Unit V: Percent

Teachers' Notes on Meaning Activities

Activity 1

The characteristics you use in this activity should depend on local conditions. As many as 20 yes-no characteristics can be collected.

Activity 2

After this activity is completed, you will have to provide students with ways to check the accuracy of their answers. Grid paper provides much structure for this activity.

Activity 3

Translating from fractions to decimals to percents should receive much emphasis. Many teachers believe students should memorize all the numbers on this page.

Activity 4

These questions centre on a coach and players making decisions about volleyball. Do coaches really use percentages? This activity should reinforce the idea that percentage is a pervasive concept.

Activity 5

Percent problems require careful reading. This activity focuses on reading and understanding. Students should solve these problems *after* they have made the picture.

Activity 6

Restating questions is a way for students to internalize the problem. After the restatement, students should solve the problems.

Activity 7

This activity requires sorting through data and reading carefully. The information in a simpler form might be as follows:

ski	hockey	ice-fishing	stove
50 percent off	30 percent off	20 percent off	regular price
$400	3 x $35 = $105	$700	$50

The teacher can provide some guidance but a rigid format should not be required.

Meaning Activity 1 Meaning of Percent

Teacher Sheet

Have students construct the following chart(s) in their notebooks:

Characteristic	1	2	3	4
Number with				
Number without				

Characteristic	1	2	3	4
Fraction with				
Fraction without				

Characteristic	1	2	3	4
Percent with				
Percent without				

Which chart gives you the best information? Some possible characteristics to chart are

1. Watch tv
2. Attend hockey games
3. Take a computer class
4. Play musical instruments
5. Plan on attending university
6. Eat bananas

According to these characteristics, are you a "usual" student? How do you decide this?

Meaning Activity 2 Meaning of Percent

1. Page 198 of *Journeys in Math* 8 has a drawing of a school marked out on a 10 x 10 grid. Percent is easy to calculate using this grid. Why? Be sure you understand this diagram. You are an architect responsible for designing a house floor plan with the following specifications. Use grid paper. (Your house needn't be square.)

Kitchen 12 percent
Living room 25 percent
Dining room 15 percent
Bathroom 10 percent
Bedroom A 13 percent
Bedroom B 15 percent
Hallway 10 percent

Meaning Activity 3

	Fraction	Decimal	Percent	Picture of the Fraction
1			100%	
2		0.9		
3	4/5			
4	5/8			
5			66⅔%	
6		0.60		
7				
8	2/5			
9		0.375		
10	1/3			
11			30%	
12	1/4			
13	1/8			
14		0.01		
15		0.001		

Try to remember these combinations of numbers. When you see 0.7 or 0.70, your should be able to image 7/10 or 70 percent or 

Meaning Activity 4 Finding a Percent of a Given Number

1. Jane said 50 percent of her volleyball team were playing with injuries. There are 20 members on the team. How many have injuries?
2. Jane misses 25 percent of her serves. On average, she makes 80 serves a game. How many does she miss? How many does she make?
3. Jane is responsible for 20 percent of the setups for the team in a typical game. The coach wants 120 setups in a game. How many must Jane make?
4. Josie spikes 75 percent of all the setups that Jane makes. How many is this?
5. The coach has a rule that 60 percent of players with injuries must dress for the game. How many will this be?
6. On average, the coach says 10 percent of her players go on to more advanced play. How many members of this team will go on?
7. Forty percent of the members have A averages. How many is this?
8. On average, about 2 percent of volleyball players at this level go on to play at the national level. How many girls from Jane's team could be expected to make it?

Meaning Activity 5 Find a Number When the Percent of It Is Known

Read the following questions and draw a simple picture representing the problems.

1. (a) Billy's cat is 66 cm long. She was 20 percent of this when Billy got her. How long was she then?
   (b) The veterinarian said the cat is still only 70 percent of her final length. How long will she be?
2. John's brother's record collection is 500 percent larger than John's. John has 75 records.
3. A cola mix for a birthday party uses 30 percent syrup and the rest carbonated water. Sally's dad bought 5 L of syrup. How much cola could be made? Did Sally have enough for her party?
4. The Calgary Flames management estimates that 70 percent of customers are season ticket holders. How many people do they expect if they have 9,500 season ticket holders?

5. At Super Slopes Ski Run, 65 percent of accidents involved hot-doggers. Twelve hot-doggers reported injuries at the end of the day. What is a good estimate of how many average skiers were injured?
6. (a) At the same Ski Run there is a 0.001 percent chance of the ski lift collapsing. If 5,500,000 people use the ski lift in 10 years, how many would you expect would be involved in a collapse in this time?
   (b) How many would this be in one year?

Meaning Activity 6 Percent Problems

Restate the following questions in your own words:

1. Ninety percent of all students watch at least two hours of tv every week. In your class, how many watch less than two hours?
2. On average, 20 percent of senior hockey players weigh over 95 kg. On the Red River Ramblers, eight of their twenty players were over 95 kg. The coach said half of these were overweight. Is the team above the average in weight? Would they be above the average if half of them lost enough weight to be below 95 kg?
3. Of the tourists traveling to the U.S.A., 99 percent fly or drive their own cars. Of the 3,525,790 who visit the U.S.A. in an average year, how many do not fly or drive?
4. An investor lost 98 percent of his $500,000 investment. How much was this? What percent did he save? How much was this?
5. (a) Jan's puppy grew from 8 kg to 20 kg in six months. What percent gain was this?
   (b) The puppy became ill and went down to 8 kg. What percent loss was this?
   (c) The veterinarian said that weaned puppies can lose up to 40 percent of their weight. Was Jan's pup within this figure?

Meaning Activity 7 Discount Problems

Read carefully and write the question in point form below it. Do not answer the question.

1. A sporting goods store is having a sale of all its winter equipment. Angela likes skiing; her brother Manley likes hockey; her parents like ice fishing. All skiing equipment is reduced 50 percent; hockey equipment is reduced 30 percent, and ice-fishing equipment is reduced 20 percent. Angela is shopping with her parents and her brother. Angela wants the $250 skis and the $150 ski pants. Her parents want the $700 ice auger and the $50 camp stove. Manley wants three hockey sticks, each priced at $35. The store clerk says that the advertised discounts apply to all items except the stove because it is already so cheap. How much would the family save by buying now?

   Write your version of the problem in simpler form.

Application 1 Meaning in Percent

1. A cola drink is made by mixing 1 L of syrup to 4 L of water. What percent of a cola drink is syrup?
2. A junior high has 92 Grade 7 students, 96 Grade 8 students and 112 Grade 9 students. What percent of students are in Grade 8?
3. An apple inspector found that Farm A had 200 rotten apples in 1,500; Farm B had 150 rotten apples in 1,000; and Farm C had 280 rotten apples in 2,000. Which farm has the best record? Which has the worst?
4. What percent of each rectangle below is shaded? (Estimate.)

   (a) 
   (b) 
   (c) 
   (d) 

Application 2 Percent as a Decimal and Fraction

1. Students were asked to name their favorite sport. Of these, 1/5 favor hockey, ¼ favor skiing and ½ like to swim. The remainder said that they had no favorite sport. Of 200 students in the school, how many were in this last category?
2. In a truckload of 4,000 kg of fish, 98 percent were spoiled. Write the number of kilograms of good fish over the total kilograms as a fraction.
3. The fractions below are formed by adding one to the numerator and one to the denominator of the previous fraction. Convert each to a percent. What conclusion can you make?

   ½ = ___ ⅔ = ___ ¾ = ___ 4/5 = ___

   5/6 = ___

4. A hockey team gets two points for a win, one point for a tie and zero points for a loss. They won 20 games and tied 8 games of the 40 games they played. What percent of the total possible points did they get?

Application 3 Finding a Percent of a Number

1. Twelve percent of passengers on trains are smokers. In each car, 27 seats are reserved for smokers. In 10 years' time, the railway company expects 4 percent of passengers to be smokers. How many seats will they have to reserve then?
2. Of 16,000 people at Oilers games, 15 percent were children and 25 percent were female. How many people were in each group?
3. When a weather forecaster says there is a 20 percent chance of rain tomorrow, what does that mean?
4. One year, a hockey team scored 450 goals in an 80-game season. The next year, the team's goal production was down by 20 percent. How many goals were scored the next year?

Application 4 Fractions and Decimals as Percent

1. Which is larger: (a) ½ of 25 percent of 1,000 kg or (b) 25 percent of ½ of 2,000 kg? Try to explain this!
2. Divide 1,000 into eight parts. How large is one part? How much are the seven remaining parts? If you put four of these parts together, how much would you have?
3. In a certain dough, the ratio of flour to milk to sugar is 6:3:1. If 12 cups of flour are used, how much milk and sugar are used? Express these amounts in percent.

Application 5 Finding a Number When a Percent of It Is Known

1. In a light bulb factory, 5 percent of the bulbs are defective. One percent of these defective bulbs are dangerous to use. If a company produces 20,000 bulbs per day for a 20-day period, how many dangerous bulbs will be made?
2. Susan found out that kids her age often spend 25 percent of their allowance on entertainment. Susan wants to go to two shows at $3.50 each and two concerts at $6.50 each. Based on this, what would she want her allowance be?

Application 6 Discount

1. A certain grapefruit will retain 95 percent of its weight after a month in storage. How much will a dozen grapefruit weigh if each weighed 150 grams when packed?
2. Ninety-eight percent of students who begin a driver-education course pass in three weeks' time. On February 1, 150 students enrolled. How many will graduate on February 22?
3. A ski shop is going to have a sale. The manager is trying to decide if she should offer a 30 percent discount followed by a 20 percent discount or offer the discounts in reverse order. What do you suggest?

Application 7 Sales Tax

1. How would you solve this problem? "Mr. Mumphry bought shoes, socks and a tie. Each had a different price. He also had to pay sales tax which was a percent of the price. How much sales tax did he pay?"
2. A certain number, n, is 8 percent of 25. What percent of 50 is the same number n?
3. Nova Scotia has a 10 percent sales tax. If the cost (original price plus sales tax) of an item is $0.99, what was the original price?
4. In a province with a 10 percent sales tax, what is saved in sales tax when a $100 item is discounted by 20 percent?

Application 8 Gain and Loss

1. Harry got a mark of 70 percent on a test. The teacher increased this by 20 percent because Harry had correctly answered the bonus questions. What was his mark? The teacher decided to decrease this new mark by 20 percent because Harry's bonus answers were messy and did not show all of his work. What was Harry's final mark?
2. Pat had a test score of 55 percent. Because Pat had all her assignments done, the teacher said he would either add 10 points to her score or increase her score by 15 percent of her original score. Which option would you advise Pat to take?