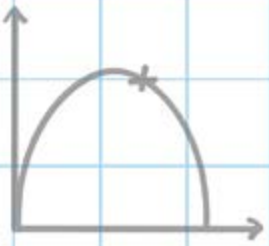
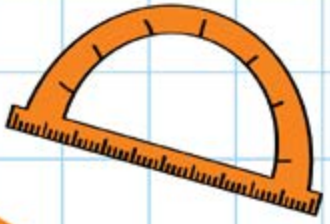
DUCK CHUCK

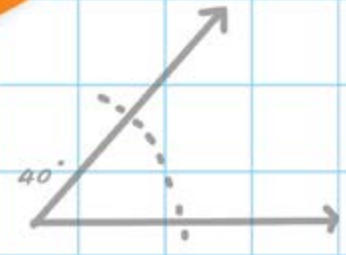




National Inventors Hall of Fame®
EDUCATION PROGRAMS

DUCK CHUCK™

INVENTOR LOG



SAFETY & HYGIENE

WARNING:

Choking hazard–small parts.
Not for children under 3 years.

- All activities require adult supervision.
- Ages 5+
- Read and follow all instructions.
- If there are any latex allergies, substitute resealable plastic bags for latex balloons.
- Wash hands after each activity.
- Properly hold and use scissors. Do not run with scissors.
- Never launch live animals.
- Do not put materials in or near anyone's eyes, mouths, and ears.
- Do not play with or place plastic bags near the face or mouth.
- Ventilate the room when using markers.
- If anyone has an allergy, remove any materials that may trigger an allergic reaction for them.


For an enhanced experience,
access music and videos online at
invent.org/recharge/duckchuck
PASSWORD:
DUCK

GET READY TO BLAST OFF!

Use this hand rocket to investigate trajectory by launching at different angles. Trajectory is the path that the rocket takes as it flies through the air!

MIGRATE OR BUST!

An international rubber duck got lost during migration. Check out these fun facts, then decide which duck you want your rubber duck to represent. Put an X next to it and place a matching flag sticker on your rubber duck.

MORE TO EXPLORE!

Most ducks migrate, often flying to warmer locations when it starts to get cold. Some ducks can fly more than 60 miles (≈96 kilometers) per hour. The fastest flying duck ever recorded was a Red-Breasted Merganser. It was clocked going 100 miles (≈160 kilometers) per hour. Researchers have found that ducks sometimes use landmarks to help them navigate!

BLUE-WINGED TEAL DUCKS

Home Pond: México
Fun Fact: Migrate a long distance–up to 7,000 miles (≈11,000 km) in one trip

RUDDY SHELDUCKS

Home Pond: Scotland
Fun Fact: Lay eggs about 3–4 inches (≈7–10 centimeters) long–extremely large for their size

COMB DUCKS

Home Pond: Madagascar
Fun Fact: Can perch in trees due to long, curved nails

BLUE-BILLED DUCKS

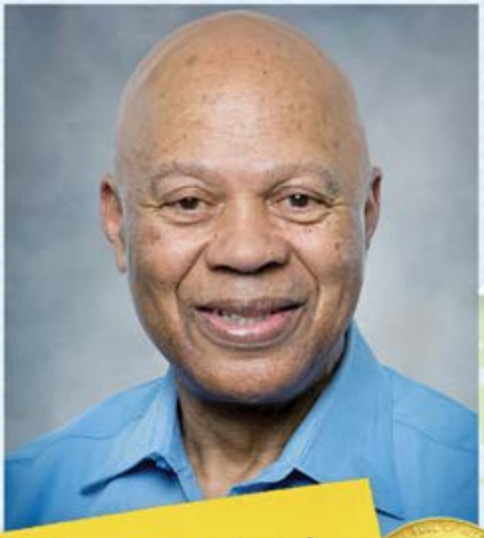
Home Pond: Australia
Fun Fact: Have a unique bill

THE CHILOÉ WIGEON DUCKS

Home Pond: Chile
Fun Fact: Sometimes steal food from other animals

SPOT-BILLED DUCKS

Home Pond: India
Fun Fact: Usually eat at night



MEET A HALL OF FAMER:

MARSHALL JONES

Before inventing Industrial Laser Technology, National Inventors Hall of Fame® (NIHF) Inductee Marshall Jones lived on a duck ranch where he helped by herding the ducks and doing other chores like cutting wood.

Marshall Jones believes in the importance of hard work and never giving up.

Learn more about Jones here:
invent.org/inductees/marshall-jones

FIND YOUR DUCK ON THE MAP!

NIHF INDUCTEE MARSHALL JONES LIVED ON A DUCK RANCH IN AQUEBOGUE, NEW YORK!

MÉXICO

CHICHÉN ITZÁ PYRAMID

EASTER ISLAND

CHILE

MOAI STATUES

5


PIONEERED THE USE OF LASERS FOR INDUSTRIAL MATERIALS
MARSHALL JONES
WATCH THE MARSHALL JONES VIDEO!
SCOTLAND
SCOTT MONUMENT
INDIA
THE HIMALAYAS
MADAGASCAR
BAOBAB TREES
AUSTRALIA
SYDNEY OPERA HOUSE

BUILD A LANDMARK

Use your materials, recyclables, and items from around your home to build a landmark! Check out these pictures for inspiration.

PLAY THE LANDMARKS MUSIC.

Moai Statues are located on Easter Island, which is off the coast of Chile. There are more than 1,000 statues on the island.

Baobab trees can grow up to 98 feet (≈30 meters) tall and can be found in Madagascar and other parts of Africa.

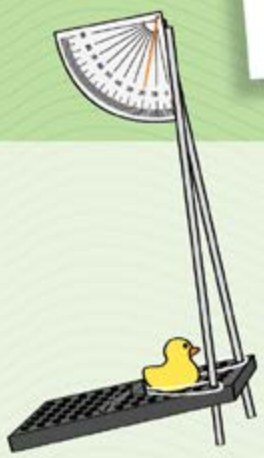
Sydney Opera House is an art institution and concert venue in Sydney, Australia.

YOU'LL NEED:

Chichén Itzá Pyramid is a Mayan ruin located on the Yucatán Peninsula in México.

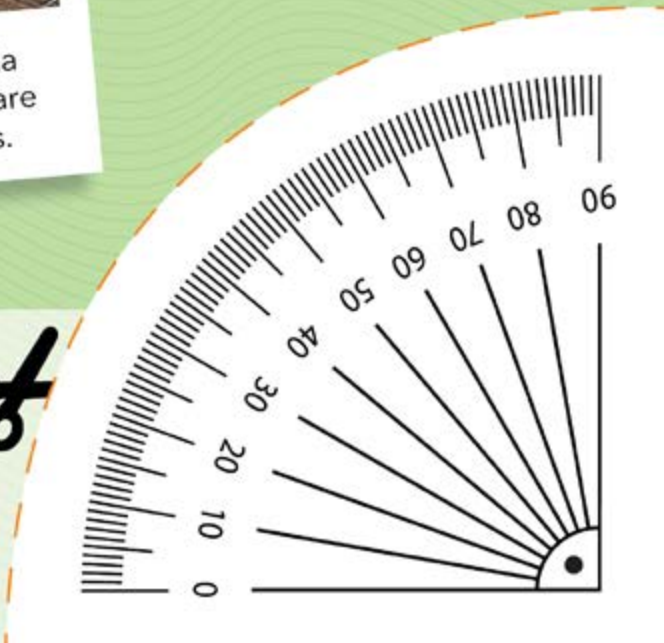
Scott Monument is a monument to Sir Walter Scott, a writer, in Edinburgh, Scotland.

The Himalayas are a large mountain range in Asia separating India from the Tibetan Plateau. There are more than 110 mountain peaks in the Himalayas.



NEXT STOP, LAUNCHER ASSEMBLY!

Get ready to launch your duck. Cut out the protractor along the orange dotted line.



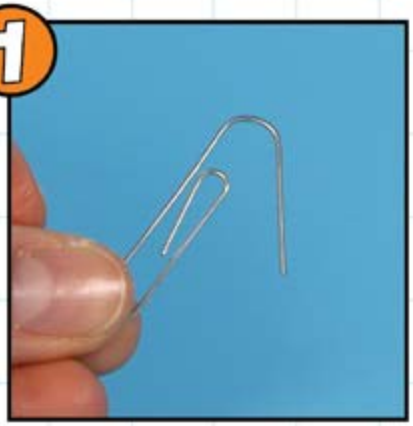
LET'S BUILD A LAUNCHER

It's time to build your launcher! Gather your materials and watch the **Launcher Assembly video** or use the pictures on the next page.

YOU'LL NEED:

PRO TIP:
Put your duck's chest against the black, flat edge of the binder clip.

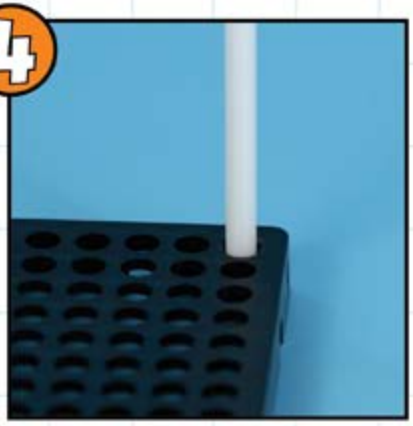
PUSH THE LEG OF YOUR PAPER CLIP THROUGH HERE!



Pull the leg of the paper clip out.

Push the leg of the paper clip through the dot on the back of the protractor.

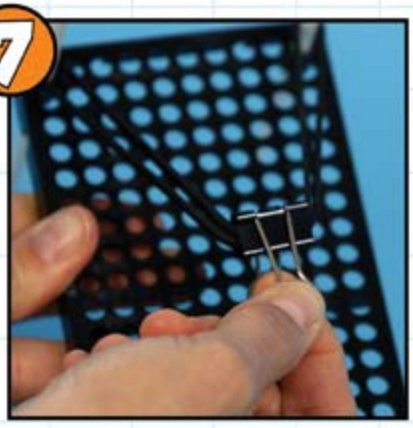
Tape the protractor to one of the plastic sticks.



Push each plastic stick into a corner of the base.

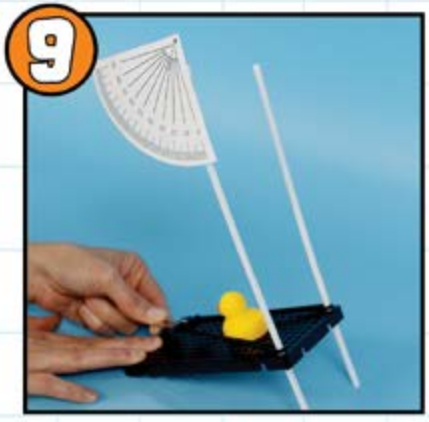
Slide the plastic sticks until the base is even. Adjust the angle by sliding the base up and down.

Slide the rubber band over both plastic sticks.



Pinch the rubber band and put it in the binder clip.

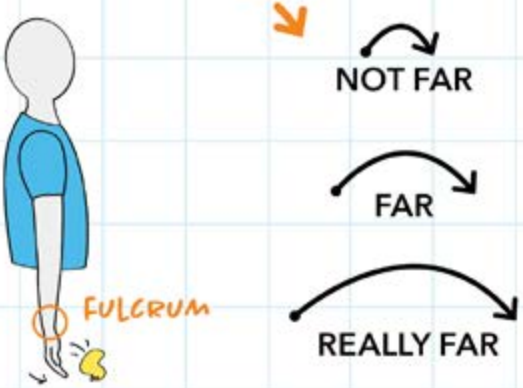
Flip over the silver parts of the binder clip.



Grab your duck and test your launcher!

GET OUTSIDE!

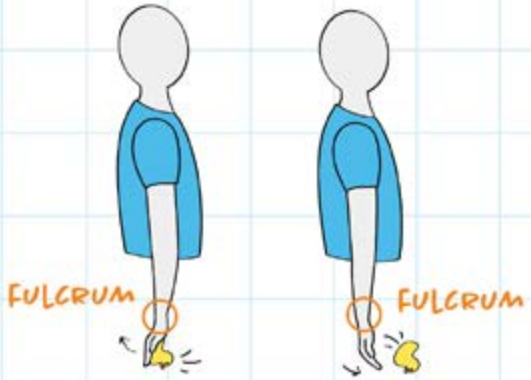
EXPERIMENT! Launch your duck first using your wrist, then elbow, then shoulder. **Circle your duck's trajectory after each trial.**



Trial 1

Place your wrist against your side and throw your duck. Remember to only use your wrist!

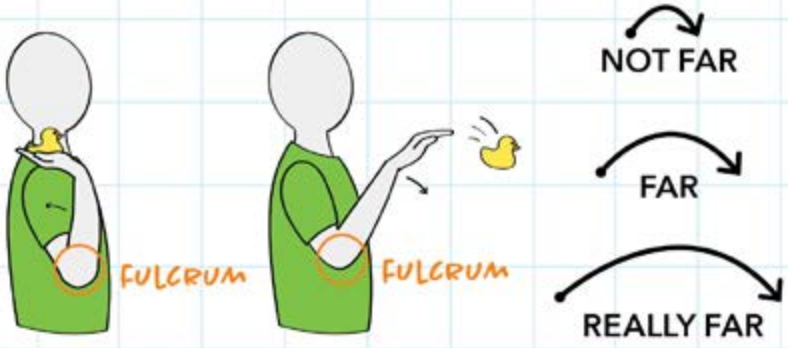
This will limit the amount of force you can use, so your duck may not go very far.



Trial 2

Place your elbow against your side and throw your duck. Remember to only move your elbow!

This will limit the amount of force you can use, but allow you to use more force than when only using your wrist.



Trial 3

Throw your duck by moving your shoulder, elbow, and wrist.

You will be able to use more force when you use your shoulder, and the full extension of your arm.

WATER BALLOONS!

The water balloons have more mass than your rubber ducks. They will not go as far as the ducks without applying additional force. **Modify your Duck Chucking Device to make your water balloons go far.**

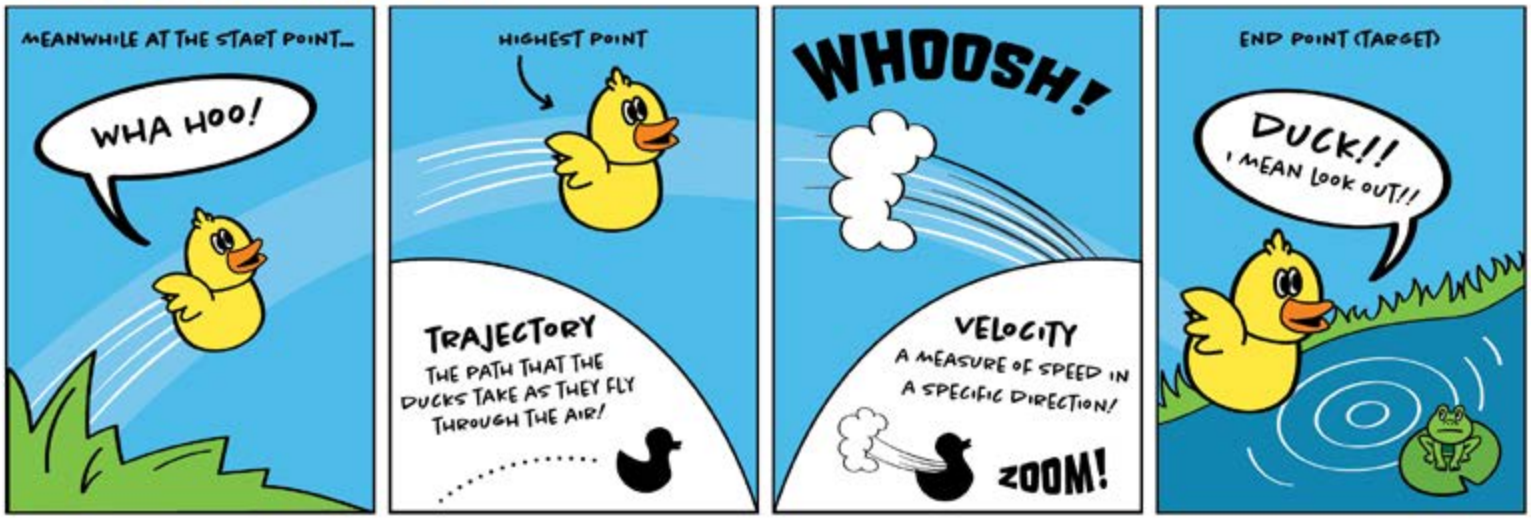
MORE TO EXPLORE!

Some jobs involve the use of math and measurement to study projectile paths. Sometimes, people measure projectiles just for fun! Think of football players. It is important for them to understand how the football moves through the air and what path it will take after it is thrown or kicked. It is also important for them to consider how much force is necessary to move the football.

TRAJECTORY EXPERIMENT

Test how mass affects trajectory. First, launch a table tennis ball. Then, launch a bouncy ball. The bouncy ball has more mass. If you want it to go as far as the table tennis ball, you'll need more force.

TRAJECTORY & VELOCITY

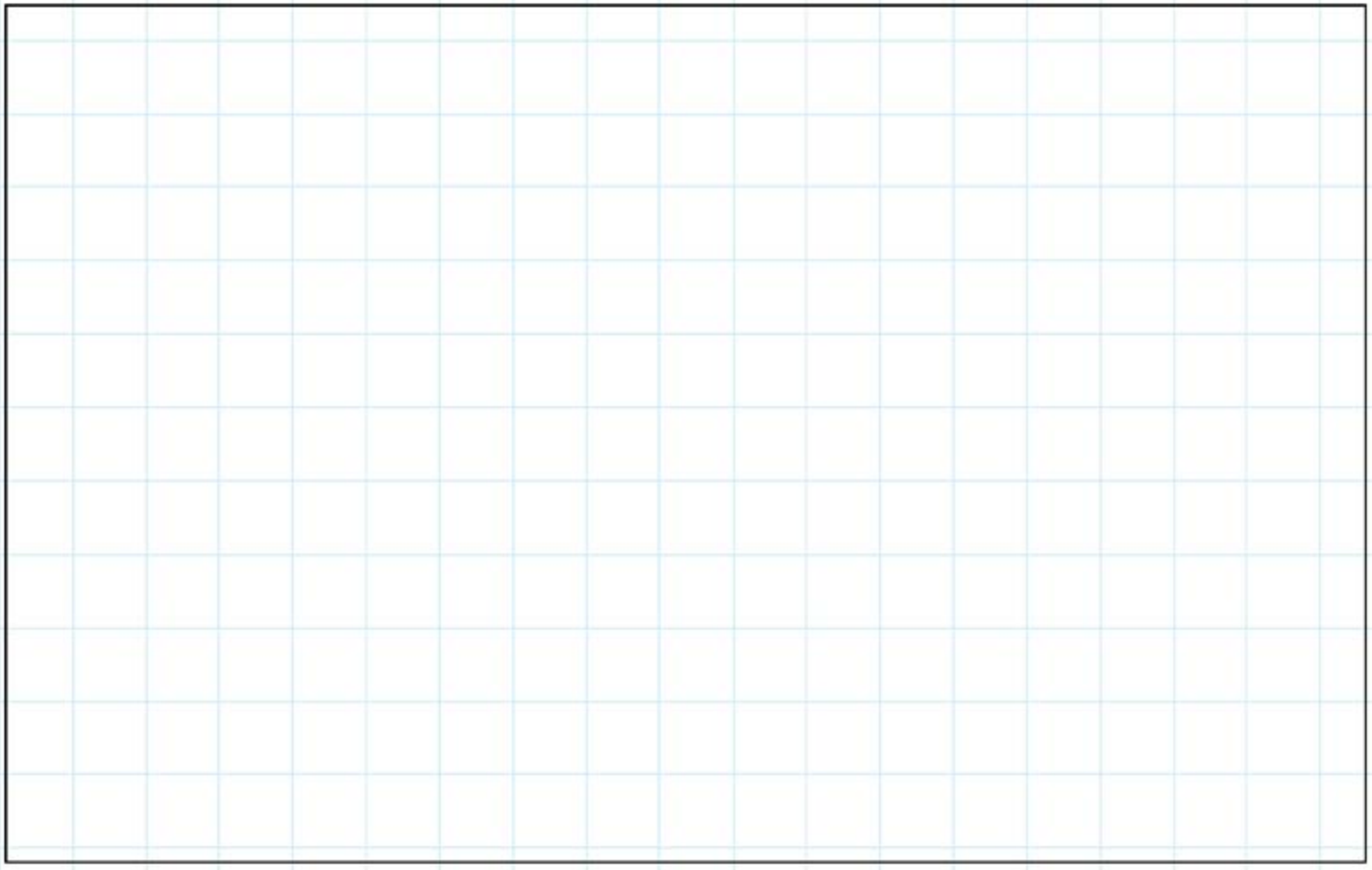


YOU'LL NEED:

WATCH THE TRAJECTORY AND VELOCITY VIDEO!

Draw your duck's trajectory and label it using the following words:

DUCK, TRAJECTORY, TARGET.



MORE TO EXPLORE!

When you are testing your Duck Chucking Device, you are using scientific concepts like velocity, trajectory, mass, and force. You are also exploring mathematical concepts like angles and measurement. Along with keeping open to exploring new concepts, you are also pushing past barriers and thinking of novel uses for ordinary materials.


PRO TIP:
Keep this page open and clip it to your Pegboard to use as a target.

MARKETING CAMPAIGN

YOU'LL NEED:

It's time to create an advertisement for your Duck Chucking Device. Start by answering these questions!

WHAT UNIQUE FEATURES DOES YOUR INVENTION HAVE?

WHO WILL BE INTERESTED IN YOUR INVENTION?

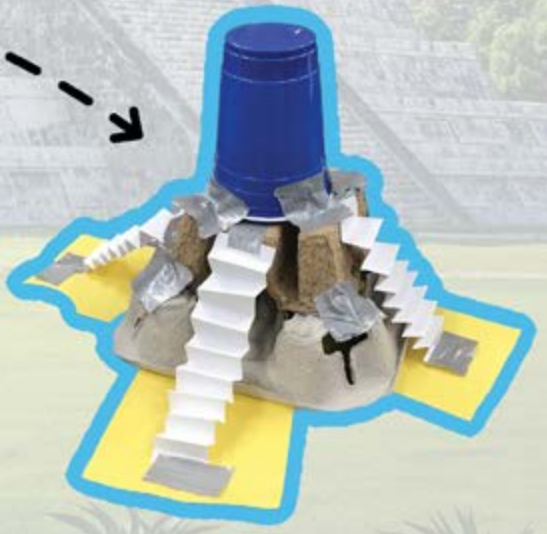
WHAT OTHER WORDS, OR SYNONYMS, FOR DUCK (FOWL, BIRD, DUCKIE) AND CHUCK (THROW, TOSS, PITCH) COULD YOU INCLUDE IN YOUR ADVERTISEMENT?

GRAND FINALE!

LAUNCH YOUR RUBBER DUCK TOWARD YOUR LANDMARK!

YOU'LL NEED:

HOMEWARD BOUND!



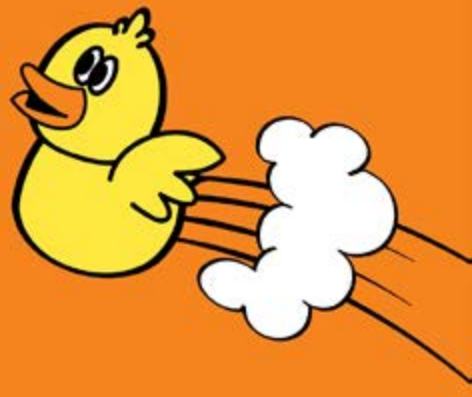
MORE TO EXPLORE!

In 1992 about 30,000 plastic ducks were released into the ocean when they slipped off a boat. Researchers tracked the plastic ducks which helped them understand more about ocean currents. Some ducks made it all the way to Alaska and others to Japan. Mistakes sometimes happen, but remember to learn something from them.

DUCK CHUCK

CHECK OFF EACH ACTIVITY AS YOU COMPLETE IT!

- [ ] Blast Off!
- [ ] Migrate or Bust!
- [ ] Build a Landmark
- [ ] Build a Launcher
- [ ] Get Outside!
- [ ] Trajectory Experiment
- [ ] Marketing Campaign
- [ ] Grand Finale!



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