Invention Project®

GRADES K-6

CURRICULUM EXCERPT

Invention Project®

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RESCUE SQUAD™

Selected pages from Rescue Squad™

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FOREWORD

Introduced in 1990, National Inventors Hall of Fame® programs have encouraged students to explore their creativity and innovation through Science, Technology, Engineering, and Mathematics (STEM) activities and real-world challenges, fostering a lifelong interest in inventive thinking.

Created by the National Inventors Hall of Fame®, Invention Project® is inspired by the Inductees, who are integrated throughout the curricula. In collaboration with the United States Patent and Trademark Office, Invention Project® gives children the opportunity to take risks, use creative problem solving, and develop an entrepreneurial mindset.

To date, the National Inventors Hall of Fame® has impacted over two million children, teachers, parents, college students, and inventors through education and recognition programs, including Invention Playground®, Camp Invention®, STEM Maker Lab®, Club Invention®, Invention Project®, and the Collegiate Inventors Competition®.

Please visit the Invention Project® website at invent.org/IP to learn more. The National Inventors Hall of Fame® makes no warranty, explicit or implied, as to the safety or suitability of our activities. We urge you to always use proper safety equipment and precautions.

SAFETY AND HYGIENE

- For the safety and hygiene of participants, please be sure all children wash and sanitize their hands before and after each session.
- Be sure to follow all local and state fire and safety regulations.
- Ventilate the classroom when using markers.
- Demonstrate to the children how to properly hold and use scissors. Do not allow anyone to run with scissors.
- Remind children to safely handle objects with a point, such as pipe cleaners.
- Do not allow children to shoot each other with rubber bands.
- Ensure children use caution with binder clips and clothespins to avoid pinching skin.
- If any participant has an allergy, remove any materials that may trigger an allergic reaction for them.
- Make sure children do not put materials in or near their eyes, mouths, and ears.
- Keep marbles and beads away from faces and mouths to avoid choking hazard. In addition, ensure loose marbles or beads are not on the floor to avoid slipping hazard.
- Do not allow children to play with or place plastic bags near the face or mouth.
- Do not allow the floors to become wet. If floors do become wet, use a mop or towels to dry them.
- Only Instructors should use glue guns. Practice caution when handling glue guns. They are hot.
- Liquid iodine and iodine water should only be handled by Instructors. Please wear gloves when handling and do not allow children to come into direct contact with iodine. Conduct the activity with iodine on tiled, nonporous floors or outside.
- Coin batteries can be harmful if swallowed. Please take precautions to make sure they are not placed near the children's mouths.

- Do not allow coin batteries to touch when not in use.

Unit Two: Nature's Engineering

Session Four: STEAM

Operation Bear Trouble

Participants airdrop into a riverside town and receive their next mission: Operation Bear Trouble. Squads build parachutes and airdrop beavers to the river, then they collect data and use the results to improve their airdrop accuracy.

Concepts

- ☐ Testing Materials and Properties
- ☐ Analyzing and Interpreting Data
- ☐ Engineering Design
- ☐ Cause and Effect

Plan Ahead

- Hang the Rescue Squad Operation Map poster.

- Set up the space for the beaver airdrop by completing the following **(see Figure 2)**:
  - Identify five open floor spaces, one for each Squad to perform the aerial drop.
  - Place one River poster in each team's floor space, securing with masking tape, if needed.
  - Place a masking tape line approximately 4 feet from each River poster to serve as a parachute launching point.

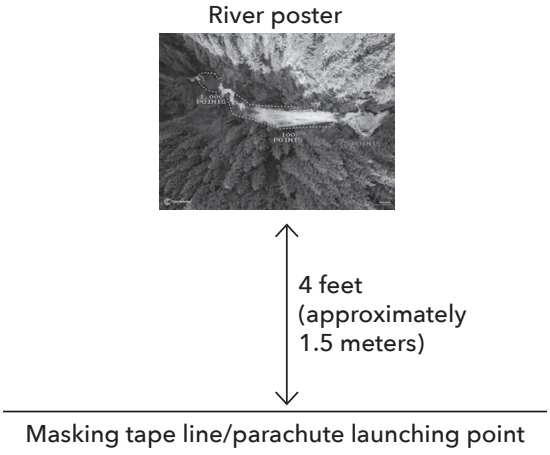
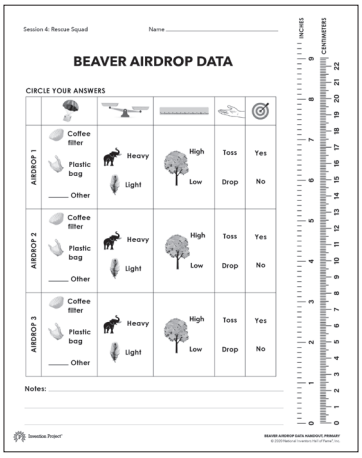
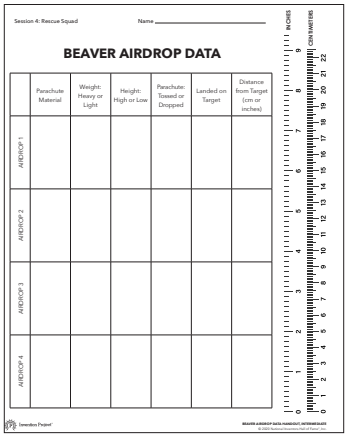


Figure 2. Beaver Airdrop Setup

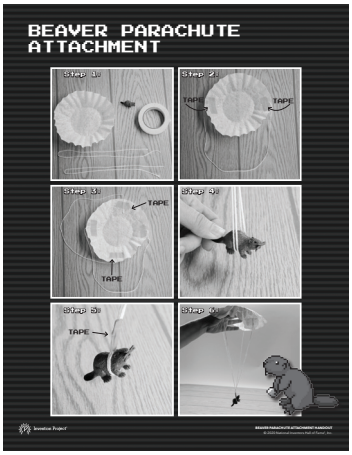
✔ If choosing to do this activity individually, disregard the above setup. Instead, give each participant one of the Rescue Squad Operation Map handouts for children to use as individual targets.

- Prepare one copy of the following handouts per participant:
  - Beaver Airdrop Data (Primary or Intermediate version)

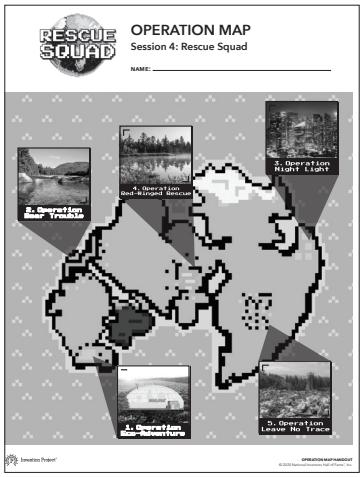




  - Beaver Parachute Attachment



- Rescue Squad Operation Map



UNIT TWO

ACTIVITY: OPERATION BEAR TROUBLE

Materials

- ☐ Animal figures (from Session Two)
- ☐ Beaver Airdrop Data handouts, Intermediate
- ☐ Beaver Airdrop Data handouts, Primary
- ☐ Beaver Parachute Attachment handouts
- ☐ Coffee filters
- ☐ Markers
- ☐ Masking tape
- ☐ Paper (copy or construction)
- ☐ Pencils
- ☐ Pipe cleaners
- ☐ Rescue Squad Operation Map handouts
- ☐ Rescue Squad Operation Map poster
- ☐ River posters
- ☐ Scissors
- ☐ String
- ☐ Upcycled Materials

✔ While the activity references beaver figures, children may have assorted North American animal figures. Many types of animals (including beavers) have been airdropped!

Step-By-Step Instructions

Part One

♫ Play the "Unit Two Music" Track.

1. Say the following:

💬 *Welcome back to Headquarters, Rescue Squad. Your impressive skills are already being noticed, and we're sending you out on an urgent mission right away!*

2. Show the Rescue Squad Operation Map poster, and point out today's location.

🎞 Play the "Operation Bear Trouble" Track, or read the transcript at the end of the curriculum.

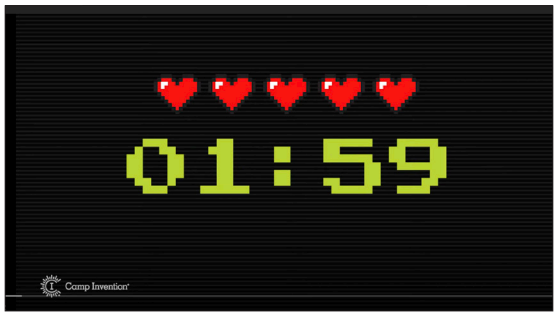
3. Tell children that they will help this river ecosystem by building parachutes to airdop the beavers!

4. Tell children that each child will build a parachute.

5. Explain that first, they can spend 2 minutes adding ecofriendly themed decorations to the top of the parachutes using markers.

6. Have children find the coffee filter in their Rescue Squad Kit and markers from their Inventor Supplies Kit.

Play the "2-Minute Timer" Track, and have children add their designs to the coffee filter.



Part Two

1. Have children get out the beaver (or other animal figure) and string from their Rescue Squad Kit. Have them get out the masking tape and scissors from their Inventor Supplies Kit.

2. Give each child a Primary or Intermediate Beaver Airdrop Data handout and a Beaver Parachute Attachment handout.

3. Tell participants that they will be testing different materials for their parachutes to see which materials work the best. Explain that they will start by testing a coffee filter parachute.

✔ Assist Primary participants with cutting tape as needed.

4. Guide children through making parachutes for their beavers by following along with the Beaver Parachute Attachment handout and making an example. Say the following:

Cut two pieces of string approximately 20 inches long. Use the ruler on the side of your handout to measure.

Lay the coffee filters on the table so that the cupped side is facing up.

Tape one string to the top of the coffee filter at the far left and far right ends with masking tape, making a loop.

Tape another string to the top of the coffee filter at the top and bottom ends using masking tape, making a second loop.

Hold the parachute so the strings are hanging down. Place the beaver in between the two loops of string so that they are cradling it.

Gather all of the strings right above the beaver and wrap a piece of masking tape around the strings. This closes the loops so the beaver will ride safely, without tipping out.

Part Three

Play the "Unit Two Music" Track.

1. Have Squads gather around their team's River poster, behind the line,

with their beavers in parachutes, and their Beaver Airdrop Data handout.

✔ If desired, give each child a Rescue Squad Operation Map handout to use as an individual target instead of the River poster.

2. Challenge the Rescue Squad members to airdrop the beaver with the parachute toward the river, aiming to have it land along the riverbank or in the river.

3. Say the following:

💬 *If you land a beaver safely in the habitat (i.e., on the poster), you will receive 50 points!*

💬 *However, there are some places that are better for the beaver to land than others.*

💬 *Score 1,000 points for parachuting the beaver into the calm water, the perfect place to build a beaver dam!*

💬 *If you drop your beaver in the sandy area, that is worth 500 points!*

💬 *If you land in the rougher part of the river, you still score 100 points.*

4. For Primary participants, point out the different variables on the Primary Beaver Airdrop Data handout, and say the following:

💬 *This chart is a place to keep track of each airdrop. When we keep track of information, we call it data.*

5. For Primary participants, complete the handout as a group, going through how to circle items to collect data for each airdrop.

6. Tell Primary participants to experiment using different items from their Inventor Supplies or Upcycled Materials, like plastic bags, paper, or pipe cleaners to create new parachutes for each airdop to see if it is better or worse.

7. For Intermediate participants, point out the different variables on the Intermediate Beaver Airdrop Data handout and say the following:

💬 *Experiment with the different variables of the airdrop, and record your data in the Beaver Airdrop Data chart. For each airdrop, test the height you release the parachute. Do you predict that a drop from higher or lower will be more likely to hit the target?*

💬 *Also, experiment with tossing the parachute versus just letting it drop from your hand. Which way seems better?*

💬 *Modify the parachute using a plastic bag, paper, pipe cleaners, or other items from the Upcycled Materials. Test the different materials and what influence they have on the outcome. Try adding weight, such as sealed water bottles filled to different levels, to make the parachute load heavier.*

💬 *For each airdrop, record if you are successful in hitting the target. If your beaver didn't quite make it to the destination, use the ruler on the Beaver Airdrop data chart to measure how far away from the target your beaver landed.*

Play the "Unit Two Music" Track, and begin the challenge!

✔ Have children stand behind the tape line when launching.

8. Have children take turns airdropping and retrieving the beavers.
9. Allow children to use Upcycled Materials to modify their parachutes, and retest.
10. Have participants perform as many airdrops as time allows.
11. As a class, discuss the findings recorded in the Beaver Airdrop Data handouts.
12. Once all beavers have been airdropped to the river, congratulate the Rescue Squad on completing Phase One: repopulating the river with beavers!

Primary Guiding Questions

- Have you ever seen a bear or beaver? What did they look like?
- Was airdropping the beaver hard or easy? In what ways?
- What combination of materials, height, and weight made for the most successful beaver airdrop?
- What other animals do you think could be airdropped to new locations? Why?

Intermediate Guiding Questions

- How might you make a parachute environmentally friendly after an animal airdrop?
- What do you think makes beavers well suited for a river environment?
- Do you think airdropping animals is sometimes a better option than delivering them in another way? Why?
- What did your data indicate was the best combination of materials and variables for an accurate beaver airdrop?

Primary Discussion

Animals and nature need to live in balance with each other. Sometimes that means sharing land near each other. People have come up with creative ways to help animals when they are having trouble on their own. Wildlife departments airdrop animals into locations when their numbers are low, or even reintroduce animals into areas in which they used to live.

Intermediate Discussion

Did you know relocating animals by airdropping them into remote locations actually happens? Over 60 years ago, wildlife scientists airdropped beavers in boxes with parachutes to help bring beavers back to hard-to-reach forests. Now, more than just beavers are being airdropped. Sometimes people overfish lakes, and the number of fish in the lake drops too low. Wildlife departments across the United States fix this situation by dropping fish into the lakes from an airplane! This allows fish to be added back to lakes in areas that cannot be reached by cars or trucks. Otherwise, people would have to hike carrying buckets of fish! Other animals, even those as large as bison, have been airdropped to remote parks to boost local populations!