NAME _____

LESSON 18

TWISTY T

FOCUS Flight

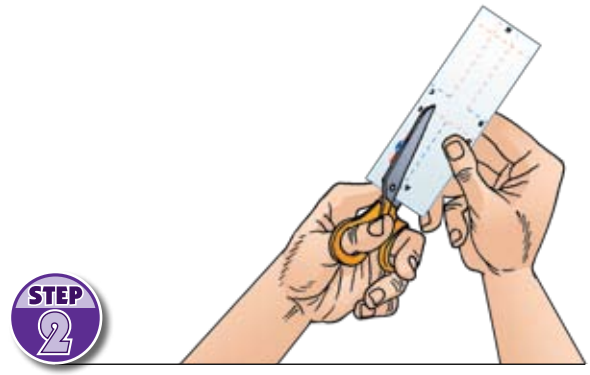
OBJECTIVE To explore how forces allow flight

OVERVIEW You've discovered that nothing moves without forces. But how do forces help things fly? This activity provides an answer with a "twist!"

WHAT TO DO

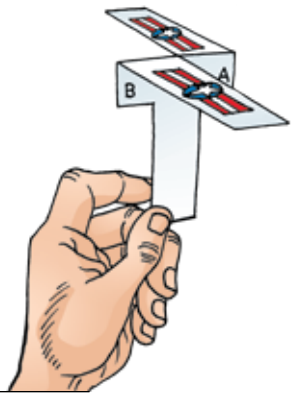
STEP 1

Remove the "Twisty T" page from the back of your worktext (page 171). **Cut out** the Twisty T flyer using the solid blue lines. (Do not cut any red lines. Red lines are for folding only!)



STEP 2

Carefully **cut** along the dotted blue lines (A, B, C). Cut only as far as the lines go! Now **fold** along line D one way, and along line E the other. If you look at your Twisty T from the side, it should now look like the letter T.



STEP 3

Fold in the sides at lines F and G so your Twisty T has a smaller shaft. Now **fold** the bottom up at line H to make a tab at the bottom. (Make sure the wings are tipped up slightly.) Now **examine** your Twisty T and make notes about what you see.

STEP 4

Here comes the fun part! **Toss** your Twisty T into the air. It should wobble skyward, stop, and begin spinning to the ground in a graceful spiral. Now carefully **review** each step in this activity. **Share** and **compare** observations with your research team.

WHAT JUST HAPPENED?

Forces always come in **pairs**. Every force has an **opposing force**. For instance, when you stand up, the force of your muscles fights against the force of **gravity**.

In this activity, gravity was trying to **pull** your Twisty T flyer down. But your Twisty T flyer resisted gravity by spinning like a top and slowing its fall. This showed us that there was another force in action, too. So what happened?

As it fell, your Twisty T flyer's wing flaps were given a slight **twist**. The twist turned those strips of paper into wings, creating **lift** (a backwards **push** against gravity). Lift is a force that's caused when air rushes over the top of a surface faster than it does the bottom. It's the force that allows for flight. Although gravity will eventually triumph, the force of lift allows us to slow the descent of the Twisty T.

WHAT WE LEARNED

1. **Describe the Twisty T flyer after you cut it out in Step 1. Would it fly like this? Why or why not?**

2. **Compare the Twisty T flyer at the end of Step 3 with what it looked like at the end of Step 1. How was it similar? How was it different?**

3 **What were the two forces demonstrated in this activity? How did they interact with each other?**

4 **What kind of aircraft does the Twisty T flyer remind you of? How are they similar? How are they different?**

5 **Compare the flight of your Twisty T flyer with the flyers made by other teams. List some factors that might make them fly differently.**

CONCLUSION!

Nothing moves without the influence of a force. Forces come in pairs, and every force has an opposing force. Under controlled circumstances, the force of lift can allow an object to fly.

FOOD FOR THOUGHT

James 4:7 Your Twisty T flyer did a great job resisting the pull of gravity. But eventually, gravity won, and the flyer ended up on the ground. Even a powerful helicopter can't resist gravity forever. Sooner or later, it has to come down.

Scripture tells us that we must "resist" the devil. Yet Satan is powerful, and if we only rely on our own strength, eventually he'll drag us down. But the first part of this verse offers us an "opposing force." James tells us to submit (or give) ourselves to God. If we do this, then God's power will overcome the force of the devil, and we will be kept safe from harm!

SCIENCE JOURNAL NOTES