DAILY DIRECTIONS

DAY 1

2. Using one set of containers, introduce and identify each container along with its abbreviation.
Cup = c
Pint = pt
Quart = qt
Gallon = g
3. Give brief overview of CAPACITY CONVERTERS. Explain:
 - a. Students will work on teams with four members.
 - Each group of four will represent a Measurement Team.
 - Teams will meet and decide on a team name.
 - b. Each member of the team will become an Expert on one capacity—cups, pints, quarts, or gallons.
 - This expert will help other team members understand his/her unit of capacity measurement.
 - c. Each expert will meet with experts from other teams (all cups experts meet together, all pints experts meet together, etc.)
 - The Expert groups investigate, solve, and record answers to basic questions on their unit of measurement.
 - d. The Experts return to their original teams and demonstrate that their answers to their questions are in fact correct.
 - The Experts use the four containers and the water for their demonstrations.
 - e. After all four teammates have shared their knowledge, the Measurement Teams work together to answer more difficult questions involving cups, pints, quarts, and gallons.
 - The teams use the four containers and the water to check for accuracy as they solve these problems.
 - f. The Measurement Team scoring at least 90% on their Posttest will be recognized as *Champion Capacity Converters Teams*.
 - g. Students may earn individual achievement certificates, as well as certificates for participation and working well with teammates.
4. Assign students to four-member Measurement Teams. As you do so, identify which students will be the *Cups*, *Pints*, *Quarts*, and *Gallons* Experts for each team. Display the copy of the COOPERATIVE GROUP WORK RUBRIC and make clear to the students their responsibilities throughout the unit.



Reinforce your expectations for responsible student behavior while using the measuring containers. Pints may be the most challenging Expert Group topic.

5. Have the teams meet and decide on a team name. While students are discussing their team names, distribute the EXPERT worksheets. Make sure all students assigned to cups get the CUPS EXPERT, pints get the PINTS EXPERT, quarts get the QUARTS EXPERT, and gallons get the GALLONS EXPERT.
6. Introduce the concept of students working in “Expert Groups.”
 - a. Point out that each Expert Group will learn about their specific capacity, based on the EXPERT sheets just distributed.
 - b. Emphasize that each “Expert” will then return to his or her Management Team and teach the other team members about that capacity.
 - c. Direct all students assigned to the same capacity unit to meet at their Expert station where they will investigate, solve, and record their findings.
7. Oversee students as they complete their EXPERT worksheets. When the Expert groups are finished, students return to their Measurement Teams.
8. Direct each Measurement Team to a station with a set of containers and a tub for water.
9. Have each Expert use the containers to demonstrate and prove to his/her team members that the answers on the EXPERT worksheet are correct.
10. Direct each team to work together to complete as many of the problems on the TEAM INVESTIGATIONS worksheet as they can.

TEAM INVESTIGATIONS Answer Key

- | | |
|---|-----------------|
| 1. 1 pt = 2 c | 11. 6 c = 3 pt |
| 2. 1 g = 4 qt | 12. 8 pt = 4 qt |
| 3. 1 qt = 2 pt | 13. 12 qt = 3 g |
| 4. 1 qt = 4 c | 14. 3 pt = 6 c |
| 5. 1 g = 8 pt | 15. 2 qt = 4 pt |
| 6. 1 g = 16 c | 16. 3 qt = 12 c |
| 7. 2 g = 8 qt | 17. 6 pt = 3 qt |
| 8. 4 c = 2 pt | 18. 8 c = 4 pt |
| 9. 4 pt = 2 qt | 19. 16 pt = 2 g |
| 10. 8 qt = 2 g | 20. 32 c = 2 g |
| 21. Answers will vary | |
| 22. <u>Yes, she brought enough juice.</u> 2 qt = 4 pt. | |
| 23. <u>4 c.</u> 1 g = 4 qt. The jug is 3 qt full; that leaves 1 qt remaining. 1 qt = 4 c. | |



Point out to the students that when they are going from a larger capacity to a smaller capacity they go from fewer containers to more containers. Suggest that they visualize the larger and smaller containers.

It is not critical that the teams complete all of the questions before the end of class. Allow them some time to use their containers to investigate and solve more difficult problems. This kinesthetic learning will help students observe that they can convert units from one to another. Tomorrow's lesson will simplify this conversion process.



DAILY DIRECTIONS

DAY 1

Capacity Estimation Application

Materials

- Bucket (2-gallon) — *one (It cannot have markings or lines on it indicating amounts of capacity.)*

Procedure

1. Introduce *Capacity Estimation*. This interactive exercise allows teams to apply estimation in working with quantities. Teammates discuss and explore estimation strategies and recognize when an estimate is appropriate. Use this as a measurement team competition to heighten interest.
2. Fill the bucket with water to any amount.
3. Direct teams to look at the amount of water in the bucket as you walk around from team to team with the bucket in hand.
4. Tell the teams to discuss the amount of water they see and estimate how much water they believe is in the bucket. Each team should write their estimation down on a piece of paper. Estimations can be in any quantity—cup, pint, quart, or gallon—or any combination of quantities (e.g., 1 g and 2 q).
5. As a class, measure out the water in the bucket using the cup, pint, quart, and gallon containers to find out how much water is in the bucket.
6. The team that had the best estimation scores a point.
7. Repeat this process with a different amount of water in the bucket. The team that scores three points first, wins.
8. Modify this activity to fit your needs—from team size to points needed to win.
9. After class, write each Measurement Team's name on a clasp envelope. Place inside two sets of CAPACITY CONVERTER FLASH CARDS per team and one CONVERSION KID (copied on both sides of one sheet of paper) per team member. Teams will use these on Day 3.

Day 2

Objectives

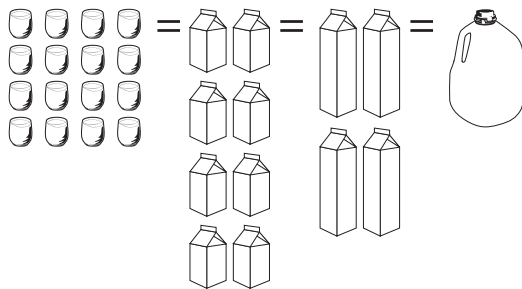
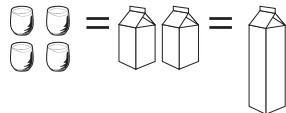
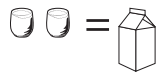
- Introduce **Conversion Kid Wall Chart**
- Teams practice capacity conversions

Materials

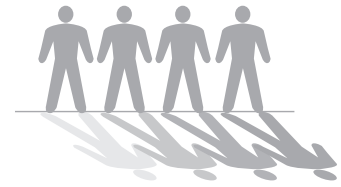
- **Conversion Kid Wall Chart** (22" x 34") — *one*
- **COLOR THE KID** — *class set*
- **CAPACITY CONVERTERS FLASH CARDS** — *one set*
- Blue marker or blue crayon — *class set*
- Containers (cup, pint, quart, gallon) — *one set*

Procedure

1. To begin teaching students how to convert from one unit to another, review the basics that they learned yesterday. Line up the containers in the front of the classroom—cup, pint, quart, and gallon. Review the facts:
 2 cups = 1 pint 2 pints = 1 quart 4 quarts = 1 gallon
 4 cups = 1 quart 8 pints = 1 gallon
 16 cups = 1 gallon



2. Tell students that you are now going to share with them a very easy way (trick) to remember these basic facts. This “trick” will also help them with more difficult problems as well.
3. Display the 22" x 34" laminated **Conversion Kid Wall Chart**.



Individuals
Cooperative groups of four

DAILY DIRECTIONS

DAY 2



Converting cups to pints can be confusing for students, especially having to divide the fingers (cups) when you divide the arm into two pints.

Point out that the body parts that we are using to represent cups, pints, quarts, and gallon progress in size just like the actual cups, pints, quarts, and gallon containers. The cups are the smallest (fingers and toes), then pints (forearms and biceps or quadriceps and calves), then quarts (arms and legs), and finally the largest—the gallon (body).

Even though it is obvious to adults that our body is not a gallon and our limbs are not quarts, young students may not make this distinction. You may find that a student believes that his/her body actually holds a gallon and his/her leg actually holds a quart of fluid. Explain to students that using the body to help make conversions is simply a mnemonic, a device they can use to remember these facts.

4. Explain to students that they can use their bodies to recall these facts. Using the chart, point out to students that:

a. We are going to pretend that each of our bodies is one gallon.



b. Each gallon (body) contains four quarts (limbs).



c. Each quart (limb) contains two pints (forearm and bicep or quadricep and calf). Notice that there are eight pints in one gallon (body).



d. Each quart (limb/two pints) has four cups (toes or fingers—excluding big toes and thumbs). Notice that there are sixteen cups in one gallon (body). Also, point out that since two pints are equal to four cups, then one pint is equal to two cups.



5. Hand out COLOR THE KID and the markers or crayons. Check the students as they color to be sure they are correct. Tell them to keep COLOR THE KID as a reference for tomorrow's lesson.

6. Using one set of CAPACITY CONVERTERS FLASH CARDS, guide students (as a class) to understand and answer each card using the students' bodies as a reference.

Example: How many pints are in three quarts? Students would look at their bodies and notice that there are six pints in their three quarts (arms and legs).

7. Have teams take out their TEAM INVESTIGATIONS from Day 1. Review as many of the problems as class time allows.

Day 3

Objectives

- Teams practice capacity conversions
- Students apply learning
- Students complete written assessment

Materials

- WRITING ASSIGNMENT AND RUBRIC (Grades 2, 3, and 4) — *class set*
- Clasp envelopes — *one per team (each contains two sets of CAPACITY CONVERTERS FLASH CARDS and one CONVERSION KID reference sheet for each member of the team)*

Mix and Match Application Materials

- CUP ICON (cut apart) — *class set*

Procedure

1. Direct Measurement Teams to practice making conversions using the CAPACITY CONVERTERS FLASH CARDS and CONVERSION KID reference sheets.
2. Once again, stress to students the importance of helping their teammates in order that they **all** understand and can make conversions.
3. Remind students that Measurement Teams that achieve an average score of 90% on the POSTTEST will be recognized as *Champion Capacity Converters Teams*.

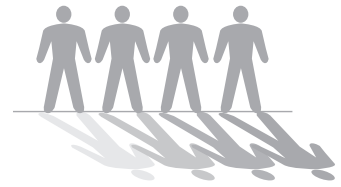
Mix and Match Application

Materials

- CUP ICON (cut apart) — *class set*

Procedure

1. Introduce Mix and Match. This kinesthetic activity allows students to get out of their seats, form groups to represent pints, quarts, and gallons, and reinforce their knowledge of the relationship between the various capacities.
2. Distribute one CUP ICON to each student. Tell the class that each student is holding one cup. They will carry their cups as they move to join with other students to make combinations of pints, quarts, and gallons. Have the students form groups, when appropriate, to answer the following questions.



*Individuals
Cooperative groups of four*



Act as a facilitator going from team to team. Allow the students 15–20 minutes to practice their conversions.



Previous days led students to divide their bodies into cups, pints, quarts, and gallons. Using the CUP ICON during this activity will minimize confusion.

DAILY DIRECTIONS

DAY 3



You can modify this activity and have the boys do it by themselves and the girls do it by themselves. Then compare the results when both groups are finished. The idea is to see if students can come up with the answers by themselves by forming groups.



3. Begin the activity by asking the following question:
How many cups (students) are there in this room?
(Students should count off and call out the answer while holding aloft their CUP ICONS.)
4. Tell students that they can now move about the room to answer the next questions. Ask,
How many pints are in this room? *(Students should get into groups of two and raise their CUP ICONS.)*
Are there any cups left over?
How many quarts are in this room? *(Students should get into groups of four and raise their CUP ICONS.)*
Are there any pints left over?
Are there any cups left over?
How many gallons are in this room? *(Students should get into groups of 16 and raise their CUP ICONS.)*
Are there any quarts left over?
Are there any pints left over?
Are there any cups left over?
5. Grades 2, 3, and 4. With a few minutes remaining in the class, tell students to return to their desks. Distribute the **WRITING ASSIGNMENT AND RUBRIC**. Discuss the rubric expectations, then allow the remaining time for students to complete or assign as homework to be ready by the next class.

WRITING ASSIGNMENT Answer Key

Grades 2, 3, and 4

1. Look for a clear explanation of using the torso, limbs, and fingers to compute the answer of 26 cups.
 $1 \text{ g} = 16 \text{ c}$
 $2 \text{ qt} = 8 \text{ c}$
 $1 \text{ pt} = 2 \text{ c}$
 $16 + 8 + 2 = 26 \text{ c}$

Day 4
Extra Instruction Day for Grade 5
Half-Gallons and Converting to and from Fluid Ounces

Objectives

- Students practice capacity conversions

Materials

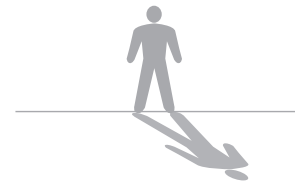
- CONVERTING TO AND FROM FLUID OUNCES — *display copy*
- WRITING ASSIGNMENT AND RUBRIC (Grade 5) — *class set*

Procedure

1. Introduce the concept of a half-gallon. Have students stand and bend at the waist.
 - a. Point out that the top of the torso equals one-half gallon.
 - It equals two quarts (two arms) **OR**
 - Four pints (above and below the elbows) **OR**
 - Eight cups (fingers on both hands).
 - b. The bottom of the torso also equals one-half gallon
 - It equals two quarts (two legs) **OR**
 - Four pints (above and below the knees) **OR**
 - Eight cups (toes on both feet).
2. Introduce fluid ounces. There really is no trick for teaching fluid ounces. However, with the help of CAPACITY CONVERTERS students can learn to make conversions. The fact that students must eventually know is:
8 fluid ounces (fl oz) = 1 cup (c)
3. Explain and demonstrate this fact to students. Once the students accept the fact that $8 \text{ fl oz} = 1 \text{ c}$ converting becomes easy, regardless of the capacity they are trying to convert.

Converting Capacities to Fluid Ounces

1. When converting a quantity to fluid ounces, students follow this simple process:
Convert to cups and multiply by 8
2. Regardless of given capacity (pt, qt, or g), counsel students to always convert to cups using their CAPACITY CONVERTERS knowledge. After they have converted to cups they will multiply by 8 to determine the number of fluid ounces.



Individuals



Have the students recite their eights tables up to 64 (the half-gallon). For more of a challenge, have the students go to 96 or 128 with their eights tables.

Acknowledge that ounces are also measurements for weight, but they are different from the capacity studied here.

DAILY DIRECTIONS

DAY 4 (Grade 5)



Stress to students that when converting to fluid ounces or from fluid ounces, the number to remember is 8.



At this grade level it may be advantageous to make all numbers divisible by 8.

- Using the top half of the CONVERTING TO AND FROM FLUID OUNCES display copy, show and explain the following examples:

Capacity	Convert to Cups	Multiply by 8	Fluid Ounces
3 c	3 c	3×8	24 fl oz
2 pt	$2 \text{ pt} = 4 \text{ c}$	4×8	32 fl oz
3 qt	$3 \text{ qt} = 12 \text{ c}$	12×8	96 fl oz
1 g	$1 \text{ g} = 16 \text{ c}$	16×8	128 fl oz

- Continue to do and give as many conversion problems as needed. Ask for students to call out capacities and solve the problems as a class.

Converting Fluid Ounces to Other Capacities

- When converting fluid ounces to a standard capacity, students follow this simple process:

Divide the total of fluid ounces by 8

- Dividing the total will give the students the number of cups. They can then convert the number of cups to the appropriate capacity of pints, quarts, or gallons.
- Using the bottom half of the CONVERTING TO AND FROM FLUID OUNCES display copy, show and explain the following examples:

Fluid Ounces	Divide by 8	# of Cups	Convert to
16	$16 \div 8$	2	2 c = 1 pt
64	$64 \div 8$	8	8 c = 2 qt
96	$96 \div 8$	12	12 c = 3 qt
40	$40 \div 8$	5	5 c
(5 c = 1 qt + 1 c)			

- Continue to do and give as many conversion problems as needed. Ask for students to call out fluid ounces and solve the problems as a class.
- Distribute the WRITING ASSIGNMENT AND RUBRIC. Discuss the rubric expectations, then allow the remaining time for students to complete or assign as homework to be ready by the next class.

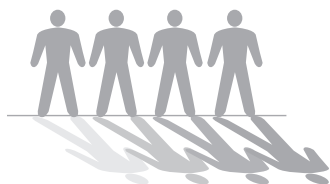
WRITING ASSIGNMENT Answer Key
Grade 5

1. Look for a clear explanation of using the torso, limbs, and fingers to compute 26 cups.
 $1 \text{ g} = 16 \text{ c}$
 $2 \text{ qt} = 8 \text{ c}$
 $1 \text{ pt} = 2 \text{ c}$
 $16 + 8 + 2 = 26 \text{ c}$
2. 208 fl oz. Require that students detail their work.
 $1 \text{ g} = 16 \text{ c}$ $16 \times 8 = 128 \text{ fl oz}$
 $2 \text{ qt} = 8 \text{ c}$ $8 \times 8 = 64 \text{ fl oz}$
 $1 \text{ pt} = 2 \text{ c}$ $2 \times 8 = 16 \text{ fl oz.}$
 $128 + 64 + 16 = 208 \text{ fl oz.}$
3. The smallest number of containers is:
5 gallon containers, 1 quart container, 1 pint container, and 1 cup container.
Require that students detail their work.
 $696 \text{ fl oz} \div 8 = 87 \text{ c}$
 $87 \text{ c} \div 16 = 5 \text{ g} + 7 \text{ c}$
 $7 \text{ c} \div 4 \text{ c} = 1 \text{ qt} + 3 \text{ c}$
 $3 \text{ c} \div 2 \text{ c} = 1 \text{ pt} + 1 \text{ c}$



DAILY DIRECTIONS

DAY 4 (Grades 2, 3, and 4)



*Individuals
Cooperative groups of four*

Day 4 Day 5 for Grade 5

Objectives

- Written assessment
- Students apply learning

Materials

- POSTTEST — *class set*
- CERTIFICATES — *as needed*
- Containers (cup, pint, quart, and gallon) — *one set per team*

Popcorn Party

- Napkins — *class set + extras*
- Pitchers or containers for drink mix — *several*
- Plastic cups — *enough for students*
- Popcorn — *enough for students*
- Powdered drink mix — *several envelopes (assorted flavors)*
- Scratch paper — *one piece per team*
- Spoon — *one or more (for mixing drink mix)*
- Sugar — *several cups*

Procedure

1. Administer the POSTTEST.

POSTTEST Answer Key

Grades 2, 3, and 4

1. 12 qt = 3 g
2. 1 g = 4 qt
3. 8 c = 4 pt
4. 32 c = 2 g
5. 1 g = 8 pt
6. 6 pt = 3 qt
7. 2 g = 8 qt
8. 4 c = 2 pt
9. 1 qt = 2 pt
10. 3 pt = 6 c
11. 3 qt = 12 c
12. 8 pt = 4 qt
13. 1 pt = 2 c
14. 8 qt = 2 g
15. 3 qt = 6 pt
16. 6 c = 3 pt
17. 1 g = 16 c
18. 4 pt = 2 qt
19. 16 pt = 2 g
20. 1 qt = 4 c
21. Which unit would be best for measuring the capacity of water in a bathtub? Gallon. Explain your answer. Look for clear reasoning in the written response.
22. You should drink about 8 cups of water each day to help you stay healthy. How many pints is that? 4 pints. How many quarts? 2 quarts
23. Suppose that you want to take 10 cups of water to a soccer game. What is the least number of filled containers you can take? Accept two quart containers + one pint container. Explain your answer. Look for clear reasoning in the written response.



DAILY DIRECTIONS

DAY 4 (Grades 2, 3, and 4)

24. John needs to fill his dog's bathtub. What size container should he use? Gallon jug. Explain your answer here or on the back. Look for clear reasoning in the written response.
25. Each goldfish in a fish bowl needs about 1 gallon of water to live. How many fish could live in a fish bowl that holds 32 cups of water? Two fish. Explain your answer. Look for clear reasoning in the written response.

Grade 5

- | | |
|--------------------|---------------------|
| 1. 12 qt = 3 g | 13. 3 qt = 12 c |
| 2. 1 g = 4 qt | 14. 3 pt = 48 fl oz |
| 3. 8 c = 4 pt | 15. 1 pt = 2 c |
| 4. 32 c = 2 g | 16. 8 qt = 2 g |
| 5. 2 qt = 64 fl oz | 17. 1/2 g = 4 pt |
| 6. 6 pt = 3 qt | 18. 6 c = 3 pt |
| 7. 2 g = 8 qt | 19. 56 fl oz = 7 c |
| 8. 4 c = 2 pt | 20. 4 pt = 2 qt |
| 9. 1 qt = 2 pt | 21. 16 pt = 2 g |
| 10. 3 pt = 6 c | 22. 1 qt = 4 c |
| 11. 24 fl oz = 3 c | 23. 8 c = 1/2 g |
| 12. 8 pt = 4 qt | 24. 1 g = 8 pt |

Popcorn Party

Preparation

Study the sample procedural guideline below—alter as desired. See **Setup Directions #11, Incentives and Reward** on page 7 for more information.

1. Determine (without telling students) how much drink and popcorn you will allot for each student (e.g., 2 cups of drink and 3 cups of popcorn).
2. Buy just enough, a little more, or a little less drink mix and popcorn.
3. You may choose to have one-quart or two-quart containers available for measuring the popcorn.

Procedure

1. Say or tell:
“As you know, you will often use what you have learned about capacity measurement in your everyday life. In fact, before starting this popcorn party, we have to solve this capacity problem.”



DAILY DIRECTIONS

DAY 4 (Grades 2, 3, and 4)



I bought _____ packages of drink mix and _____ large bags of popcorn. Did I buy enough to give each of you 2 cups of drink and 3 cups of popcorn? If I bought too little, how much can I serve? If I bought more, how much may I serve?

In your groups, plan a strategy and solve this problem. Before you start, what information do you need to know to solve this problem? Be sure to label your answers.”

2. Encourage students to ask questions. Lead a class discussion of problem solving.
 - a. Students will ask questions such as, “How much does each package of drink make?” or “How many cups of popcorn is in that bag?”
 - b. Write the information on the chalkboard so that all teams have the same basic information to develop their strategy and solve the problem.
3. When all teams have submitted their answers, discuss.
 - a. If teams made errors, discuss them.
 - b. If you have bought too little or too much, readjust the amounts.
 - c. Write the total amount of available drinks and popcorn on the board. After the party, teams will compute how much their team and the class actually ate and drank.
4. Direct Measurement Teams to make one package of drink mix by following the directions on the package.
5. Create two areas, one for distributing popcorn and one for drinks.
6. Distribute the popcorn and drinks.
7. Measure any amount that remains to determine how much your class ate and drank. (Ignore amounts that were thrown away.)



Tell students that the class will use the information to determine how much each team drank and ate, and how much their entire class drank and ate.

To avoid long lines and possible accidents, you may choose to set up four distribution sections for drinks and popcorn, OR you may assign students to act as wait-staff and serve popcorn and drinks.

Stress that the teams are not in a contest to see how much they can drink and eat. Explain to students that we are going to keep track of how much popcorn is being eaten according to cups, pints, quarts, and gallons for learning purposes.

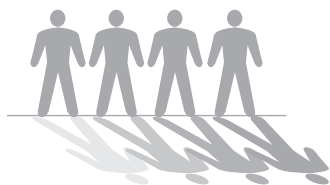
DAILY DIRECTIONS

DAY 4 (Grades 2, 3, and 4)

8. Additional sample questions to ask individuals, teams, and/or the whole class:
 - a. How many cups of drink did you drink and how many cups of popcorn did you eat?
 - b. How many pints of drink did you drink and how many pints of popcorn did you eat?
 - c. Was there a cup left over?
 - d. How many quarts of drink did you drink and how many quarts of popcorn did you eat?
 - e. Was there a pint or cup left over?
 - f. How many gallons of drink did you drink and how many gallons of popcorn did you eat?
 - g. Was there a cup, pint, or quart left over?
9. Distribute individual and team CAPACITY CONVERTERS award and participation certificates.



EXTENSIONS



Two groups



Pairing students of similar ability across from each other will make for a better individual match and a better game.



Student pairs

If the whole class will play at the same time, provide one set of CAPACITY CONVERTER FLASH CARDS for every two students.

CAPACITY BEE

Materials

CAPACITY CONVERTERS FLASH CARDS — *one set*

Procedure

1. Divide your class into two groups and have them line up on opposite sides of the room—just like a Spelling Bee.
2. As the teacher and facilitator, flash a CAPACITY CONVERTER FLASH CARD for the two students at the front of each line.
 - a. The student that responds with the correct answer first scores a point for his/her team.
 - b. Allow only one response per student—this controls random guessing.
 - c. Upon completion of that problem, those two students go to the end of their line and the next two students step up.
 - d. Give these two students a new flash card problem.
 - e. Continue this process. The first team to reach 10 points wins.

CAPACITY WAR

This game requires very little explanation. It is a convenient, yet effective game for two students during math time, center time, or free time. The rules are the same as for the game of War played with a regular deck of cards.

Materials

- CAPACITY CONVERTERS FLASH CARDS — *one set per pair of students*

Procedure

1. One of the two students playing shuffles the FLASH CARDS and deals them all out face down.
2. With each student having a pile in front of him or her, they both flip their top card over.
3. The student with the highest capacity wins those two cards and puts them at the bottom of his/her pile.
4. If the two FLASH CARDS are equal in capacity, it is *Capacity War*.
 - a. Each student lays three FLASH CARDS face down.
 - b. One of the students says, “First,” “Second,” or “Third.”
 - c. Whichever one is said, both students flip that card over.
 - d. The one that is the highest wins all eight cards.
 - e. The object of the game is to get all the FLASH CARDS.

STUDY TRIP

If you sent out the PARENT LETTER requesting packages from home, students do not need to participate in this study trip. Both activities teach how food products are packaged. (For more information see **Setup Directions #6, Preparing Materials** on page 4.)

Materials

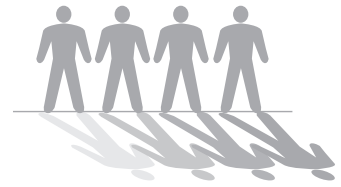
- MERCHANT LETTER — *as needed*
- PARENT PERMISSION LETTER — *class set*
- STUDY TRIP WORKSHEET — *class set*
- Pencils — *class set*

Setup

1. Make arrangements to take your students to a local grocery store(s) to practice finding, identifying, and recording products that are packaged in cup, pint, quart, and gallon containers. (See **Setup Directions #10, Study Trip** on page 6.)

Procedure

1. You can have students do this activity individually, with partners, as Expert Groups, or with their Measurement Teams. How you choose to do it will probably depend on your students' ability to do the task at hand, how many volunteers you have along to watch students, as well as how many stores agree.
2. Explain to the students that the goal of the study trip is to gather experience in a real-world situation using the skills they have been studying.
3. Distribute a STUDY TRIP WORKSHEET to each student. Point out that the worksheet has four sections—cups, pints, quarts, and gallons.
 - a. Their assignment is to find and record as many products as possible that are packaged in cup, pint, quart, and gallon containers.
 - b. They write the name of the product and the capacity labeled on the product on their STUDY TRIP WORKSHEET.
4. Remind the students that they will be completing their STUDY TRIP WORKSHEETS in a real business. Clearly spell out for students your behavioral expectations.



Individuals, Student pairs, or Cooperative groups of four



Take extra STUDY TRIP WORKSHEETS along in case a student loses his/hers or if a student simply needs another one.

EXTENSIONS

5. Remember, your students have been working with standard cup, pint, quart, and gallon containers in the classroom. You may need to explain that the products in the store will come in many different shapes. Also, many products are not packaged in exactly one cup, one pint, one quart, or one gallon containers. Example: a product may be packaged as 2.5 pints.
6. This real-world experience is an excellent opportunity to invite the local newspaper or television station to publicize the achievements of your students.
7. When you return to your classroom encourage your students to orally share their recorded information. Compile a post-trip list of products that were packaged in cup, pint, quart, half-gallon, and gallon containers.
8. Have students write thank you letters to the business(es). In addition, you and your students may write thank you letters to parent volunteers.



Cooperative Group Work Rubric

Name _____

4 — *Exemplary*

You *consistently* and *actively* helped your team achieve its goals by communicating well with other team members, by encouraging the team to work together, and by *willingly* accepting and completing necessary work.

3 — *Expected*

You *usually* helped your team achieve its goals by communicating with other team members, by encouraging your team to work together, and accepting and completing necessary work.

If your evaluation is less than *Expected*, try to use your cooperating skills more consistently.

2 — *Nearly There*

You *sometimes* helped your team achieve its goals.

1 — *Incomplete*

You *did very little* to help your team achieve its goals.

Cooperative Group Work Rubric

Name _____

4 — *Exemplary*

You *consistently* and *actively* helped your team achieve its goals by communicating well with other team members, by encouraging the team to work together, and by *willingly* accepting and completing necessary work.

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You *usually* helped your team achieve its goals by communicating with other team members, by encouraging your team to work together, and accepting and completing necessary work.

If your evaluation is less than *Expected*, try to use your cooperating skills more consistently.

2 — *Nearly There*

You *sometimes* helped your team achieve its goals.

1 — *Incomplete*

You *did very little* to help your team achieve its goals.



PARENT LETTER

Date:

Dear Parents,

Our class will soon start a unit studying capacity—specifically cups, pints, quarts, and gallons. Besides being able to identify each unit and learning their abbreviations, we will also learn a neat “trick” on how to convert from one unit of capacity to another. Our study unit is called **CAPACITY CONVERTERS**. Have your child show you the “trick.” It is really neat!

This letter is not only to inform you about what we will study, but also to ask a favor. If your family finishes a food product that is measured in cups, pints, quarts, or gallons, and is labeled that way on the container, please rinse it out thoroughly and send it to school with your child. Our goal is to see how many different products we can find that use these four measurements. There is no need to send more than one of the same container.

CAPACITY CONVERTERS will help your child gain awareness and understanding that products are packaged in many shapes, sizes, and capacities.

Thank you for your help.

Sincerely,

CAPACITY CONVERTERS FLASH CARDS
(BACK)



**CAPACITY
CONVERTERS**

**CAPACITY
CONVERTERS**

**CAPACITY
CONVERTERS**

**CAPACITY
CONVERTERS**

**CAPACITY
CONVERTERS**

**CAPACITY
CONVERTERS**

**CAPACITY
CONVERTERS**

**CAPACITY
CONVERTERS**



CAPACITY CONVERTERS FLASH CARDS (FACE)

1 pt = _____ c

6 c = _____ pt

1 g = _____ qt

8 pt = _____ qt

1 qt = _____ pt

12 qt = _____ g

1 qt = _____ c

3 pt = _____ c

CAPACITY CONVERTERS FLASH CARDS

(FACE)



1 g = _____ pt

3 qt = _____ pt

1 g = _____ c

3 qt = _____ c

2 g = _____ qt

6 pt = _____ qt

4 c = _____ pt

8 c = _____ pt



CAPACITY CONVERTERS FLASH CARDS (FACE)

4 pt = _____ qt

16 pt = _____ g

32 c = _____ g

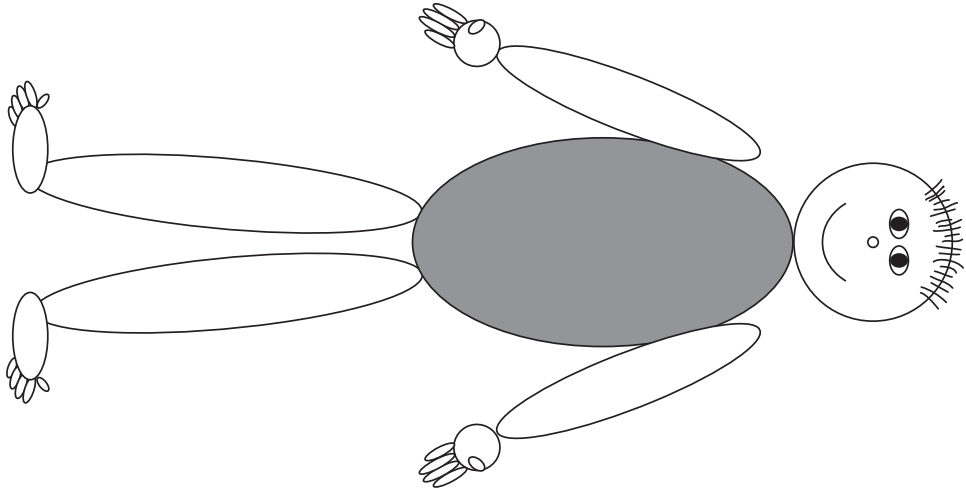
8 qt = _____ g

CONVERSION KID (PAGE 1)



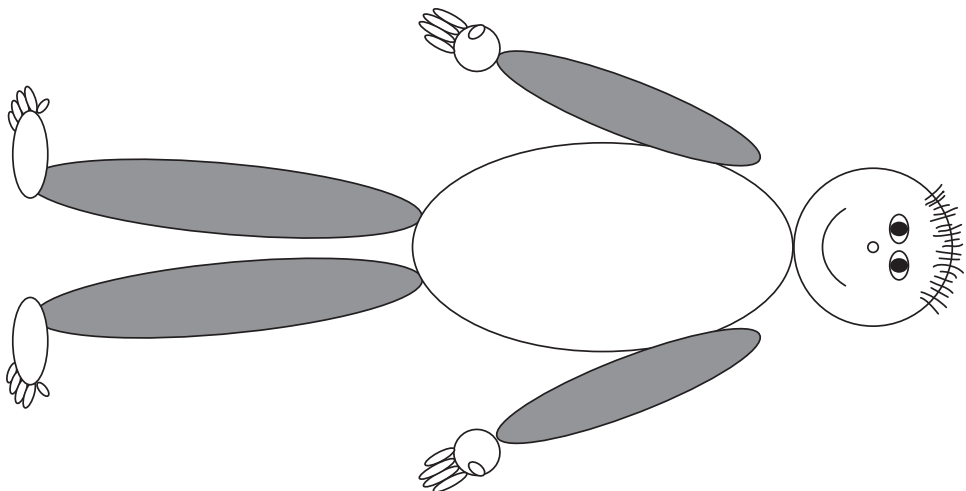
Gallon

Pretend that your body is 1 gallon.



Quarts

*Your body (1 gallon) can be split into 4 quarts (your limbs).
1 gallon = 4 quarts*



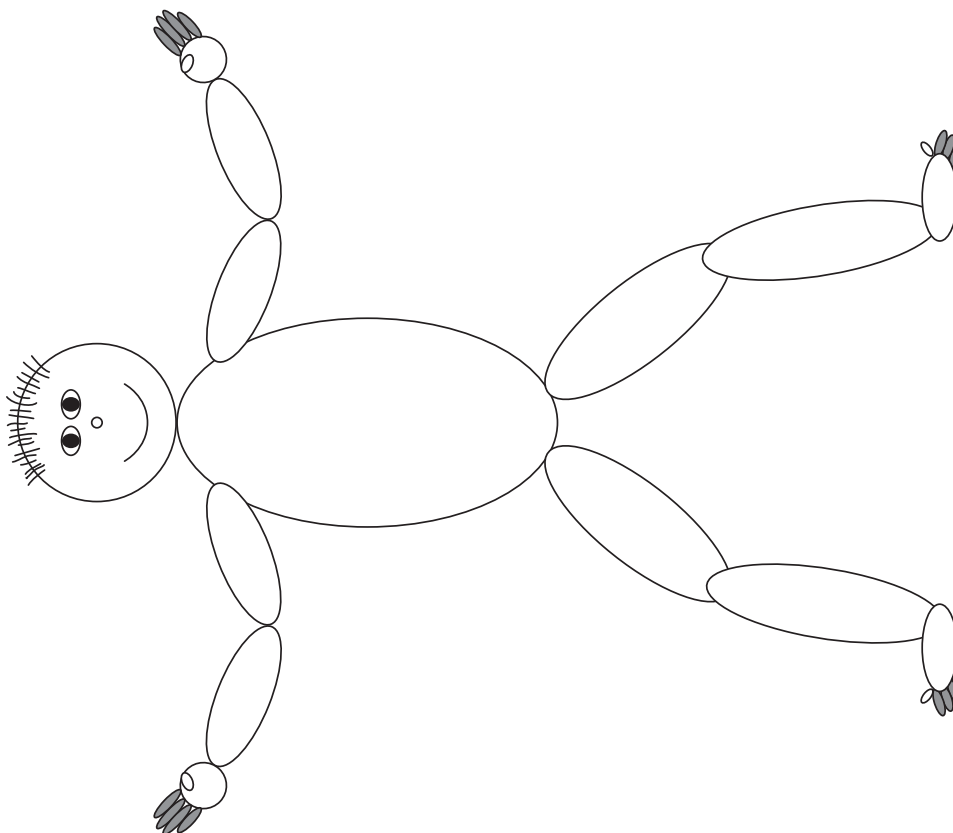
Note: There are 4 quarts in 1 gallon.



CONVERSION KID (PAGE 2)

Cups

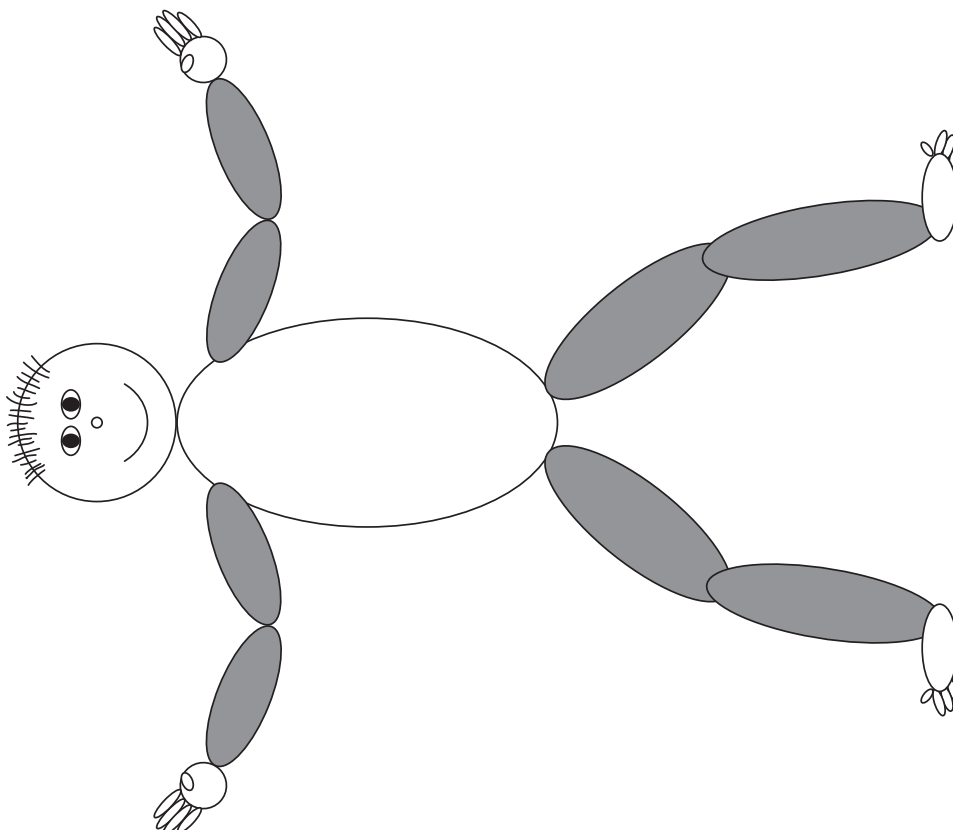
*Each hand or foot can be split into 4 cups
(Do not use your thumbs or big toes.)
1 quart or 2 pints = 4 cups*



Note: There are 16 cups in 1 gallon.

Pints

*Each quart (limb) can be split into 2 pints.
1 quart = 2 pints*



Note: There are 8 pints in 1 gallon.

PRETEST



Name: _____

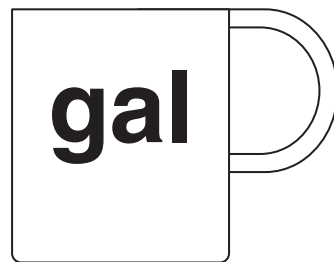
Write a short paragraph describing what you know about cups, pints, quarts, and gallons.

Name: _____

Write a short paragraph describing what you know about cups, pints, quarts, and gallons.



CUPS EXPERT BASIC KNOWLEDGE OF CUPS



Name: _____

Work with your Cups Expert Group. Use your set of containers (cup, pint, quart, and gallon).

Investigate and solve the following basic questions about cups.

Draw and write your answer.

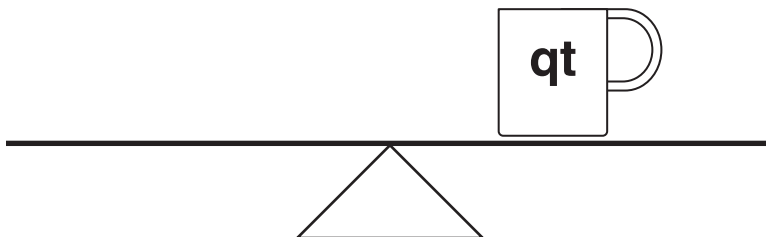
A. How many cups equal 1 pint?

_____ cups = 1 pint



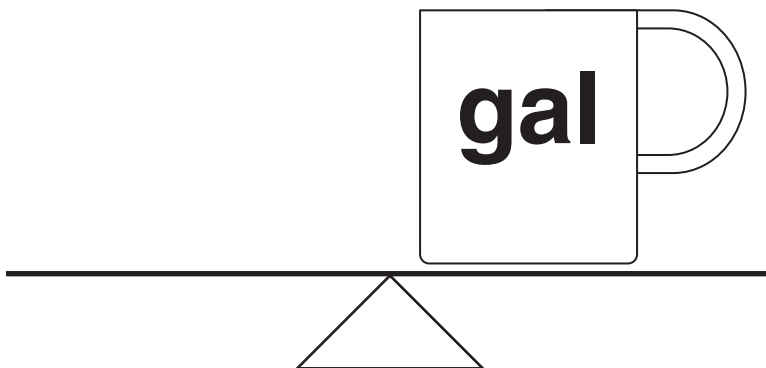
B. How many cups equal 1 quart?

_____ cups = 1 quart



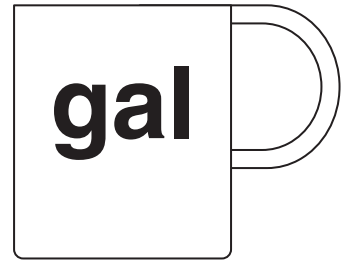
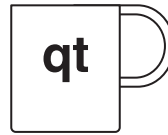
C. How many cups equal 1 gallon?

_____ cups = 1 gallon



PINTS EXPERT

BASIC KNOWLEDGE OF PINTS



Name: _____

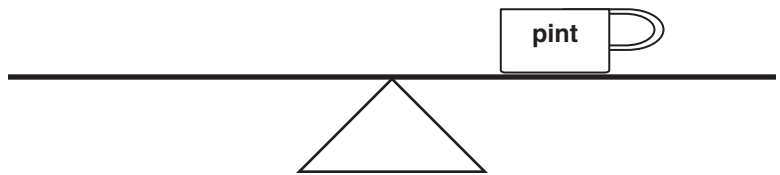
Work with your Pints Expert Group. Use your set of containers (cup, pint, quart, and gallon).

Investigate and solve the following basic questions about pints.

Draw and write your answer.

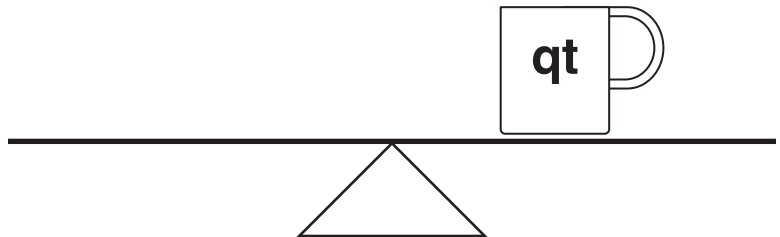
A. How many cups equal 1 pint?

_____ cups = 1 pint



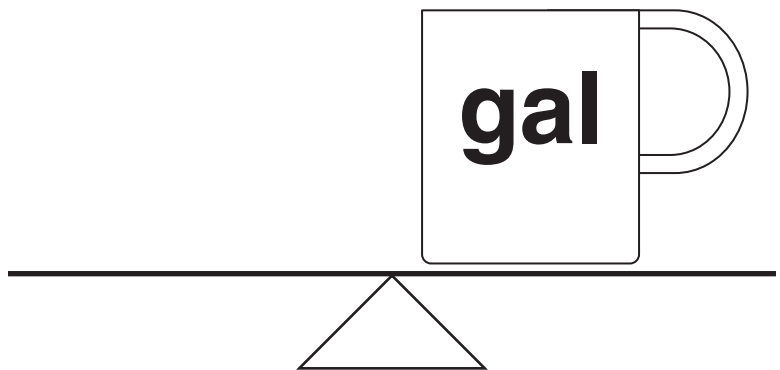
B. How many pints equal 1 quart?

_____ pints = 1 quart



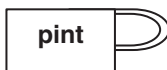
C. How many pints equal 1 gallon?

_____ pints = 1 gallon





QUARTS EXPERT BASIC KNOWLEDGE OF QUARTS



Name: _____

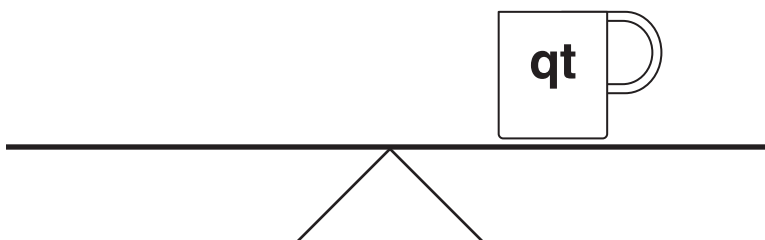
Work with your Quarts Expert Group. Use your set of containers (cup, pint, quart, and gallon).

Investigate and solve the following basic questions about quarts.

Draw and write your answer.

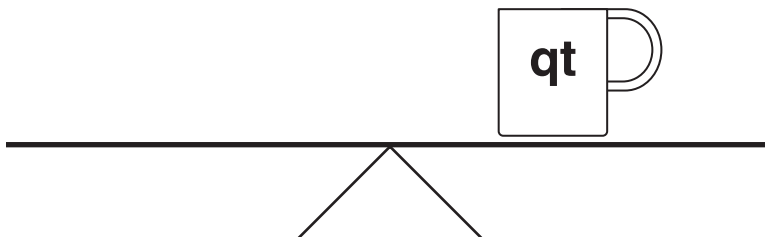
A. How many cups equal 1 quart?

_____ cups = 1 quart



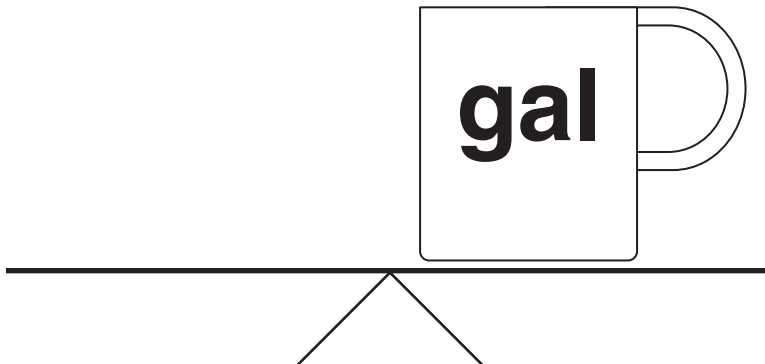
B. How many pints equal 1 quart?

_____ pints = 1 quart



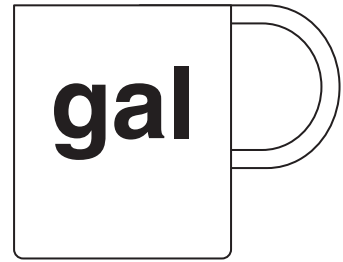
C. How many quarts equal 1 gallon?

_____ quarts = 1 gallon



GALLONS EXPERT

BASIC KNOWLEDGE OF GALLONS



Name: _____

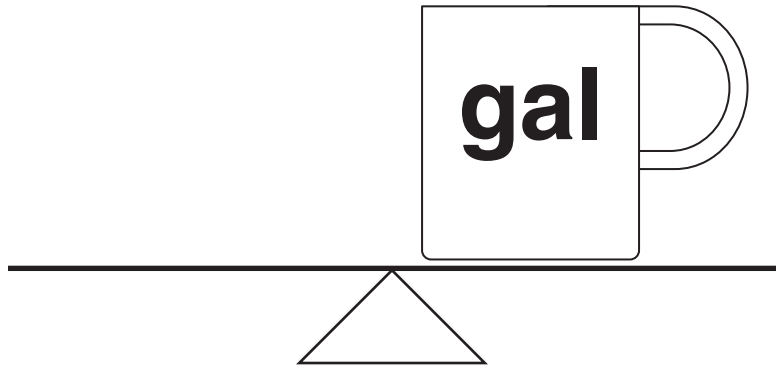
Work with your Gallons Expert Group. Use your set of containers (cup, pint, quart, and gallon).

Investigate and solve the following basic questions about gallons.

Draw and write your answer.

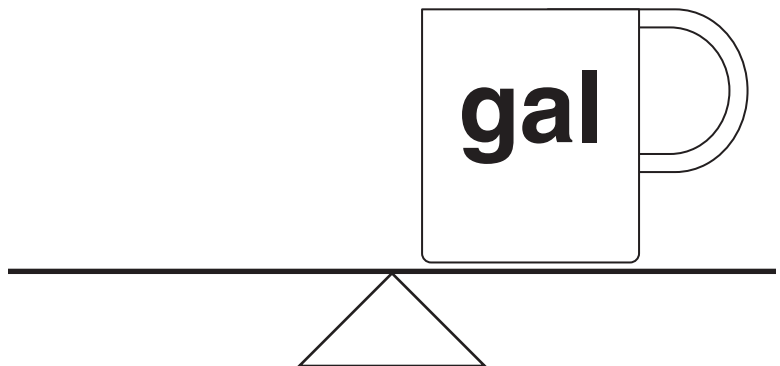
A. How many cups equal 1 gallon?

_____ cups = 1 gallon



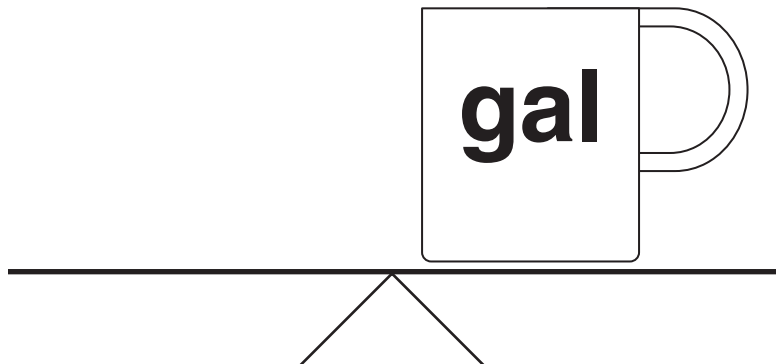
B. How many pints equal 1 gallon?

_____ pints = 1 gallon



C. How many quarts equal 1 gallon?

_____ quarts = 1 gallon





TEAM INVESTIGATIONS

CONVERTING CUPS, PINTS, QUARTS, AND GALLONS

Team Name: _____

Work with your Measurement Team. Investigate and solve the following problems.

Use your set of containers to check for accuracy. Write answers on the back.

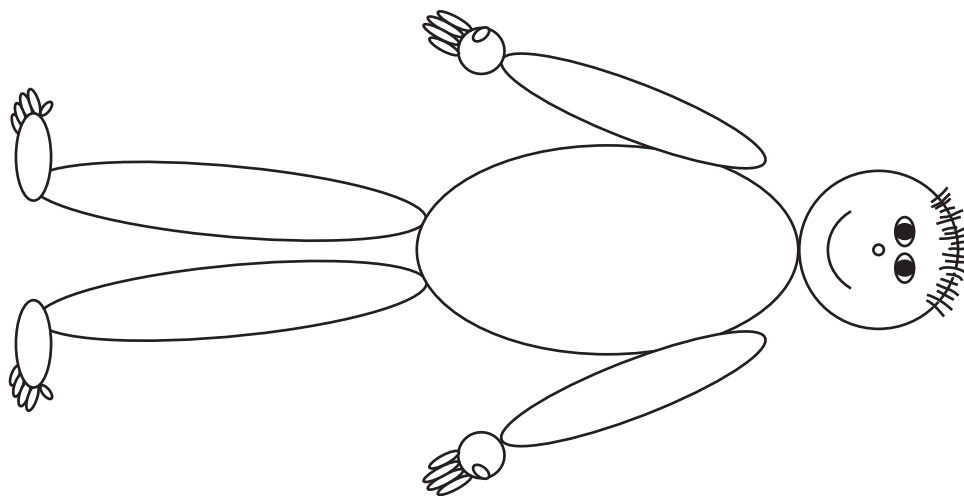
- | | |
|--------------------|---------------------|
| 1. 1 pt = _____ c | 11. 6 c = _____ pt |
| 2. 1 g = _____ qt | 12. 8 pt = _____ qt |
| 3. 1 qt = _____ pt | 13. 12 qt = _____ g |
| 4. 1 qt = _____ c | 14. 3 pt = _____ c |
| 5. 1 g = _____ pt | 15. 2 qt = _____ pt |
| 6. 1 g = _____ c | 16. 3 qt = _____ c |
| 7. 2 g = _____ qt | 17. 6 pt = _____ qt |
| 8. 4 c = _____ pt | 18. 8 c = _____ pt |
| 9. 4 pt = _____ qt | 19. 16 pt = _____ g |
| 10. 8 qt = _____ g | 20. 32 c = _____ g |
21. How many ways can you describe the capacity of a 2-gallon jug? List as many as you can. Use many different units of measure.
22. Mr. Schroeder told Becky to bring at least 2 quarts of juice for the party. Becky brought 5 pints of juice. Did she bring enough? Explain.
23. Susan was using a measuring cup to fill a gallon jug with water. The jug is 3 quarts full. How many more cups does Susan have to pour? Explain how you know your answer.

COLOR THE KID

(PAGE 1)

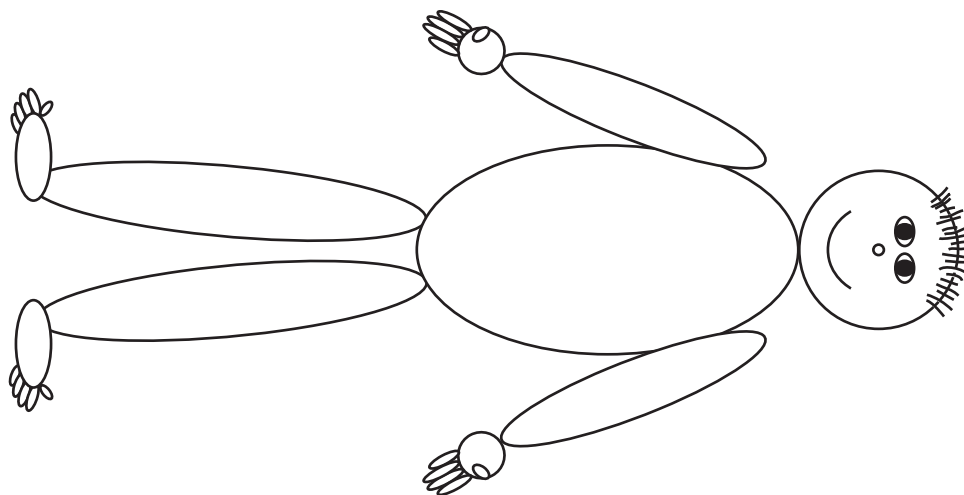


Color blue the part of the picture that represents 1 gallon.



Name: _____

Color blue the part of the picture that represents 4 quarts.

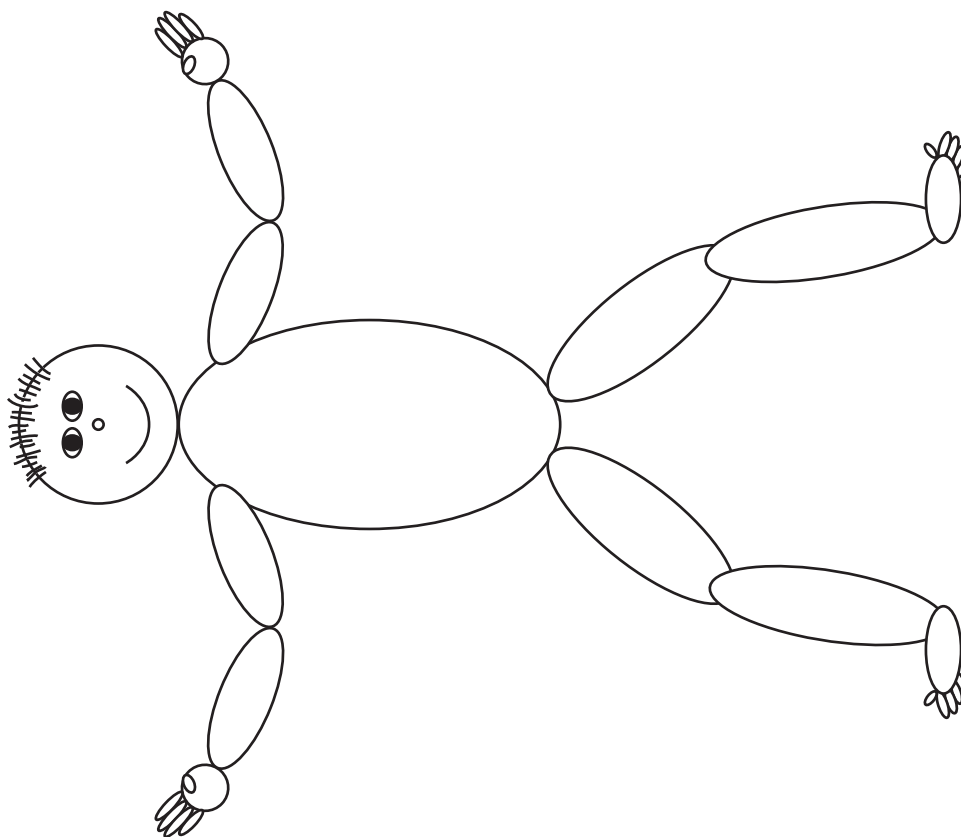




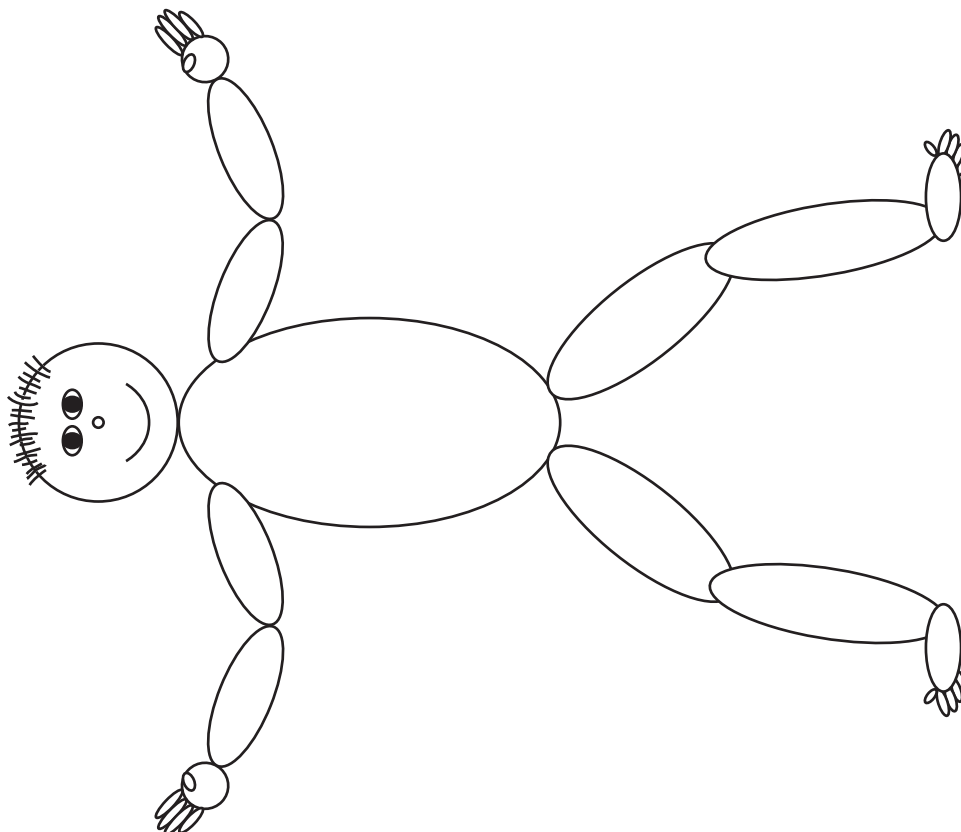
COLOR THE KID (PAGE 2)

Name: _____

Color blue the part of the picture that represents 16 cups.



Color blue the part of the picture that represents 8 pints.



WRITING ASSIGNMENT

(GRADES 2, 3, and 4)



Explain in detail how you would solve this problem using your body. Write your answer on a separate sheet of paper.

1. How many cups equal 1 gallon, 2 quarts, and 1 pint?

WRITING ASSIGNMENT RUBRIC

Preparation, organization, and detail

4 — *Exemplary*

- Your writing provided an **excellent explanation** of how to make capacity conversions.
- The information was **very well organized**, and you provided **more information** than expected.
- You **consistently provided** detailed descriptions.

3 — *Expected*

- Your writing provided an **accurate and appropriate explanation** of how to make capacity conversions in an **organized** manner.
- You **provided some** detailed descriptions.

2 — *Nearly There*

- Your writing provided only **some information** of how to make capacity conversions in and/or was **somewhat disorganized**.
- You **seldom provided** detailed descriptions.

1 — *Incomplete*

- Your writing offered **too little information** or was **disorganized**.



CONVERTING TO AND FROM FLUID OUNCES

Fact to remember:

$$8 \text{ fl oz} = 1 \text{ c}$$

Converting cups, pints, quarts, or gallons to fluid ounces

Capacity	Convert to Cups	Multiply by 8	Fluid Ounces
3 c	3 c	3×8	24 fl oz
2 pt	$2 \text{ pt} = 4 \text{ c}$	4×8	32 fl oz
3 qt	$3 \text{ qt} = 12 \text{ c}$	12×8	96 fl oz
1 g	$1 \text{ g} = 16 \text{ c}$	16×8	128 fl oz

Converting fluid ounces to cups, pints, quarts, or gallons

Fluid Ounces	Divide by 8	# of Cups	Convert to Capacity
16	$16 \div 8$	2	$2 \text{ c} = 1 \text{ pt}$
64	$64 \div 8$	8	$8 \text{ c} = 2 \text{ qt}$
96	$96 \div 8$	12	$12 \text{ c} = 3 \text{ qt}$
40	$40 \div 8$	5	5 c
			$(5 \text{ c} = 1 \text{ qt} + 1 \text{ c})$

WRITING ASSIGNMENT

(GRADE 5)



Explain in detail how you would solve this problem using your body. Write your answer on a separate sheet of paper.

1. How many cups equal 1 gallon, 2 quarts, and 1 pint?

Explain in detail how you would make conversions to and from fluid ounces for the following capacities.

2. How many fluid ounces are in one gallon, two quarts, and one pint?
3. How many gallons, quarts, pints, and cups equal 696 fluid ounces? Determine the smallest number of each capacity container to hold that much liquid.

WRITING ASSIGNMENT RUBRIC

Preparation, organization, and detail

4 — Exemplary

- Your writing provided an **excellent explanation** of how to make capacity conversions.
- The information was **very well organized**, and you provided **more information** than expected.
- You **consistently provided** detailed descriptions.

3 — Expected

- Your writing provided an **accurate and appropriate explanation** of how to make capacity conversions in an **organized** manner.
- You **provided some** detailed descriptions.

2 — Nearly There

- Your writing provided only **some information** of how to make capacity conversions in and/or was **somewhat disorganized**.
- You **seldom provided** detailed descriptions.

1 — Incomplete

- Your writing offered **too little information** or was **disorganized**.



CUP ICON



POSTTEST

(GRADES 2, 3, AND 4)



CONVERTING CUPS, PINTS, QUARTS, AND GALLONS

Name: _____

Fill in the blanks.

1. 12 qt = _____ g

11. 3 qt = _____ c

2. 1 g = _____ qt

12. 8 pt = _____ qt

3. 8 c = _____ pt

13. 1 pt = _____ c

4. 32 c = _____ g

14. 8 qt = _____ g

5. 1 g = _____ pt

15. 3 qt = _____ pt

6. 6 pt = _____ qt

16. 6 c = _____ pt

7. 2 g = _____ qt

17. 1 g = _____ c

8. 4 c = _____ pt

18. 4 pt = _____ qt

9. 1 qt = _____ pt

19. 16 pt = _____ g

10. 3 pt = _____ c

20. 1 qt = _____ c



POSTTEST (GRADES 2, 3, AND 4)

21. Which unit would be best for measuring the capacity of water in a bathtub?

Explain your answer. _____

22. You should drink about 8 cups of water each day to help you stay healthy.

How many pints is that? _____ How many quarts? _____

23. Suppose that you want to take 10 cups of water to a soccer game. What is the least number of filled containers you can take?

Explain your answer. _____

24. John needs to fill his dog's bathtub. What size container should he use?

_____ Explain your answer here or on the back.

25. Each goldfish in a fish bowl needs about 1 gallon of water to live. How many fish could live in a fish bowl that holds 32 cups of water? _____

Explain your answer. _____

POSTTEST (GRADE 5)



CONVERTING CUPS, PINTS, QUARTS, AND GALLONS

Name: _____

Fill in the blanks.

- | | |
|------------------------|------------------------|
| 1. 12 qt = _____ g | 13. 3 qt = _____ c |
| 2. 1 g = _____ qt | 14. 3 pt = _____ fl oz |
| 3. 8 c = _____ pt | 15. 1 pt = _____ c |
| 4. 32 c = _____ g | 16. 8 qt = _____ g |
| 5. 2 qt = _____ fl oz | 17. 1/2 g = _____ pt |
| 6. 6 pt = _____ qt | 18. 6 c = _____ pt |
| 7. 2 g = _____ qt | 19. 56 fl oz = _____ c |
| 8. 4 c = _____ pt | 20. 4 pt = _____ qt |
| 9. 1 qt = _____ pt | 21. 16 pt = _____ g |
| 10. 3 pt = _____ c | 22. 1 qt = _____ c |
| 11. 24 fl oz = _____ c | 23. 8 c = _____ g |
| 12. 8 pt = _____ qt | 24. 1 gal = _____ pt |



POSTTEST (GRADE 5)

25. Which unit would be best for measuring the capacity of water in a bathtub?

Explain your answer. _____

26. You should drink about 8 cups of water each day to help you stay healthy.

How many pints is that? _____ How many quarts? _____

27. Suppose that you want to take 10 cups of water to a soccer game. What is the least number of filled containers you can take?

Explain your answer. _____

28. John needs to fill his dog's bathtub. What size container should he use?

_____ Explain your answer here or on the back.

29. Each goldfish in a fish bowl needs about 1 gallon of water to live. How many fish could live in a fish bowl that hold 256 ounces of water? _____

Explain your answer. _____



CAPACITY CONVERTERS

Converting Cups, Pints, Quarts, and Gallons

Champion Capacity Converters Team
90% or better on POSTTEST

Team Members:

Date

Instructor



CERTIFICATES

CAPACITY CONVERTERS

Converting Cups, Pints, Quarts, and Gallons

Master Converter
90% or better on POSTTEST

Date

Instructor



CAPACITY CONVERTERS

Converting Cups, Pints, Quarts, and Gallons

Participated and completed Capacity Converters unit
while working well with others

Date

Instructor



MERCHANT LETTER

Dear Merchant,

Hello. My name is _____.

I teach _____ at _____.

Our class is learning about different capacities—including cups, pints, quarts, and gallons. Students are learning how to recognize and convert capacities by studying everyday items. At the conclusion of our measurement unit we would like students to take a 30–40 minute study trip to a local store to locate and identify different capacities of packages. The study trip will allow students to apply classroom lessons to the real world.

Would you be willing to host some of our students for such a study trip? On the visit a few students, accompanied by a parent volunteer, will survey merchandise in your store. They will search for and record products that are packaged in cup, pint, quart, or gallon containers. After they return to the classroom they will share what they learned with the rest of the class.

I plan to contact the local newspaper and invite them to photograph and interview the students during and/or after their study trip. We request your permission to include your place of business in this potential interview situation. The students will be thrilled to have their efforts recognized by the local media. Also, the community should know that your business actively encourages our students to expand their horizons and apply their learning.

Please consider participating in this school/community venture. I will contact you within the next two weeks for your decision. I hope that your place of business can accommodate our learning experience. Thank you for your consideration of our request.

Sincerely,

MERCHANT LETTER



Dear Parents,

Our classroom is participating in a CAPACITY CONVERTERS interaction unit that teaches students to identify cup, pint, quart, and gallon containers, as well as, make conversions from one unit of capacity to another.

On _____ students from our class will participate in a short study trip to one of several local businesses. The students will locate, identify, and record products that are packaged in cup, pint, quart, and gallon containers. We will visit these stores:

_____.

We will go by _____ (transportation or walking).

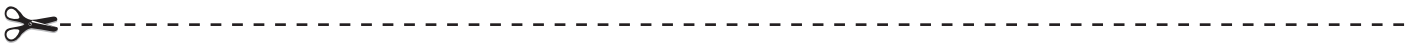
The study trip will begin at _____. We will return to school by _____.

Please sign the permission slip below. Your child will not be allowed to participate in the study trip without a signed permission slip. If you have any questions, please let me know.

Cut on the dotted line and have your child return by _____.
Thank you for your support of this wonderful learning opportunity for your student.

Sincerely,

Your student's teacher



Permission for CAPACITY CONVERTERS Study Trip

My child _____ has permission to participate in the study trip to
local businesses on _____.

Parent signature

Date

In order to successfully complete this practical experience in the store, we need parent volunteers to supervise the students. Are you available to assist during the students' store experience?

I am able to help during this study trip.

Yes

No

Please call me at _____ with more details of the trip.



STUDY TRIP WORKSHEET
(GRADES 2, 3, and 4) PAGE 1

Find and record as many products as possible that are packaged in cup, pint, quart, and gallon containers. Write the name of the product and the capacity labeled on the product.

Packaged in Cups		Packaged in Pints	
Product	Capacity on Label	Product	Capacity on Label
1. _____	_____	1. _____	_____
2. _____	_____	2. _____	_____
3. _____	_____	3. _____	_____
4. _____	_____	4. _____	_____
5. _____	_____	5. _____	_____
6. _____	_____	6. _____	_____
7. _____	_____	7. _____	_____
8. _____	_____	8. _____	_____
9. _____	_____	9. _____	_____
10. _____	_____	10. _____	_____
11. _____	_____	11. _____	_____
12. _____	_____	12. _____	_____



STUDY TRIP WORKSHEET

(GRADES 2, 3, and 4) PAGE 2

Find and record as many products as possible that are packaged in cup, pint, quart, and gallon containers. Write the name of the product and the capacity labeled on the product.

Packaged in Quarts		Packaged in Gallons	
Product	Capacity on Label	Product	Capacity on Label
1. _____	_____	1. _____	_____
2. _____	_____	2. _____	_____
3. _____	_____	3. _____	_____
4. _____	_____	4. _____	_____
5. _____	_____	5. _____	_____
6. _____	_____	6. _____	_____
7. _____	_____	7. _____	_____
8. _____	_____	8. _____	_____
9. _____	_____	9. _____	_____
10. _____	_____	10. _____	_____
11. _____	_____	11. _____	_____
12. _____	_____	12. _____	_____



STUDY TRIP WORKSHEET

(GRADE 5) PAGE 1

Find and record as many products as possible that are packaged in cup, pint, quart, and gallon containers. Write the name of the product and the capacity labeled on the product.

Packaged in Cups or Fluid Ounces		Packaged in Pints or Fluid Ounces	
Product	Capacity on Label	Product	Capacity on Label
1. _____	_____	1. _____	_____
2. _____	_____	2. _____	_____
3. _____	_____	3. _____	_____
4. _____	_____	4. _____	_____
5. _____	_____	5. _____	_____
6. _____	_____	6. _____	_____
7. _____	_____	7. _____	_____
8. _____	_____	8. _____	_____
9. _____	_____	9. _____	_____
10. _____	_____	10. _____	_____
11. _____	_____	11. _____	_____
12. _____	_____	12. _____	_____



STUDY TRIP WORKSHEET

(GRADE 5) PAGE 2

Find and record as many products as possible that are packaged in cup, pint, quart, and gallon containers. Write the name of the product and the capacity labeled on the product.

Packaged in Quarts or Fluid Ounces		Packaged in Gallons or Fluid Ounces	
Product	Capacity on Label	Product	Capacity on Label
1. _____	_____	1. _____	_____
2. _____	_____	2. _____	_____
3. _____	_____	3. _____	_____
4. _____	_____	4. _____	_____
5. _____	_____	5. _____	_____
6. _____	_____	6. _____	_____
7. _____	_____	7. _____	_____
8. _____	_____	8. _____	_____
9. _____	_____	9. _____	_____
10. _____	_____	10. _____	_____
11. _____	_____	11. _____	_____
12. _____	_____	12. _____	_____

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E-mail: _____

Interact Unit: _____

Comments: _____

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Name of Student: _____ (print)

Age of Student: _____ (print)

Parent or Guardian: _____ (print)

Signature: _____ Date: _____

Address:

Phone: _____

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