Title: Finding The Way

Brief Overview:

It is the first week of school and the kindergarten students are having problems finding their way to the restroom. In this unit students will use geometrical problem-solving skills, measurement and distance to construct a map to be used to guide the younger students.

Links to NCTM 2000 Standards:

- **Standard 1: Numbers and Operation**
  Mathematics instructional programs should foster the development of number and operation sense so that all students estimate appropriately.

- **Standard 3: Geometry and Spatial Sense**
  Mathematics instructional programs should include attention to geometry and spatial sense so that all students use visualization and spatial reasoning.

- **Standard 6: Problem Solving** Mathematics instructional programs should focus on solving problems as parts of understanding mathematics so that all students apply strategies to solve problems and adapt the strategies to new situations.

- **Standard 7: Reasoning and Proof**
  Mathematic instructional programs should focus on learning to reason and construct proofs as part of understanding mathematics so that all students make and investigate mathematical conjectures.

- **Standard 8: Communication**
  Mathematics instructional programs should use communication to foster an understanding of mathematics so that all students organize and consolidate their mathematical thinking to communicate with others; and use the language of mathematics as precise means of mathematical expressions.

- **Standard 9: Connection**
  Mathematics instructional programs should emphasize connections to foster an understanding of mathematics so that all students recognize, use, and learn about mathematics in contexts outside of mathematics.

- **Standard 10: Representation**
  Mathematics instructional programs should emphasize mathematical representations to foster an understanding of mathematics so that all students record and communicate mathematical ideas.

Grade/Level:

Grade 4

Duration/Length:

This unit takes approximately 3-4 class periods (50 minutes each) to complete.

Prerequisite Knowledge:

Students should have working knowledge of the following**:**

- Measurement using meters and protractors
- Graphing
- Lines
- Angles and degrees of angles

Student Outcomes:

Students will:

- work cooperatively in groups.
- identify a solution to a real-life problem.
- demonstrate mapping skills.
- create a chart to display types of angles and lines in diagrams and maps.

Materials/Resources

- Teacher Resource 1 (Vignette), Overhead
- Student Resource 1 (How Many Lines and Angles)
- Student Resource 2 (The Flower Garden)
- Student Resource 3 (Graph Paper)
- Student Resource 4 (T-Chart)
- Teacher Resource 2 (Grading Rubric)
- Rulers (cm and meter)
- Protractors
- Construction paper, scissors, tape, and glue
- Journals

Developmental/Procedures

Task 1:

- Review vocabulary terms: parallel, intersecting and perpendicular lines right, acute and obtuse angles, rays, end points, and vertex.
- Make an overhead of Teacher Resource 1. Share Vignette with students.

- Elicit student response to share ideas about how to help the kindergartners.
- Record responses**.**

Task 2:

- Use Student Resource 1 to estimate how many lines (parallel, intersecting, and perpendicular) and angles (right, acute, and obtuse) will be constructed when Student Resource 2 is completed.
- Instruct students to use Student Resource 2 to connect dots in numerical order. Use the completed activity to review the concepts of right, acute, or obtuse angles and parallel, intersecting, and perpendicular lines. Count the lines and angles and record the actual count on Student Resource 1.
- Model the use of a protractor to measure angles. Measure the angles on Student Resource 2.
- Teacher will elicit and record on board or chart students' responses.
- Have students record a journal entry for this activity.

Follow-up Homework:

- Have students select one type of graph paper and complete Student Resource 3 to give them an opportunity to think about angles and degrees and turns to practice on graph paper the directions from their kitchen to their bedroom.

Task 3 :

- Have students draw a map that gives directions from their classroom to the lunchroom.
- Maps must contain icons to label their path. Students select one type of paper.
- Have students develop a T chart that explain**s** their turns, angles, and the degrees of their angles. (Student Resource 4).
- Student maps must contain icons to label their path.

Task 4 :

- Students discuss map which they constructed from the previous day.
- Students will work cooperatively to construct a map that will show the kindergarten students how to get from their class to the restroom.
- Discuss the specific criteria necessary to create the map**.**
- Distribute meter sticks and other materials.
- Allow students to work in pairs to measure the hallway from the kindergarten classroom to the restroom.
- Students will record distance and angle measurements in the path in hallway to restroom.
- Students will label their paths.
- Students will share this information with the kindergarten students.

Performance Assessment:

- Students' completed map will be used for assessment**.** The task criteria may be used to evaluate the product (Teacher Resource 2).
- Students will grade what is acceptable for each area and a sample sheet will be displayed on the bulletin board.
- Students will receive a blank rubric where the key code will be used.

Extension/Follow Up:

- Construct a large wall map from Task 4 to be displayed beside the kindergarten class.
- Construct a map of their classroom.

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Vignette

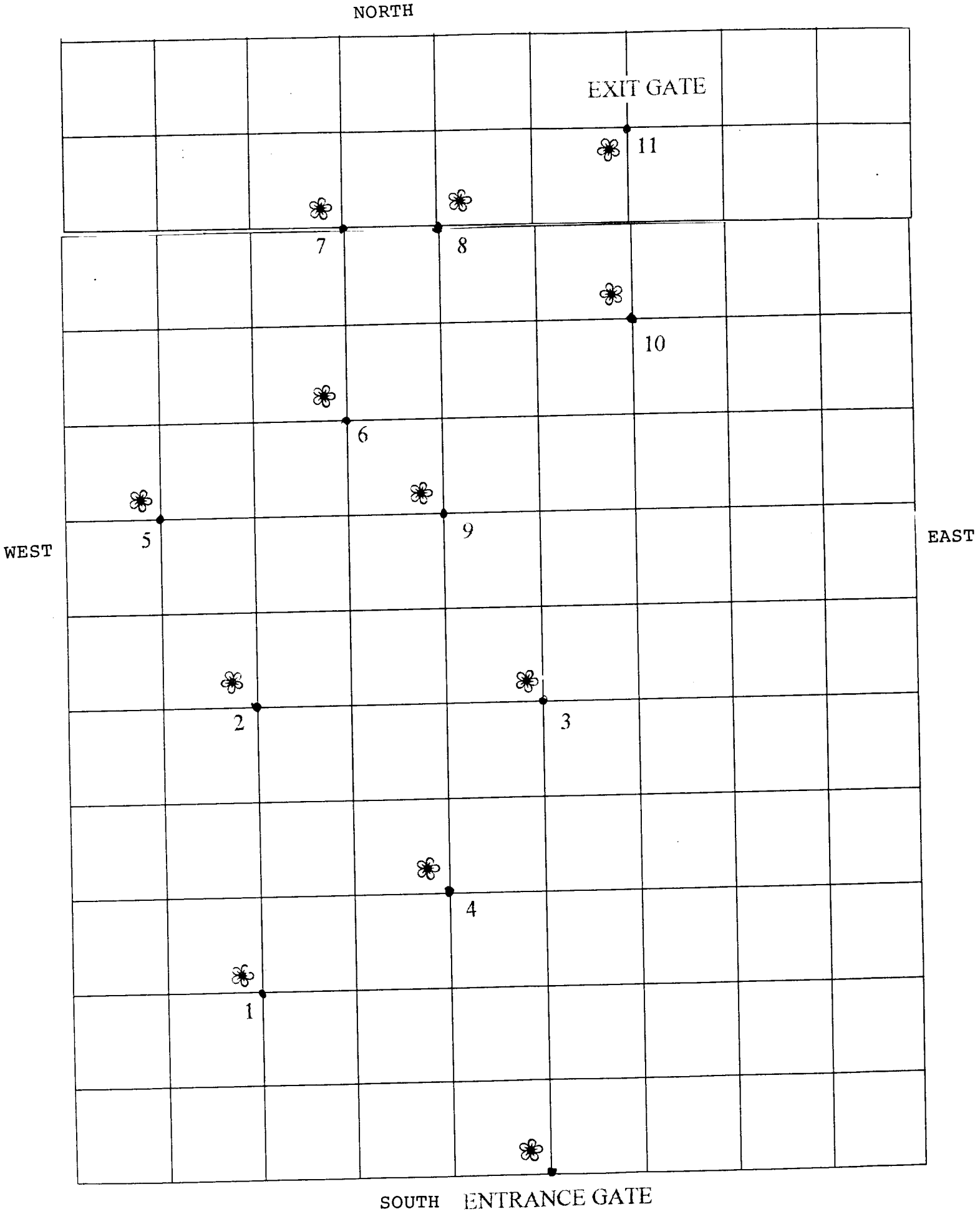
The kindergarten class is having a serious problem. Some of them have gotten lost inside our school building. They have gotten lost getting from their classroom to the restroom. Their teacher is asking for help. What can we do to help them?

How Many Lines and Angles?

Lines	Estimate _____ Intersecting Lines Actual Count _____	Estimate ____ Parallel Lines Actual Count _____	Estimate_____ Perpendicular Lines Actual Count _____
Angles	Estimate _____ Right Angle Actual Count _____	Estimate _____ Acute Angles Actual Count _____	Estimate _____ Obtuse Angles Actual Count _____

THE FLOWER GARDEN

Student Resource 2



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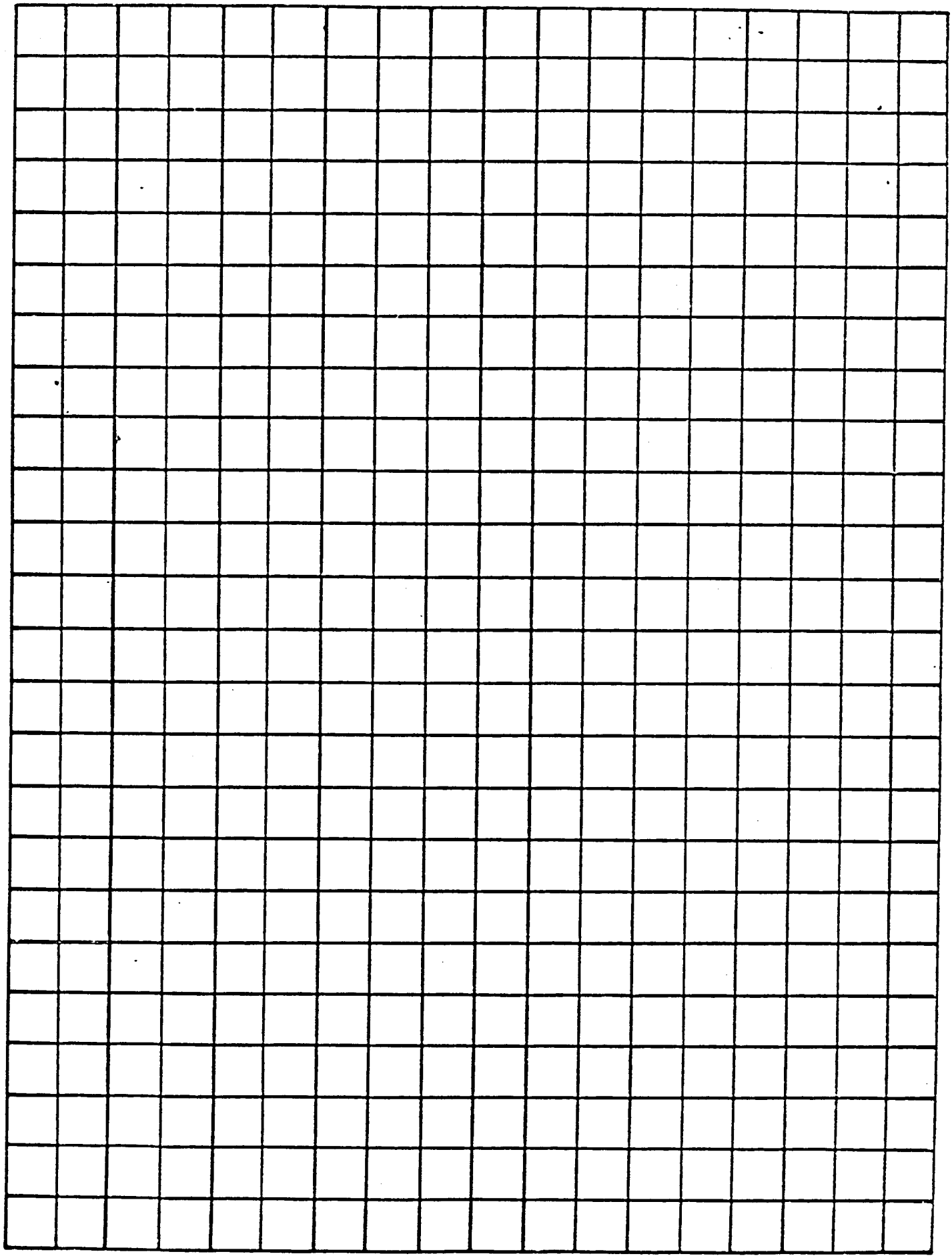

CLASSROOM TO LUNCHROOM T-CHART

ROTATE

TURNS	DEGREES

RECORD: Use these words.

RT=RIGHT TURN

LT=LEFT TURN

FD=FORWARD

ED=END

Grading Rubric

Criteria	Advanced	Proficient	Basic	Below Basic
Directions must be precise and easy to read.				
Map is made on graph paper.				
Measured angles and turns are written on map.				
Map contains a scale.				
Map is neat and colorful.				

Value for Key Code:

Each check in Advanced column equals 10 Points.
Each check in Proficient column equals 8 Points.
Each check in Basic column equals 5 Points.
Each check in Below Basic column equals 2 Points.

Grades for Totals:

A total of 30-40, grade is Advanced.
A total of 20-30, grade is Proficient.
A total of 15-20, grade is Basic.
A total of 2-15, grade is Below Basic.