SIGNAL LAB

Obstacle Detection

Inspired by Bat Echolocation

Challenge Card 1

Natural model

OBSERVE DESIGN TEST IMPROVE

Design mission

Design a model that helps someone detect an obstacle without seeing it directly. Your system may use sound, a reflected signal, or a cue system to show when an object is nearby.

Signal or cue

- sound
- echo
- reflection

Physics connection

- sound waves
- reflection
- direction
- distance

What is detected?

- object location
- distance
- movement
- clear path

Student thinking prompt

How could your design help someone detect an obstacle without seeing it directly?

Bat Echolocation Challenge Card

Back of Challenge Card: Plan, Test, and Explain

Use this card with your Team Design Mat.

1. Define your system

Sender: What sends the signal?
Signal: What carries the information?
Receiver: Who or what detects it?
Meaning: What should be understood?

2. Choose your signal or cue

- sound
- echo
- reflection
- vibration
- light
- movement

Pick one main signal or cue, or combine two if it helps.

3. Plan before you build

Sketch the signal path. Label the obstacle, sender, signal, receiver, and meaning. Decide what counts as success before you test.

4. Test it

Another team should try to detect where the obstacle is or when it is nearby before you explain your answer.

5. Troubleshoot

What did you expect? What happened? Was the signal blocked, weak, confusing, delayed, or misread? Change one thing and test again.

Use this explanation frame

Our design is inspired by bat echolocation because ___.
Sender: ___ Signal: ___ Receiver: ___
The receiver detects ___.
We improved our design by ___.

Your challenge
Help someone detect an obstacle without seeing it directly.