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Effective Leadership for Mathematics Instruction

Levi Patrick and Jennifer Lamb

Elicit and Use Evidence of Student Thinking

Levi Patrick

1. Complete the following statement:

Formative assessments are ...

2. How frequently do you use formative assessments? _____

As Often as I Floss (for regular people only) = 0

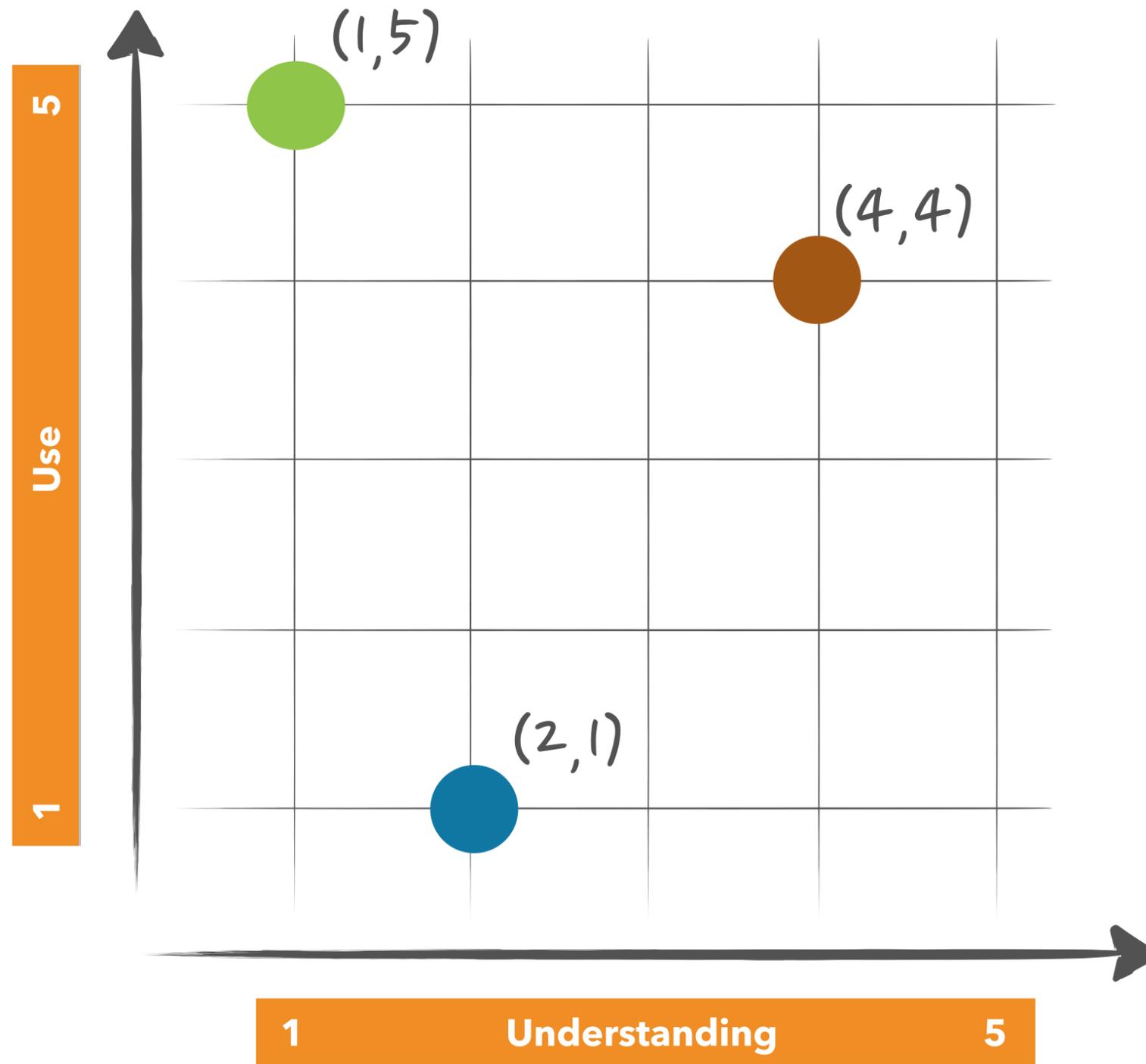
As Much You're Supposed to Floss = 5

3. How well do you understand formative assessments? _____

I've Heard Those Words Before = 0

Some People Call Me the Formative Assessment Guru = 5

Use **vs.** Understanding



Use **vs.** Understanding

Elicit and use evidence of student thinking.

Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning.

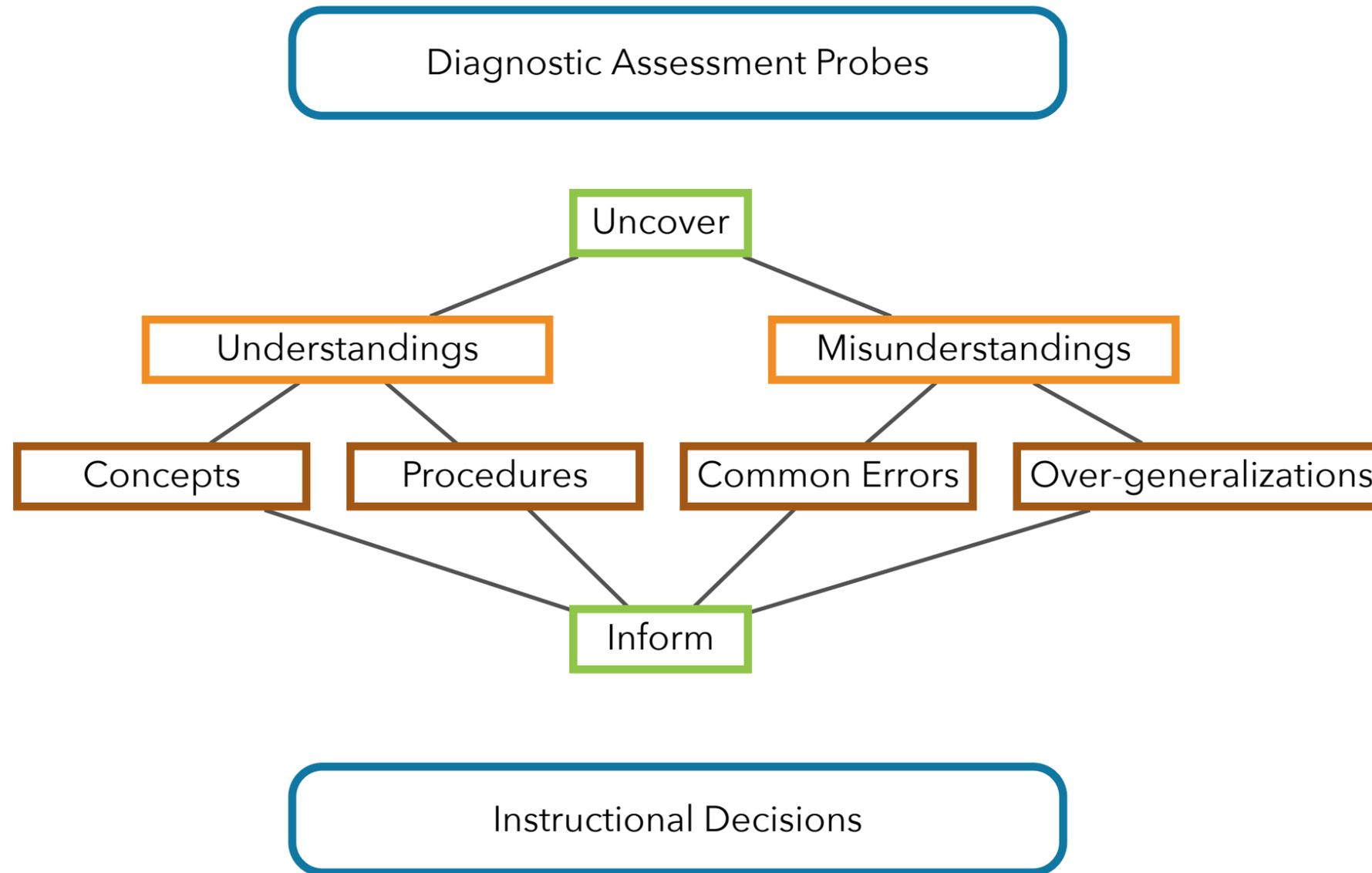
Teacher Actions

- Identifying what counts as evidence of student progress toward mathematics learning goals.
- Eliciting and gathering evidence of student understanding at strategic points during instruction.
- Interpreting thinking to assess mathematical understanding, reasoning, and methods.
- Making in-the-moment decisions on how to respond to students with questions and prompts that probe, scaffold, and extend.
- Reflecting on evidence of student learning to inform the planning of the next instructional steps.

Student Actions

- Revealing their mathematical understanding, reasoning, and methods in written work and classroom discourse.
- Reflecting on mistakes and misconceptions to improve their mathematical understanding.
- Asking questions, responding to, and giving suggestions to support the learning of their classmates.
- Assessing and monitoring their own progress toward mathematics learning goals and identifying areas in which they need to improve.

Use **vs.** Understanding



Create one **example** for each element.

What do **FAPs** Uncover?

| Category | Description |
|-----------------------------------|---|
| 1. Selected Response | One question, one correct answer, and several distractors. |
| 2. Multiple Selections Response | Two or more sets of problems, each with one question, one correct answer, and one or more distractors per problem. |
| 3. Open Response | One or more sets of items, each with one question. The open-response format does not include Tier 1 selected response choices on the student probe, but are usually developed as part of the teacher's notes rather than listed as distractors. |
| 4. Opposing Views/Answers | Two or more statements are given, and students are asked to choose the statement they agree with. |
| 5. Examples and Non-examples List | One question or statement with several examples and non-examples pertaining to a statement listed below. Students are asked to find only the examples based on a given statement. Often set up as a card sort. |
| 6. Justified List | Two or more separate questions or statements are given, and students are asked to explain each choice. |
| 7. Strategy Elicitation | A problem is stated with multiple solution strategies given. Students provide an explanation regarding making sense of each strategy. |

Tier 1: Elicitation

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|-----------------------------------|---|
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Tier 1: Elicitation

Mathematics teachers gain a wealth of information by **delving** into the thinking **behind** students' answers not just when answers are **wrong** but also when they are **correct**. (Burns, 2005)

Tier 2: **Elaboration**

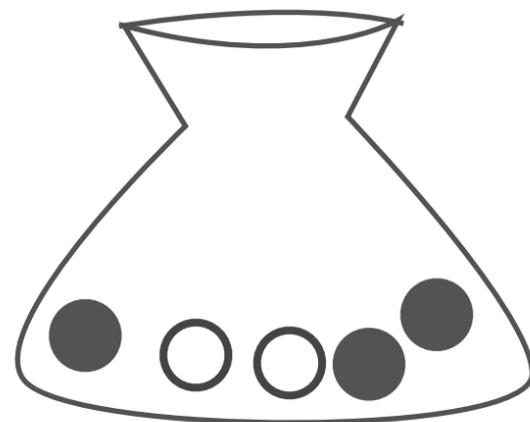
Two jars both contain black and white gumballs.

Jar A: 3 black and 2 white

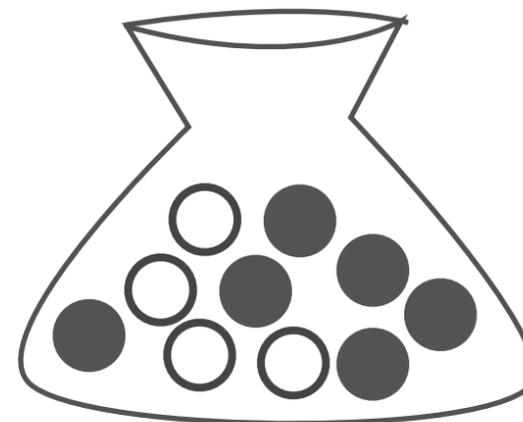
Jar B: 6 black and 4 white

Which response best describes the chance of getting a black gumball?

Jar A



Jar B



A: There is a better chance of getting a black gumball from **Jar A**.

B: There is a better chance of getting a black gumball from **Jar B**.

C: The chance of getting a black gumball is the **same for both Jars A and B**.

Explain your reasons for the answer you selected:

Tier 2: **Elaboration**

Is it related to $y=3x + 4x+1$?

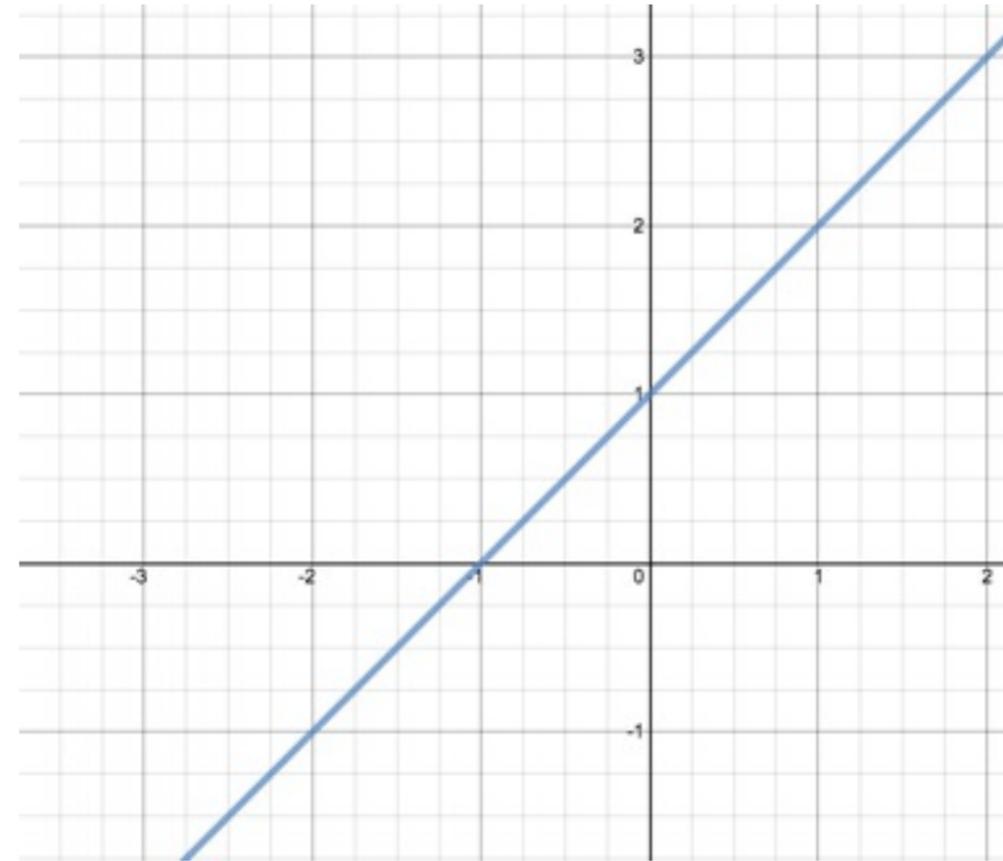
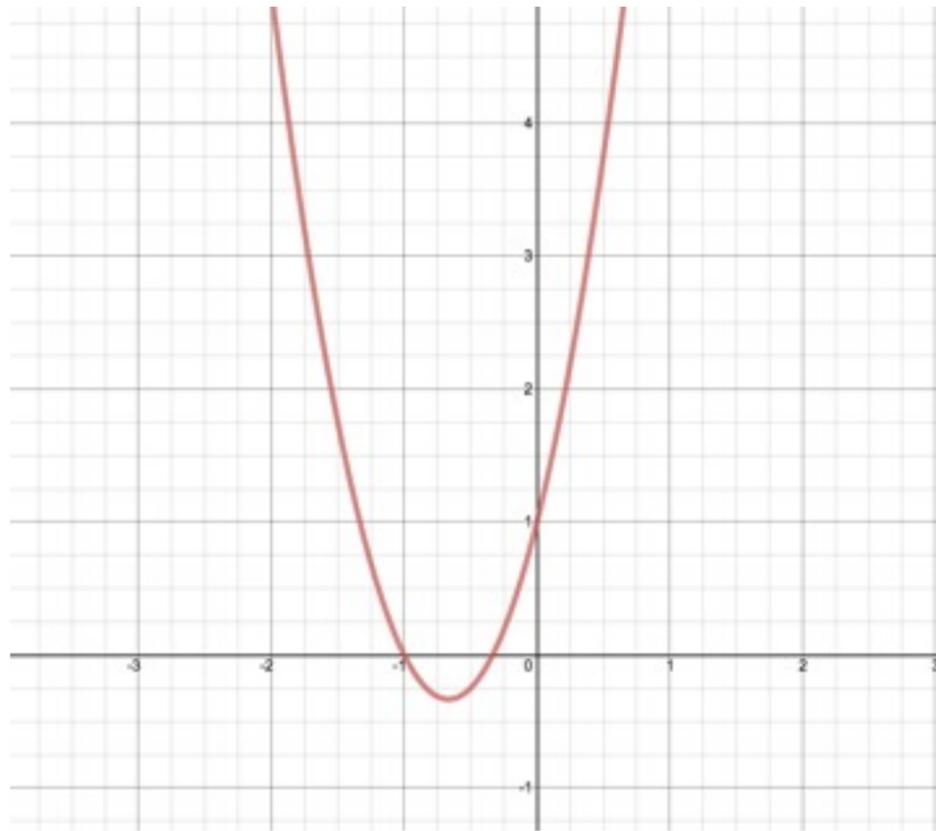
A: $(-1,0)$

D: $y=(x+1)(x+1/3)$

B: $(x + 1/3)$

E:

C:



Tier 2: **Elaboration**

Guiding Questions

1. What KSA(s) do I wish to assess (e.g., knowledge, skills, processes, understanding toward competency in a particular part of a domain)?
2. What is the cognitive/developmental path (i.e., learning trajectory) I would expect to see with regard to these KSAs?
3. What evidence (i.e., observable features of students' performances and responses) would I need in order to determine the students's level of KSAs?
4. What are the characteristics of tasks that will elicit this evidence?
5. What KSAs that are not wanted (e.g., unnecessarily complex language, need for speed of response) might this type of formative assessment process introduce?
6. How can I modify my formative assessment process to make it inclusive for all students, to minimize the impact of non-target KSAs?

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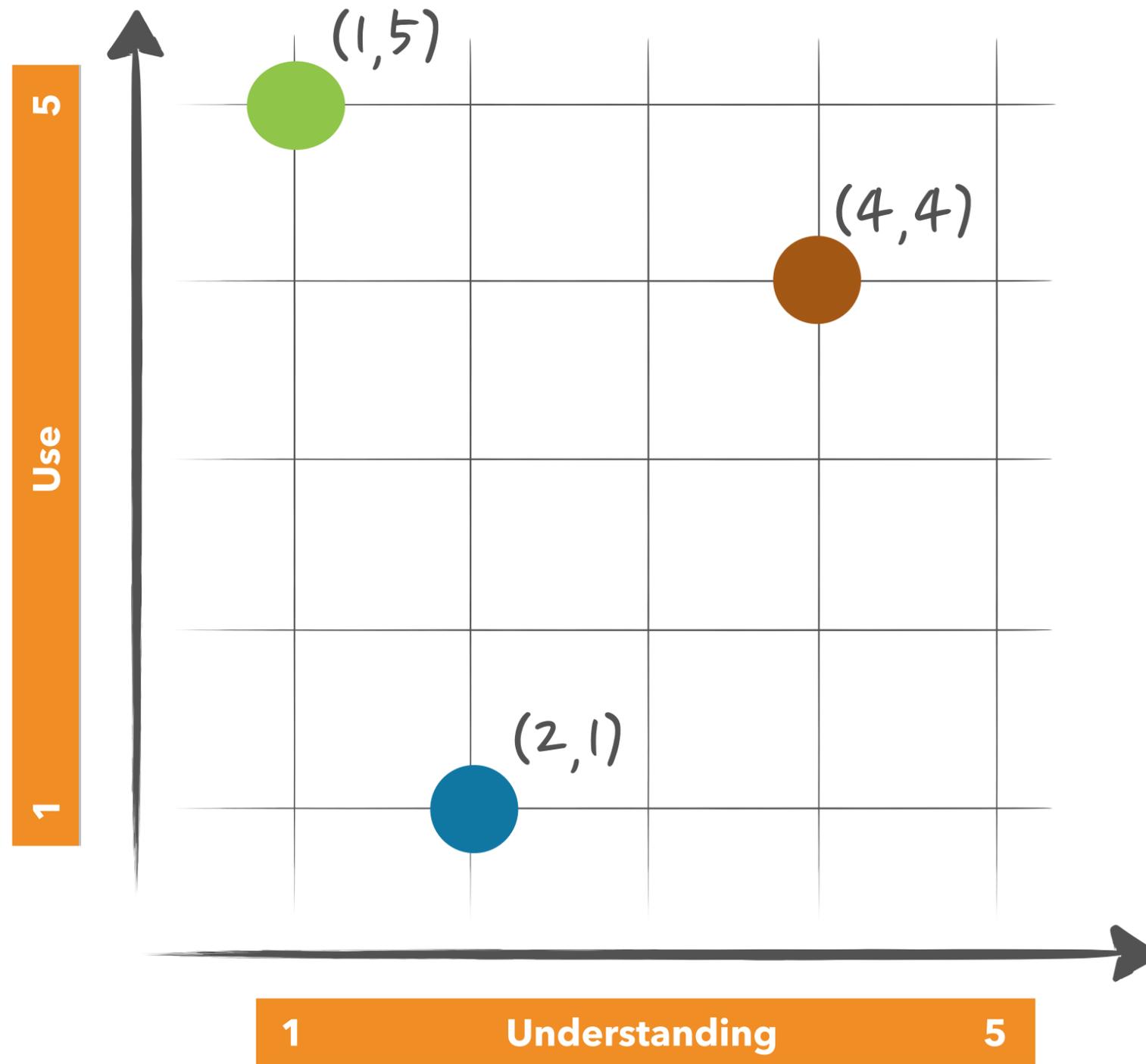
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Use **vs.** Understanding



Use **vs.** Understanding

Please complete at least two sentences.

- ① Today was perfect because...
- ② Today would have been better if...
- ③ When I go back to school, I will...
- ④ I want to learn more about...
- ⑤ I'm leaving feeling...

Thanks for coming!