M2C3 Project

Making Jump Ropes Task
Student Work

This file includes five solutions paths for grades 3, 4 and 5. Students used whole number addition and multiplication to determine the number of plastic grocery store bags needed to make jump ropes.

Factors that Students Considered

- The length of the jump rope depends on the height of the jumper.

- How many bags are needed to make the desired length rope?

- How many ropes will we make?

Connections to Students' Experiences

- Students have used jump ropes in P.E., at recess and at home. They understand that the rope length needed depends on height of the jumpers.

- Students may have seen or participated in two or more people jumping the same rope and understand that the length of the rope may need to accommodate more than one jumper.

Comments during warm-up

LENGTH OF JUMP ROPES: *Students draw on experiences jumping rope to determine rope lengths needed* (experiences at PE, at recess, at home)

5th grader: To know if it is big or not you stand right in the middle of it and stretch the rope to see if it comes up to your armpits.

3rd grader: If the rope is too short, it will slap against your legs.

3rd grader: Jump rope needs to be twice the height, to fit along both sides of the body.

5th grader: Students like to jump double dutch, so we need four 14 foot ropes, 2 sets for double dutch.
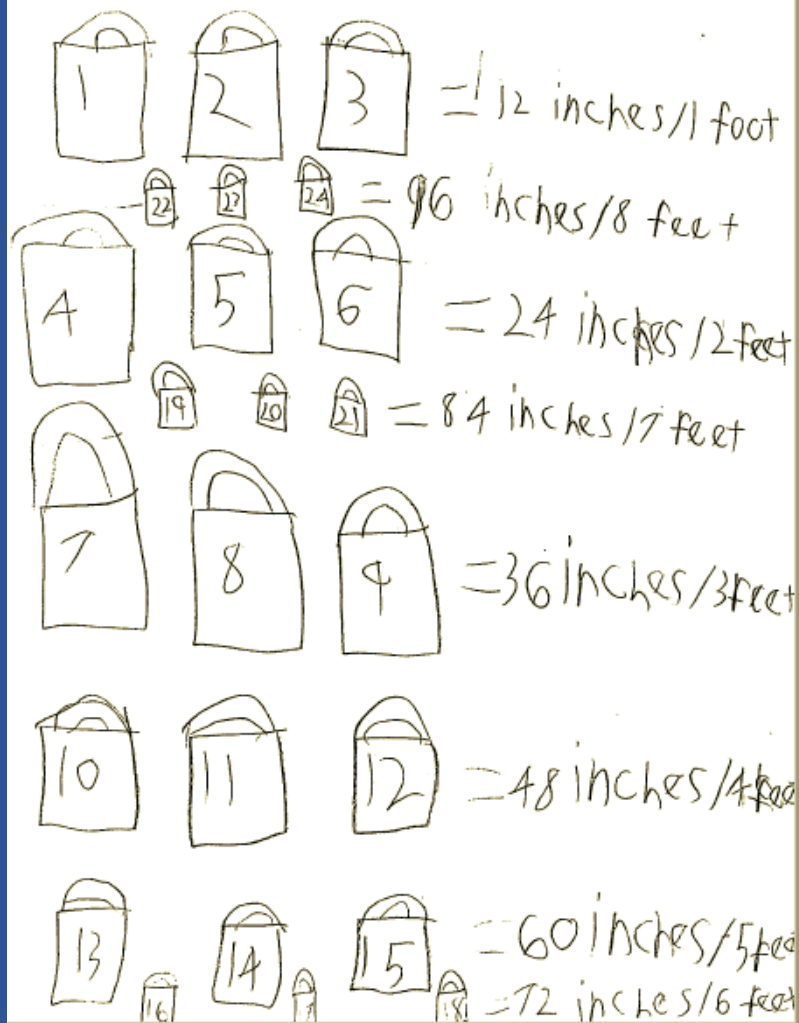
These students found that 3 bags made rope of 12 inches or 1 foot long.   They continue to draw bags in groups of threes to increase the size of the rope by 12 inches or 1 foot.

This is an example of a student who has a reasonable plan but demonstrates a misunderstanding of how to multiply using repeated addition when carrying out that plan. The student's plan is to create 8 foot ropes for 25 students. Multiplying 25 x 8 they get 89 feet. If they need 3 bags for each foot and multiple 89 x 3 they need 108 bags.

To multiply the student used repeated addition. They add eight-8s to 25. The same algorithm is used to multiply 89 x3, adding three-3's to 89.

3rd Grade

Students measured their shoulder height and doubled that amount (4'8") finding a total of 9 feet 6 inches. They decided to use 8 feet.

Using the ratio "3 bag a foot" they found 8 feet x 3 bags per foot = 24 bags. It is not clear why they changed 24 to 26 bags.   Note that the students are using the decimal point to separate feet and inches. This is common misunderstanding of the use of the decimal point to represent any remainder.

Notice

(1. 30 years of plastic bag Production = 1,507,040.89 mi²

(2. 8 millions of plastic bags can be equivelent to 12.7 mil. bison?

(3. every year people in the U.S. use over 100 billion plastic bags.

(4.

Wonder

(1. I wonder if people will charge for paper bags like other states?

(2. How many plastic bags does it take to make a jump rope or Bag?

(3. How much time does it take to make something

(4. can we prevent plastic bag littering?

Grade 4

This grade 4 student used the Notice/Wonder and Know/Need to Know/Assume tools to lay out the information he will need to develop a solution.

How many bags do we need to make a Set (bunch) of Jumpropes For a borton PE Class? our class is 27 childs

Know
- Not everyone needs their own jumpropes
- We need about 21-27 bags
- 3 bags = 12 in. 4 plastic rings
- there are different sized ropes
- I am 5ft 3 | 5'3"
- 12 in = 1 foot
- We know how many plastic bags we need to make a jump rope

Need To Know
- All bags are the same size
- Some of us are smaller/taller
- How tall are we?
- How many kids are in a p.e. | gym class?
- How many different types of jumprope do we need?

Assume
-
- 27 childs are in a p.e. class
- Some kids are the same height
-
- How many people are in a borton P.E. Class = use biggest Class size 30 Childs
- All bags are the same size

7 ft. = 21 bags (for 1 rope) – 7 ropes = 147 bags

8 ft. = 24 bags (for 1 rope) – 7 ropes = 168 bags

9 ft. = 27 bags (for 1 rope) – 7 ropes = 189 bags

10 ft. = 30 bags (for 1 rope) – 7 ropes = 210 bags

14 ft. = 42 bags (for 1 rope) – 4 ropes = 168 bags

$$\underline{\hspace{2cm}}$$
32 ropes

We Know We Will have enough Jump ropes for a P.E. Class because we decided one P.E. Class was 30 students and our set has 32 Jump ropes in it. We Will need 882 plastic bags for our one set. Why We Chose to do all the lengths of Jump ropes is because every one is different sizes and some people like to jump with a 3 people rope (like some do) Why We chose how many of each Jump rope there is, is because We Wanted every one to be able to Jump and a lot of people/kids need different sized Jump ropes some people/kids like to do duble dutch.

Knowing that 3 bags make one foot of jump rope, these students created a list showing the number of bags needed for each size rope. They decided to make enough ropes for a P.E. Class of 30 students. They would make the ropes different sizes to accommodate different heights of students and they made two extra jump ropes or 32. Using whole number multiplication to determine the number of bags needed for each size rope, they then added the number of bags to get a total of 882 bags to make their set. Note the "- 7 ropes" notation is a dash used as a separator and not a subtraction sign.

Math ÷ × − +   Writing ✏️   Drawing

Math:

27 → Bags per person 9ft
×35 → How many students
135
810
945 → Bags All-together

42 → Bags for Double Dutch 14ft
×4 → Students left
168 → Bags

945 → Bags for Singles
+168 → Bags for Doubles
1113 → Total Bags

Writing:

① We figured out how many bags we needed for the single jump ropes. We figured out how many students (39).
② We assumed 35 of us are using singles and 4 of us are doing double dutch. ③ We multiplied to see how many bags we need for singles and doubles. ④ We added them to see how many bags we need in total.

Drawing:

These students learned in the Warm-up that 3 bags make one foot of jump rope. They decided to make thirty-five 9 ft ropes for singles and four 14 ft ropes for double-dutch. Using multiplication and addition, they found then needed a total of 1113 bags.