A Simple Sketch Tool to Foster Creativity in a Science Context

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In a 2008 TED conference, Tim Brown from IDEO highlighted the use of a 30 Circles Test tool (developed by Bob McKim) as a way to foster creativity through sketching. This tool is simply a piece of paper with 30 circles placed next to each other in a 6-rows-by-5-columns format. See Figure 1 for a similar version.

In the talk (see link in Online Resources), each member of the audience was given the 30 Circles Test tool and had a minute to (in the words of Tim Brown) “adapt as many of these circles into objects of some form.” For example, they could sketch the Earth or faces of a clock. The audience could also link the circles, such as sketching a bicycle with the wheels represented by two circles or even a pair of glasses (see similar sketches in Figure 2). At the end of one minute, they were given time to compare their sketches, which led to admiration of individual creativity.

Development of a sketch tool to foster creativity

Watching the talk on YouTube inspired me to develop a similar sketch tool to foster the creativity of my students. Instead of having 30 circles, I developed a tool with only nine circles (each having a diameter of 2 cm when printed on paper) and placed them in boxes. I provided the theme of “items found at home” to guide my students’ thinking on items to be sketched.

To kickstart the ideation process (just before the start of the activity), I showed several sketches that were produced from the TED talk. Students were discouraged from adding too many “word” labels to describe their sketches. Instead, I encouraged them to add details to their sketches to help readers identify the household item being sketched. As I facilitated the 10-minute session, I encouraged my students to come up with many ideas (fluency), different ideas (flexibility), ideas that they think others would not sketch (originality), and where possible, to sketch these ideas in detail (elaboration)—these are traits of divergent thinking based on Guilford’s (1959) and Tor-
rance’s (1979) frameworks for creativity. For example, I encouraged students to come up with different items around the house, rather than focusing on items that are just in the kitchen or in the bedroom. I also encouraged students to spend some time to share and discuss their sketches with each other (see Figure 3).

Modifying the sketch tool to foster creativity in a science context

I noticed that a number of diagrams published in science textbooks are made up of circles, which led me to develop a similar sketch tool to foster creativity in a science context. The idea is to convert the circles to diagrams related to physics, chemistry, and biology. This could include concepts, symbols, or items (such as instruments) used in science. I felt that the tool could be used at the end of the school year since students would be familiar with many diagrams related to physics, chemistry, and biology.

I developed a simple scoring rubric to promote divergent thinking through this sketch tool based on Guilford’s (1959) and Torrance’s (1979) frameworks for creativity.

- **Fluency**—as a whole, there are many valid diagrams related to physics (1–3)/ chemistry (1–3)/ biology (1–3). Total: __/9

- **Flexibility**—as a whole, there are different types of diagrams related to physics (1–3)/ chemistry (1–3)/ biology (1–3). Total: __/9

- **Originality**—as a whole, the science diagrams sketched are unique (different from others) (1–3). Total: __/3

- **Elaboration**—as a whole, there is a good amount of detail in the sketches that relate to science (1–3). Total: __/3

I tried the sketch tool in Figure 4 with fellow teachers during a professional development session and shared with them the rubric for scoring. Teachers enjoyed this activity and were eager to try out the tool with their own students. I explained to teachers that when the activity is used with students, its duration is entirely at their discretion, and scoring is based on their judgment. I emphasized to them that the essence of this tool is to promote creative thinking in an enjoyable way among our students, and not to be too hard on scoring. Rather, they could use the scoring rubric as a guide to help students come up with a variety of ideas that are different, original, and detailed.

When trying out the modified tool with students, I first carried out the same procedures as I did with the ‘items found at home’ assignment to get the class warmed up. I then distributed the modified tool (I made extra copies so that students could take more if needed). I gave my students 20 minutes to sketch diagrams related to physics, chemistry, and biology. As I facilitated the session, I encouraged them not only to come up with different ways to represent a scientific concept, but also to think of different symbols and...
diagrams in physics, chemistry, and biology. I also told them to sketch their diagrams in boxes that would best suit a particular category in science. For example, based on their experience in learning science through the use of a magnifying glass, they could sketch this instrument in the biology category (as in the case of using this instrument to examine plants and insects in the field), or sketch it in the physics category (as in the case of using this instrument to converge the sun’s rays onto a piece of paper). In the process of fostering fluency and flexibility, I encouraged students to not spend too much time on any one particular idea, but to first briefly doodle their many different ideas and then return to add more details to these ideas if there was time.

Students were engaged the entire 20 minutes. During this time, I could see them sketching ideas that I myself have not thought of. For example, they converted the circles to solenoids and pendulums (physics), as well as animal cells (biology), among others.

At the end of the activity, I encouraged students to share and discuss their sketches with each other. I could see how they admired each other’s creative ideas and commended one another for being able to showcase their creativity in a science context. I heard comments such as “why didn’t I think of that!” during this part of the activity. It was heartening for me when my students were able to see that collectively, the tool provided an avenue for them to come up with many ideas (fluency), different ideas (flexibility), ideas that not many think of (originality), and graphic details to describe their sketches (elaboration) in a science context. Towards the end of the lesson, I summarized the activity by highlighting that as individuals, we can only come up with so many creative ideas, but as a class, we can come up with many more creative ideas.

REFERENCES


ONLINE RESOURCES
TED talk: Tales of Creativity and Play by Tim Brown—http://www.ted.com/talks/tim_brown_on_creativity_and_play.htm

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