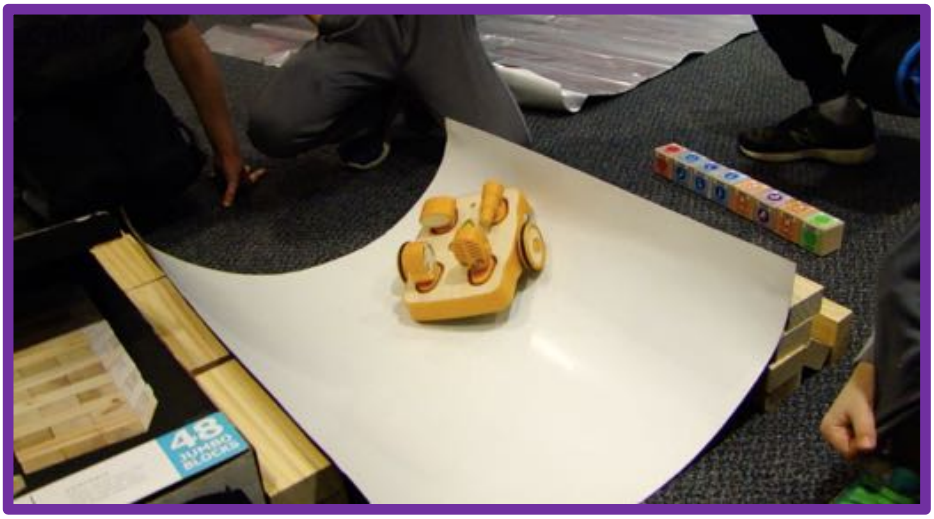
Up, Down, Around



The big idea: *Let's think vertical! Topographical and relief maps represent the ascent and descent of a natural landscape. What if KIBO could explore these ups and downs too? How can we build slopes, and how do slopes change KIBO's movement?*

Cross-curricular learning goals:

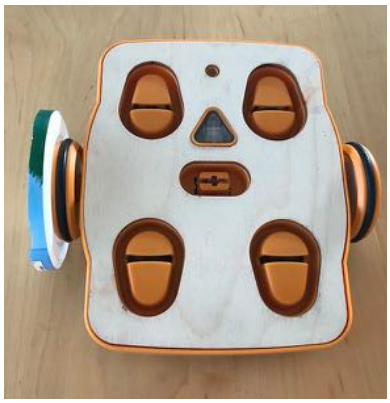
- Students use sturdy building techniques to create tilted surfaces
- Students observe the impact of incline and friction on movement
- Students observe the effect of different sized wheels on movement
- Next Generation Science Standards (see Standards table)

Procedure:

1. Discuss and show examples of relief maps and topographical maps.
2. Engage the students in building a large scale "relief map" in the classroom using blocks, cardboard sheets, planks, and other large-scale building materials.
3. Invite the students to program KIBO to explore the environment they've constructed. Encourage open ended observations of the ways the slopes and surfaces affect KIBO's movement.
4. Provide materials that the students can attach to KIBO's wheels, such as: yogurt container lids, cardboard circles, tape with different qualities of smoothness. Encourage them to experiment with altering KIBO's wheels and observing the impact on KIBO's movement (see the sidebar for details).
5. Bring the students together in a Technology Circle to share their findings from this open-ended activity.

Different Wheels for KIBO

Can KIBO drive in circles? Try attaching a cardboard circle, yogurt lid, or other sturdy circle to one of KIBO's wheels. With different sized wheels, KIBO will curve toward the side with the smaller wheel.



What about the effect of different materials? When KIBO's wheels are smoother, does KIBO climb better or worse? How does KIBO climb on a rough surface?

When engineers make small changes in their designs, they can sometimes cause big changes in how their creations work!

What's Next?

Find more floor-map activities like this one in our KIBO curriculum:

Make Learning Visible
"Activity 5: Curves, Arcs, and Circles"

KIBO Activity Center Guidebook
"KIBO Tractor Pull"

KinderLab robotics