

## Balloon Ratios - Info Gap Routine

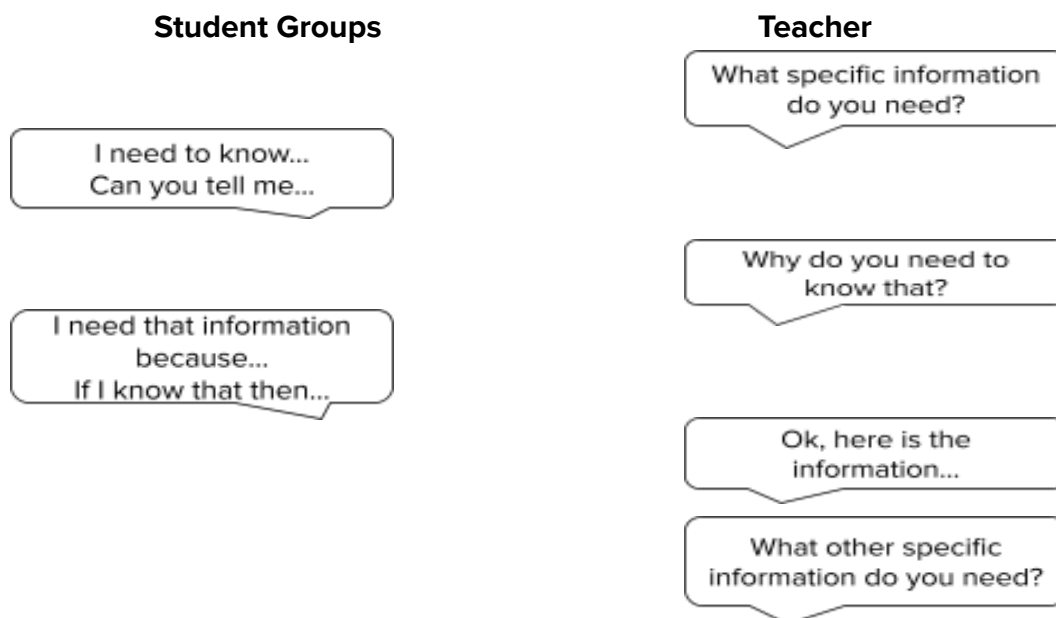
### Note for Teachers

Typically, an Info Gap routine is done in partners, with each partner holding information the other needs in order to solve a problem. In this lesson, the routine is structured as a whole-class, teacher-modeled Info Gap so students can learn the purpose and flow of the routine. In this structure:

- Students focus on identifying what information is needed to solve a problem.
- The teacher models and reinforces what specific, useful mathematical questions sound like.
- Students see that revising or refining questions is a normal part of mathematical sense-making.
- The teacher can intentionally respond with statements such as, “*I don’t have that information,*” to help students distinguish between relevant and irrelevant information and sharpen their questioning strategies.

### Procedure:

1. Teacher looks over the information table, but does not share it with the class.
2. Student groups work to solve the problem by getting information from the teacher.
3. Teacher asks student groups what specific information they need.
4. Student groups respond with a question.
5. Teacher asks why they need that information.
6. Students explain.
7. Teacher shares the information, and provides work time as needed.
8. This back and forth repeats until student groups are able to find possible solutions.



Question	Information Provided
How much does the/a person weigh?	The person weighs 150 pounds.
How much can a balloon lift?	10 balloons can lift 4 ounces.
How many ounces are in a pound?	8 ounces are in a half-pound.
How much do the clothes and shoes weigh? <i>(or other questions related to clothes/shoes)</i>	A typical outfit (shirt, pants, shoes) adds about 4 pounds.
How much does the balloon material and string weigh? <i>(or other questions related to balloon materials)</i>	For the sake of this model, we are considering only the “Net Lift” which means the actual amount that the balloon can lift (not including itself).

\*Some additional, unnecessary information is included in the table below. Some of these questions are irrelevant, while others could be used to solve extensions and provide additional modeling opportunities.

Additional Questions	Additional Information (not necessary for the standard problem)
*How old is the person?	*14 years old
*How tall is the person?	*5 feet, 3 inches
*How much does a balloon cost?	*\$1.75 each or 12 balloons for \$12
*How does the person descend?	*They can use a parachute backpack.
*How much does a parachute backpack weigh?	*16 pounds
*How long would the balloon strings have to be?	*Between 15 feet and 30 feet long
*How big is a standard balloon?	*About 12 inches in diameter
*What volume of helium is in a standard balloon?	*About 0.5 cubic feet
*How much helium is in a standard tank?	*Most tanks are 30 cubic-foot tanks.
*How much does balloon string cost?	*A 350-yard spool costs \$5.00.
*How much does helium cost?	*A 30 cubic feet tank costs \$50.00 to rent.
*What is the average weight of a house?	*A single-family house weighs 60 tons on average (average in the 40-80 ton range)
*How many pounds are in a ton?	*2000 pounds