

Helicopter Hang Time Exploration

Dear Family,

During the last few days, the children designed a set of rotor blades that could make a helicopter land very s-l-o-w-l-y. They acted just like engineers! They...

- identified and learned about a problem
- planned ways to solve the problem
- made a model
- tested the model
- thought about test results and made a new plan

In this exploration, children learned about engineering design, using shapes to make other shapes, and adding two-digit numbers up to 100. They also practiced skills, such as planning and conducting an investigation, using data to make comparisons, and making a claim supported by evidence.

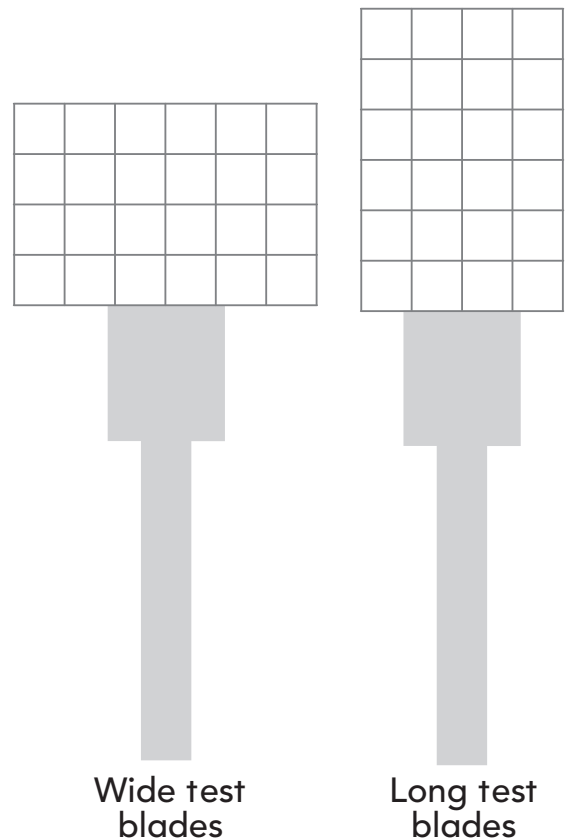
Say: *Tell me about what you did in this engineering project.*

Ask prompting questions if your child needs help.

- How did you learn about rotor blades?
- What is a fair test?
- How did you do a fair test with long test blades and wide test blades?

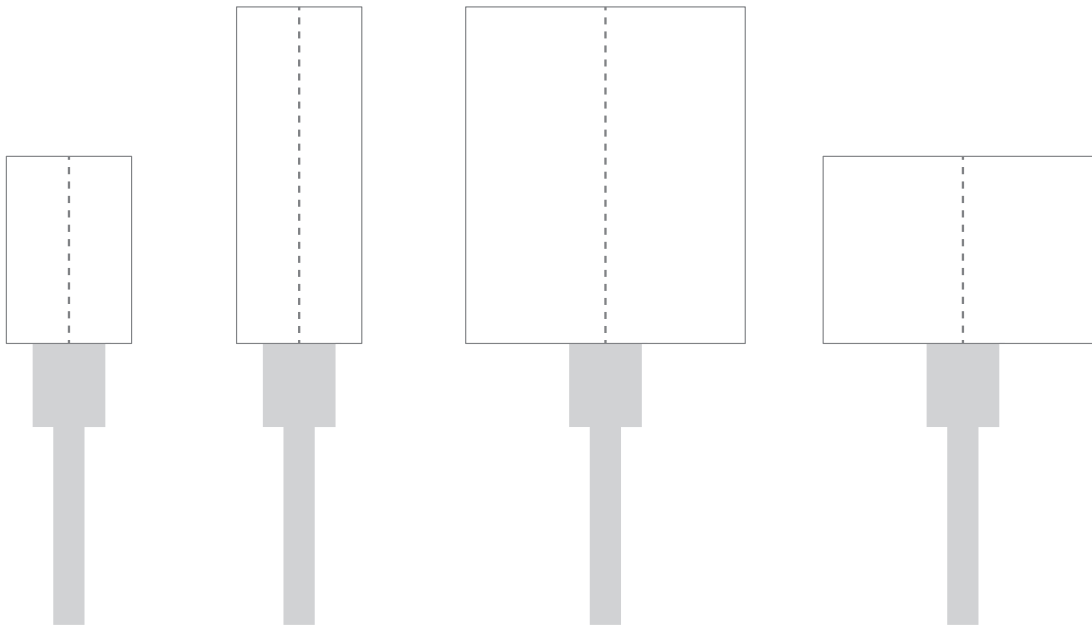
Say: *Circle the test blades that landed more slowly.*

On the back of this sheet, work with your child to find out more about what the team did in this exploration.



Helicopter Hang Time Exploration

Ask your child: *How did your team use the results of your fair test to plan new rotor blades?* **Say:** *Circle the rotor blades below that looked most like the team's new plan.*



Try it!

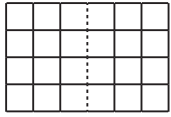
1. Use a piece of junk mail, such as letter paper or card stock.
2. Cut out a large shape like the one in the picture your child circled. Cut on the dotted line to separate the rotor blades.
3. Have your child show you how to do the test. (He or she will fold down the blades so they stick out in opposite directions, then hold it up and out, and release it.)
4. Encourage your child to plan and test new rotor blades that land even more slowly. Try:
 - other shapes or sizes
 - heavier paper
 - dividing the blades into more sections
 - attaching small weights or several paperclips to the very bottom.

Test Blades Data

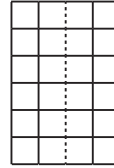
Name _____

Follow these steps.

1. **Count** the number of squares on the test blades.



_____ squares



_____ squares

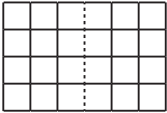
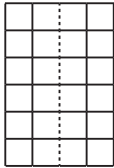
Wide blades

Long blades

2. **Predict** Which rotor blades do you think will land more slowly? Why? Circle your choice above.

3. **Test** Follow the steps on the **Fair Flight Test** page.

4. **Observe** Which fell more slowly? Put an X in the box.

	 Wide blades	 Long blades
Drop 1		
Drop 2		
Drop 3		
Drop 4		

5. **Think** Which rotor blades fell more slowly more often? Why do you think this happened? _____

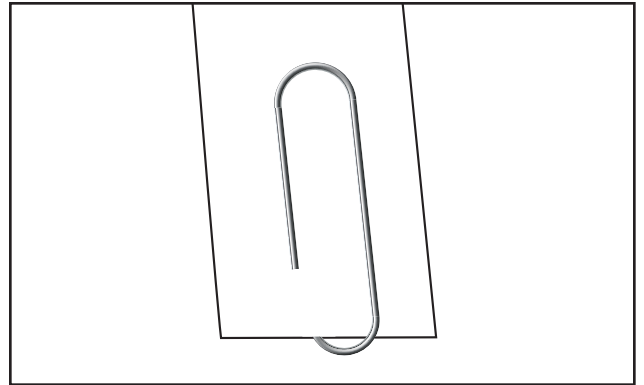
Fair Flight Test

Name _____

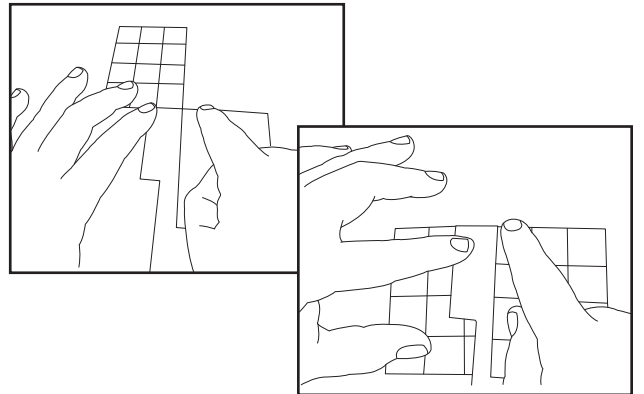
Follow these steps.

1. Put a paperclip on the bottom of each set of rotor blades.
2. Fold the rotor blades so they stick out.
3. Hold one set of rotor blades in each hand.
4. Stretch your arms up and out in front of you. Hold both hands at the same height.
5. Let go of the blades at the same time.
6. Watch the blades fall and land.
7. Write down the results.
8. Take turns holding up the two sets of blades and releasing them.
9. Write down the results of all tests.

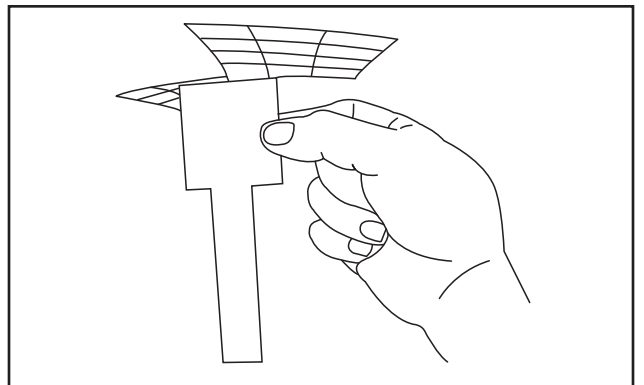
1.



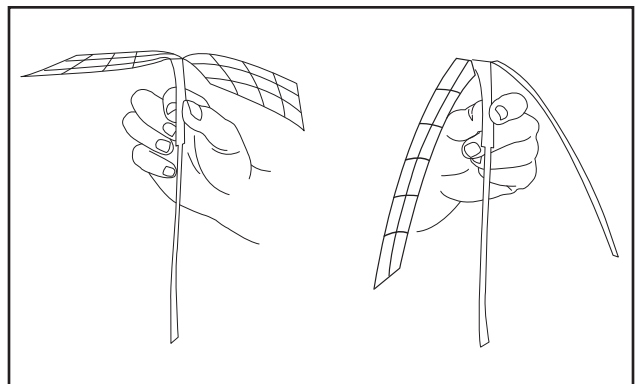
2.



3.



4.



Rotor Blades Plan

Name _____

Follow these steps.

- 1. Circle one:
My Rotor Blades Plan Team Rotor Blades Plan
- 2. **Imagine** what shape of rotor blades will land most slowly.
- 3. **Plan** Use a pencil to shade the squares that show the blades' size and shape.

Red Rotor (base)

Team Rotor Blades Data

Name _____

Follow these steps.

1. **Count** the squares on the team rotor blades and the blue test blades.

Team rotor blades _____ squares

Blue test blades _____ squares

2. **Test** Follow the steps on the **Fair Flight Test** page.

3. **Observe** Which rotor blades fell more slowly? Put an X in the box.

	Team Rotor Blades	BLUE Test Blades
Drop 1		
Drop 2		
Drop 3		
Drop 4		

4. **Think** Which kind of rotor blades fell more slowly more often? Why do you think so?
