Kata in the Classroom
Instructions

THE EXPERIMENTING RECORD - *Turn Each Step Into an Experiment*

The Experimenting Record is a simple pencil-and-paper tool to practice staying focused on the next target while being flexible in how you get there. This practice routine helps students learn how to deal with uncertainty by running experiments, and can easily be added to many activities and projects. Use it to:

- Plan and reflect on your experiments.
- Make expectations explicit so they can be compared with what actually happens.
- Shift conversations from opinions and guesswork toward observable evidence.
- Practice the repeating cycle of: predict → test → observe → learn.
- Learn to see unexpected results not as failure, but as information that can improve our understanding.
- Help tell the story.

One scientific pattern embedded in this practice routine involves comparing what we predict will happen with what actually happens, and adjusting based on what we learn from the difference. Students make a prediction before taking a step, and then compare what happened. A difference between those two things leads to learning something.

Illustration from the *Toyota Kata Practice Guide* (McGraw-Hill, 2018)

In conducting experiments, a negative result can be more useful than a positive one. When a result is as predicted, it confirms something we already thought. But when a result is different than we predicted, you may learn something new.

With scientific thinking you're looking for facts and data that poke holes in your idea, not so much for confirmation of your idea. This may seem counterintuitive, but once students internalize it, it can make all the difference for finding pathways to their goals.

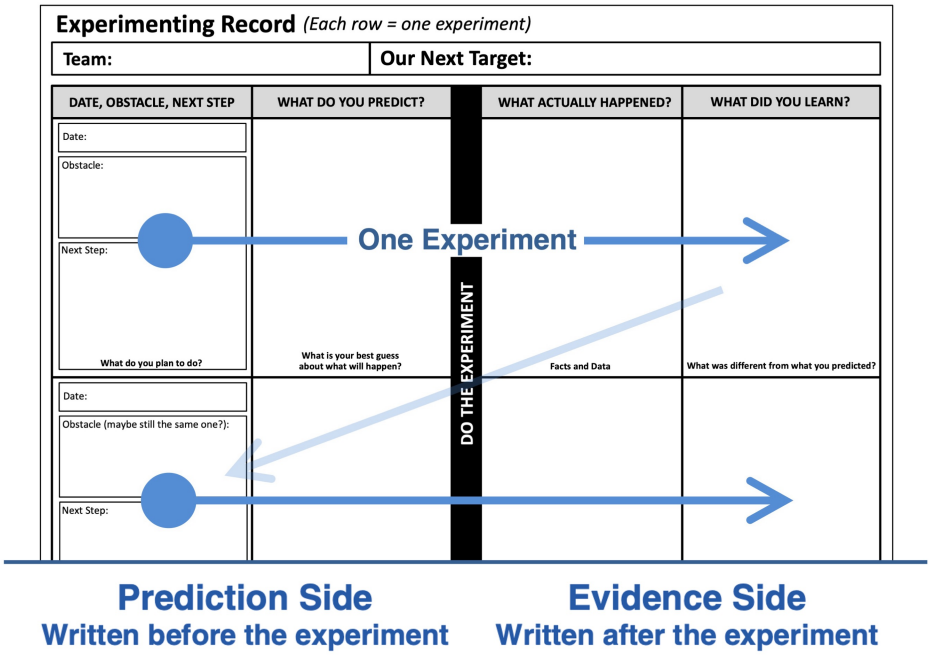
How to Use the Experimenting Record

Experiments allow you to be action-oriented, but without too quickly jumping to solutions.

The Experimenting Record is used one row at a time, from left to right, with each row representing one experiment. The left "prediction" side is completed before the experiment; the right "reflection" side is completed after it.

The four columns are:

1. What will we do next?
2. What do we predict will happen?
3. What actually happened?
4. What did we learn?



BEFORE THE EXPERIMENT (Planning):

1) What's the next step (the next experiment)?
Write down a description of the step you plan to take to try to move closer to your target. Often, what you learned in the last experiment leads to this next experiment. Start the description with *"We will..."* and be as specific as possible.

Don't make the step too big. Each experiment should be accomplished in a short amount of time. Taking the next step quickly means you'll be able to see further quickly!

2) What do you predict (your best guess) and how will you measure it?
Make a prediction about what you think will happen and write it down. Start with "We expect that..." and be as specific as possible. Try to use numbers or clear outcomes rather than words such as "more," "better," or "faster." How will you know whether your prediction was right or wrong?.

The purpose of a prediction is not to be "right." It is to make our current understanding visible and testable.

AFTER THE EXPERIMENT (Reflection):

3) What actually happened?
After conducting the experiment, record what you observed and measured. Include specific details and measurements, not interpretations or general impressions. Keep this column factual.

4) What did you learn?
Now reflect on what the results tell you. What happened compared to what you predicted? What was a surprise? What new understanding do you now have? Start with *"We learned that..."* When what actually happened is different from what you expected, it can lead to further insights and questions.

Be sure to maintain that distinction between the two "after" columns:
Column 3 = Compiling facts and data from the experiment.
Column 4 = Interpreting the results.

There are several possible outcomes of an experiment, for instance:

- The results support your prediction
- The results do not support your prediction. (Interesting!)
- The results came close, and you can see what you have to try next.
- You can't tell and need more information.

The Power of the Prediction Side

When we define our next step toward a goal, **scientific thinking** asks us to also make a prediction, our best guess, about what will happen as a result of taking that step. The purpose of including a prediction is to create a reference point. By comparing what you expected with what actually happened you open the door to seeing and learning something new. Many people aren't used to making predictions with the goal of learning, but making a prediction before each step shifts us into the "experimenting zone."

It takes time and practice to see making predictions as a useful setup for learning, rather than feeling like you have to make a definitive, true statement. Here are some ways you can help:

Reframe the purpose. Emphasize that making predictions isn't about being "right." It's about surfacing our current understanding so that any gap between expectation and reality becomes a chance to learn.

Model making predictions yourself. Seeing the educator make predictions can help make the process understandable. Express your uncertainty, and your learnings, rather than only predicting when you're sure.

Reflect on past steps. Highlight examples where valuable insights came from a gap between what was expected and what occurred. Choose examples that show a "miss" leading to useful insights.

It’s natural for learners to feel some discomfort here. Most of us grew up in cultures where being right is rewarded, so there's a fear in “being wrong.” In Kata, however, the purpose of prediction is precisely to learn from those moments when we were wrong. This is a mindset shift that Kata in the Classroom strives to nurture.

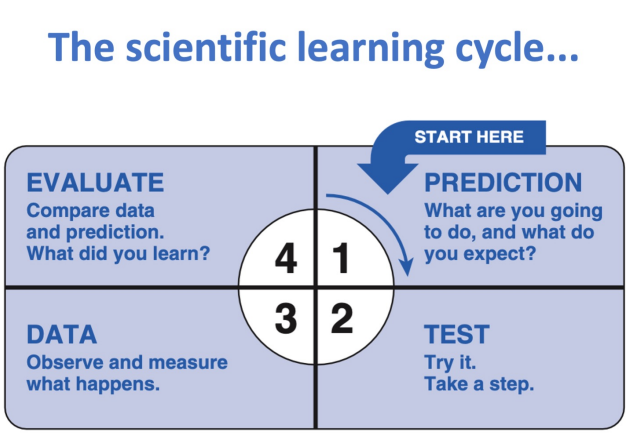
Encouraging your learners to view discomfort as a signal of growth can be powerful. You might say something like: *“The fact that this feels uncomfortable means you’re moving into the experimenting zone and potentially learning something!”*

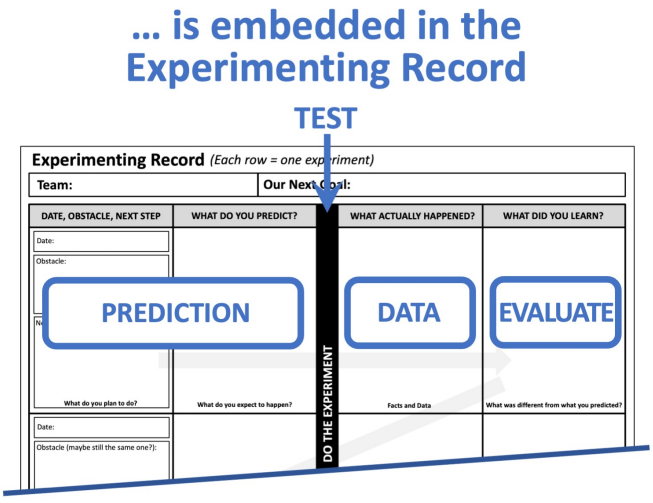
Here are some ways you can invite predictions with language that lowers the stakes and make the process feel exploratory, even playful, rather than a test of someone's knowledge:

> *“What is your best guess about what will happen?”* (This reinforces that we’re at a threshold of knowledge, and the prediction is just a hypothesis.)
>
> *“Let’s treat this as a little experiment. If you had to guess, what do you expect we’ll see after taking this step?”*
>
> *“If it doesn’t turn out the way we predict, that’s actually helpful because we can learn something.”*

Why Practice Using the Experimenting Record?

The Experimenting Record isn't just a form, it's a practice. When used consistently, it makes scientific thinking a natural part of the teaching and learning rhythm. It provides a structured way to practice and teach the scientific learning cycle for pursuing goals. The **prediction → test → data → learn** cycle embedded in the Experimenting Record is a well-known scientific pattern that your students can apply throughout their lives to work through uncertainty and achieve goals. The scientific learning cycle is the soul of improvement, adaptiveness, and innovation, and is made practical via the Experimenting Record.





NOTES & TIPS FOR PRACTICE IN YOUR CLASSROOM:

• You can start any interaction with a student team by having them walk you through the most recent rows of their Experimenting Record. The **Experimenting Record** and the **Coaching/Reflection Questions** can be used together. The Coaching/Reflection Questions are available on the KiC website.

The Experimenting Record is owned by the student team and they can use it for telling their story. The four columns in the Experimenting Record correspond with the Coaching/Reflection questions. As the educator asks those questions, the student responds by pointing to and reading what's written in their experimenting record. This helps the educator see how the student is thinking, and give appropriate feedback.

• One of the key things that distinguishes scientific thinking from simply “doing things” is the practice of making predictions. When we take action and deliberately predict the outcome, we create an opportunity to step outside our assumptions, consciously examine the results, and learn.

• At first you'll have to guide the students through how to use the Experimenting Record. It may take a while before they get it right. It will take even more time for the students to internalize it's pattern and make it a habit. All that is normal. At first this practice can feel a bit clunky. It can be a bit annoying to have to slow things down, and you can start to wonder if it is worth it... IT IS.

• To facilitate learning from an experiment, writing things down is important. Only then can you objectively compare plan and reality.

• You might ask your student teams how many times they think they should test their current idea (without changing parameters between test runs). A common response is "three times." If an idea is tested multiple times, those trials can all be recorded in one row of the Experimenting Record; as one experiment repeated a few times for more reliable data. In that case, however, the students should carefully record the *result of each run of the experiment* in the form's third-column box. When the team wants to change a parameter, it then becomes a new experiment and moves to a new row in the form.

• One thing new users may struggle with is adding enough detail in the description of their next step. This can make it harder to be specific about the expectation, which then, in turn, makes it harder to identify learnings. One tip to help fill in details is to ask, "and what else?" for each column. What else will you do? What else do you expect? What else actually happened? What else did you learn? By asking ‘and what else?’ you take students a bit deeper. The first answer to a question is rarely the full, or best, answer.

• Encourage keeping the 'next steps' small and frequent, as repetition is more important for developing habits, than taking big leaps. Don’t overthink it, test it asap.

• As you review a team's experimenting story, look for logical links, where what was learned in one experiment leads to their next experiment. Most of the steps (experiments) students take should not be randomly selected, but come out of the “chain of experiments", where what they learn sets the stage for what they need to learn next. Otherwise you're "just trying stuff," rather than engaging in a 'chain of learning.'

• Generally, you don’t reach a challenging goal through a single experiment, nor in a straight line. Not every step will bring measurable progress toward the goal. Keep in mind it is finally reaching the next target that brings the benefit, not the individual steps.

• You might encourage students to keep their Experimenting Records in a binder or folder, to make it easier to look back and tell their story.

• Once you become familiar with the document, feel free to modify the terminology to suit your classroom, but do maintain the 4-phase pattern.

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