Biomimetics
(robotic)

Lesson Overview: Students will build a robotic device that emulates an animal's digging movements.
Suggested Time: 120 minutes

Learning Objectives:

- To research and analyze the structure and function of digging animals
- To build a robot that will mimic the movement of an animal
- To build coordinate building and programming for a robot

Materials:

- Robotics kit including motors
- Cardboard
- Tape
- Paperclips
- Robotics kit including motors
- Cardboard
- Tape
- binder clips
- pipe cleaners
- popsicle sticks
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- popsicle sticks
- Paperclips

Testing Station:

- Shoeboxes or plastic tubs of a similar size
- Shredded paper, cotton balls, or wood chips

Directions:

1. Tell students they will build and program a robot that will mimic a digging anima. The robot will dig shredded paper, cotton balls, or wood chips. Show the students the testing stations which have the boxes filled with the materials.
2. Facilitate a conversation with students as you talk about different animals that dig and how they dig (e.g. claws, teeth, tail). During this discussion, look at images of animals that dig and their skeletal systems.
3. Next, have each group pick the animal that they want to emulate. Share the materials they will use so they can begin planning. Students may want to spend time researching their animal and how it digs.
4. Have students complete planning sheets that include a drawing of their intended device.
5. While students build their robots remind them to program and test as they work. Optional: Tests can include how much the robots can dig in a specified amount of time.
6. As part of the mid-design share-out, have students test their designs and give each other feedback.
7. Be sure that students iterate on their designs based on feedback.
8. At the end, ask students to show how their digger works and/or create a poster of the digger and images of animals.

Possible Discussion Topics:

- How does your animal dig?
- How did you mimic your animal's motion?
- How is the motion like your animal? How is it different?
- What other materials would you need to make your robot more accurate?