

Lesson 2: Our Block, Our Dance (1 hour)

Overview: Let's teach KIBO some new moves! Each group will create a dance step subroutine and an icon of their own to represent it. Groups will share their subroutines to teach their moves to different KIBOs.

Powerful Idea: Representation - an icon can represent an idea (or a subroutine)

Learning Goals: After this lesson, students will:

- Understand that an icon is a simple representation of a more complex idea.
- Be able to create an icon to represent a subroutine they've created.
- Be able to use multiple subroutines within one program.

Materials/Resources:

- One KIBO 10 kit or higher per group of 2 – 4 students. Any additional KIBO parts or blocks with which the students are familiar may be used in this lesson.
- One Advanced Coding Extension Set per group.
- Optionally, additional washable or dry-erase markers for drawing icons on the blocks.
- Optionally, craft supplies for decorating KIBO dancers.

Lesson Plan

✓ **Introduce the Concepts and the Task:** "Today our KIBOs will learn a new dance move! Dancers often repeat patterns of movement when they dance. But they don't just repeat the same movement over and over, like a repeat loop. They change it up, then bring that move back at different times in the dance. The moves are like subroutines in the program of the dance."

Have the kids dance along to a fun dance video with named moves. You might share square dance videos, where the caller names specific steps like the do-si-do; or dance-focused pop song videos like "Watch Me (Whip/Nae Nae)" by Silentó. (You could also involve a music teacher in this lesson.)

Tip: Watch a video of KIBO dancing The Virginia Reel square dance at kinderlabrobotics.com/videos.



"Each of the moves in these dances has a name. Just like a subroutine block, the name for the move represents the whole move. When we say the name, we know the moves to make."

"We could also represent moves like this with pictures. Another name for a simple picture that represents something more complicated is an 'icon'". Ask the students for some ideas for icons that could represent the moves you saw in the dance video. Draw their ideas on a board for the students to see.



Warm-Up / Get Active: Take an "icon walk" around the school or just around the classroom. Have students bring along engineering journals or notepads. Ask students to look for symbols around the school that represent a more complex idea in a simple, recognizable way. Examples of icons that you might find include symbols identifying gender-specific bathrooms; signs pointing the way to telephones or water fountains; and icons noting handicapped-accessible routes. Ask the students to sketch the icons they find in their journals. When you return to the classroom, lead the students in a discussion about how these icons and symbols communicate. What are the benefits of using symbols like this? How are they different from words? Might icons be confusing sometimes?



Small-Group Work: Now it's time to create our own dance move subroutines. Each group will create a dance for their KIBO that includes a move created by them and a move created by a partner group.

Choose (or allow the students to choose) a song for the KIBOs to dance to. Play this song in the background for the students during the activity.

Give each group a KIBO and an Advanced Coding Extension Set. Assign each group a partner group. Each group in these pairs will use a different subroutine block set: if one group uses the Star ★ subroutine, the other should use the Diamond ♦ subroutine.

Each group should create a dance move using their subroutine blocks. The subroutine will be the dance move. They can test their dance move by including it in a simple program that calls the subroutine.

For example:

```
BEGIN – RUN SUB ★ – END
```

Tip: Students can use more than just blue movement blocks in their dance move! KIBO's other output options, like the light bulb or sound playback blocks, can enhance the expressiveness of the dance move.

The group should decide on a name for their dance move and create an icon to represent it. Using the washable or dry-erase markers, they should draw the icon for their dance move on the BEGIN SUB, END SUB, and RUN SUB blocks for their subroutine.

Tip: Be sure to use only washable or dry erase markers when drawing your subroutine icons!

When all groups have created their dance move subroutine, groups should combine with their partner groups. Each group should scan their partner's subroutine, so both groups' KIBOs now know both the Star ★ and Diamond ♦ dance move subroutines.

Ask the groups to collaborate on a single long dance program that includes both moves. As a guideline, suggest that each dance program should use both groups' subroutines twice. (Subroutines allow KIBO to act out a much longer sequence by repeating the moves.)

For example:

```
BEGIN – RUN SUB ★ – RED LIGHT ON – RUN SUB ♦ – WHITE LIGHT ON – RUN SUB  
★ – BLUE LIGHT ON – RUN SUB ♦ – END
```

Scan the final program onto both KIBOs, and the two groups will have a pair of dancing robots that learned each other's moves. The result will be a pair of dancing robots that represent the sharing and collaboration between the groups.



Technology Circle: Finish with a dancing robot showcase. Allow each pair of groups to share their pair of dancing robots by running the program at the same time. They should also show the subroutines and icons they created for their moves.

In discussion afterward, ask groups to share their process. Why did they choose the icon they did? Did everyone agree on the icon to use? If not, how did you resolve the differences? What were difficult parts of the process? Regarding repeating the dance moves, how was using multiple RUN SUB blocks different from using REPEAT loops?

Background for the Teacher

Icons: An “icon” is a simple, graphical representation of an idea, concept, or thing. Icons are designed to be easily recognizable. Generally, icons do not include words. KIBO's regular programming blocks each have an icon along with a name and a barcode. Icons are an example of the powerful idea of representation.

Drawing on the Subroutine Blocks: The white space on each block is an invitation for students to draw! Like the icons representing KIBO's regular blocks (a forward arrow, a light bulb, etc.), children can create their own personally meaningful symbols for the block they've defined. Using erasable markers (one is included in the set), children can draw an icon directly onto the RUN SUB, BEGIN SUB, and END SUB blocks for their subroutine.

