

Predictions with Reasoning The Three Key Elements

What do the prediction and reasoning reveal about the student's:

1. Ability to use *scientific skills* (for example, the student makes a prediction that relates to the question; if the question is for a controlled investigation, the student mentions both the manipulated and responding variables)?
2. Ability to *think scientifically* (for example, states what she thinks will happen based on previous investigations and/or prior experiences, not a wild guess; provides appropriate scientific reasoning for predicted outcomes)?
3. Understanding of one or more *science concepts* (for example, describes or explains cause and effect and/or relevant properties or characteristics of an object, organism, or event to the extent possible based on level of experience with the concepts)?

Characteristics of an Exemplary Prediction with Reasoning

1. Prediction—*what the student thinks will happen*—answers the focus or investigative question.

- In a controlled investigation, mentions at least two aspects of the manipulated (changed) variable as well as the responding (measured) variable. For example, if the investigative question were “What is the effect of wheel size on the distance a go-cart can travel?” the student might write: “I predict that the largest wheel will make the go-cart travel farther than the smallest wheel will . . .” Note that the student names both the highest and lowest parts of the manipulated variable in her prediction. Students typically write about only one, usually the one that they think will have the most effect. This student also includes the relative distance (farther), which is the responding variable.*

2. Reasoning—*why something will happen*—supports the prediction.

- Usually follows because or I think/predict this because. For example, to add to the prediction above, the student might write, “because I think larger wheels have a larger circumference than smaller wheels and that makes them travel farther with one rotation of the wheel than a smaller wheel does with one rotation.” Note that the student includes both parts of the manipulated variable and the responding variable in her reasoning.*
- Reasoning makes sense at that point in the unit.*
- Reasoning is not based on personal feelings or opinions.*