BOWLING

SCIENCE: FORCE & MOTION

OBJECTIVE OF THIS INVESTIGATION:

In a modified game of bowling, children will decide which items to use to knock down water bottles and how much sand or water to put in the bottles to make them fall down more easily.

VOCABULARY:

- Heavy
- Light
- Round
- Flat

MATERIALS:

- 3-5 water bottles to represent bowling pins
- Objects to fill the water bottles to make them heavier (e.g., water, sand, small rocks, etc.)
- Different objects for knocking down water bottles (balls [round], blocks [flat], wooden blocks [heavy], foam ball [light])
- Optional: funnels, spoons, etc. to fill water bottles if needed

PROGRESSION STEPS (SCIENCE: FORCE & MOTION):

Visit **STEMIE Learning Trajectories** for details
- Collision Attribute Recognizer – Moving Objects
- Collision Attribute Recognizer – Still Objects
- Collision Identifier
- Collision Predictor

THIS INVESTIGATION:

- Gather children together and present the game. (Note: this game can be done inside the classroom or outdoors.)
    - **"We're going to play a game! It's kind of like bowling, but we're going to try it out with different objects. I'm not sure what objects will be best for this game, so I hope you can help me solve that problem."**
- Show children the "pins" and the objects they can use to try to knock the pins down.
    - **"Which objects should we use first to try to knock the pins down? Why?"** **(Collision Predictor)**
- Accept and encourage all verbal and nonverbal responses.
- If children struggle to make a prediction, encourage them to test the different objects available to see how they move.

ADAPTATIONS:

See **A Guide to Adaptations** for general ideas and strategies

Environment:
- Remove other distracting items from the area

Materials:
- Provide materials that are easy for children to hold or through.
- Provide sticks or long-handled objects for children to push objects with.

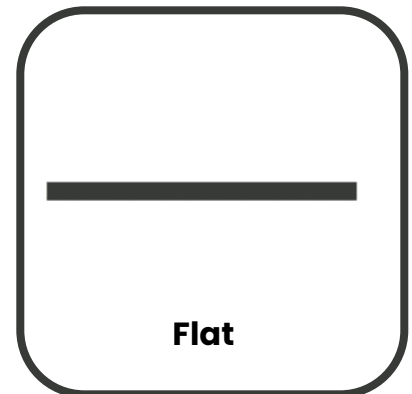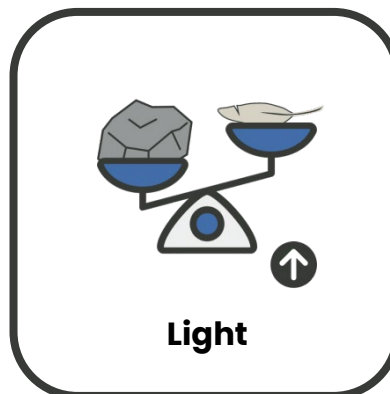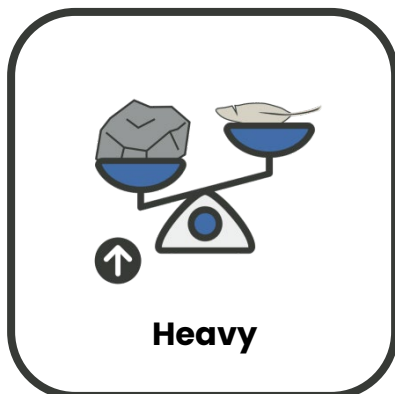*Every child is different. Do what works best for encouraging each child's exploration of this suggested activity.*

THIS INVESTIGATION (CONTINUED)

- If children still struggle to make a prediction, offer a choice based on their testing.

  "When we tested the ball, it moved really easily and really fast. When we tested the block, it didn't move very easily. Which do you think will work better for bowling: the ball or the block?" (Collision Attribute Recognizer – Moving Objects)

- Model testing both objects against the pins.

  "Which object knocked the pins down more easily?" (Collision Identifier)

- If children are still interested, or during a second activity, test different pins instead of different objects for knocking the pins down.

  "So, we decided the ball knocks the pins down more easily. What kind of pins should we set up so that they fall down more easily? Should we fill the water bottles with water and make them heavy or empty all the water out and make them light?" (Collision Predictor)

- Test children's theories by emptying or filling the water bottles and encouraging children to test knocking the pins down with different objects.

  "Did the water bottles fall over more easily when they were full and heavy or empty and light?" (Collision Attribute Recognizer – Still Objects)

- Summarize the activity:

  "We tested all of these objects and found that the ball rolled and moved really easily to knock the pins over! We tested heavy and light pins and found that the light pins fall over more easily so ! Let's remember for the next time we play bowling: we'll use a ball and empty water bottles!"
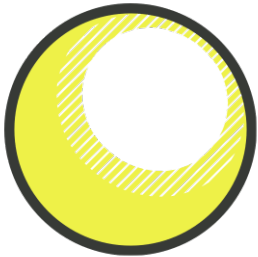
SUPPORT MATERIALS:

Heavy

Light

Flat

BOWLING

SCIENCE: FORCE & MOTION

Every child is different. Do what works best for encouraging each child's exploration of this suggested activity.

SUPPORT MATERIALS:

Use the blank ones to make your own!

Round

Roll

Slide

Rock (example of something heavy)

Feather (example of something light)