FLOATING ON AIR

How does an aircraft stay in the air? Why doesn’t it fall down and crash? You are going to research that with this exhibit. You are going to make a ping pong ball float on a stream of air. You won’t believe your eyes!

WHAT DO YOU NEED?

Materials:
- A hairdryer of at least 2,000 Watts
- Ping pong ball
- Wooden laths
- Plank
- Bolt
- Wing nut
- Wood screws
- Tie-ribs

Tools:
- Pencil
- Ruler
- Wood saw
- Hand drill
- Bench vice on a workbench
- Sandpaper

BUILDING PLAN

Before he starts building, a builder of exhibits first makes a building plan of the exhibit. That’s what you are going to do too. A building plan shows how something is made and how big it will be.

First look at the photo and the drawings under ‘How are you going to make it?’ This will give you an idea of what the exhibit will look like and how it should be constructed.

Tips: 1. You can read the text accompanying the drawings already. 2. If the materials for your exhibit are already available, it’s a good idea to have a look at them too.

Under ‘What do you need?’ you can see all the materials and tools that you need. But the list of materials does not show exactly how much of them you will need. You will know that only when you have decided how big the exhibit will be. So first decide with your pal how big the exhibit should be and how you are going to draw it. Discuss your plan with your teacher.
Now use a pencil and ruler to make a building plan in your workbook. You both make your own building plan in your workbooks, but you do it in the same way. You make the drawing to scale 1:2. This means that one centimeter on the drawing is really two centimeters in real life. So if your real exhibit is forty centimeters high, it is twenty centimeters high in the drawing. Write the real measurements next to the different parts. In your building plan, you should also mark exactly where the holes should be. For this, use the description under ‘How are you going to make it?’

You are going to show the building plan to the rest of your class. Tell them how you plan to build the exhibit. Ask the other children and the teacher what they think of the building plan. Maybe they have an idea to make it even better.

Show your improved building plan to the teacher. When he or she has approved your drawing, you can start making the list of materials together.

**LIST OF MATERIALS**

The building plan is ready, so you now know the size of all the materials and you can count how many of each part you need. Make the list of materials in your workbook and give the list to your teacher. Ask him or her where you can get these things. Then you can really start building!

**HOW ARE YOU GOING TO MAKE IT?**

To build an exhibit together you have to discuss a lot and make agreements. How are you going to tackle it? Who does what?

Divide up the different tasks as fairly as possible.

Try to work together as much as possible, so that you both get some experience of building. If you come across a difficult word, look it up in a dictionary.

1. First you are going to make a wooden stand for the hairdryer. Use the plank for a base. You also need the wooden lath. Lay everything out.

2. Look at your building plan to find the right size and, with a pencil, mark the place on the wood where you are going to saw. Saw the laths and the plank to size. You need two laths of 10 centimeters and one of 3 centimeters for the foot of the stand. You also need one lath of 30 centimeters. This is what you will later attach the drier to. Saw a point in the end of the long lath. Use a wood saw and a workbench.
3. Now you are going to drill. The building plan shows where the holes should be. Take a pencil and mark the places on the wood where the holes should be with a thick dot. Use the vice on the workbench to hold the wood in place. You are going to drill with the hand drill. For this you will need the help of an adult (teacher).

4. In the long lath, drill one hole at the side of the point. Drill the hole at a distance of 5 centimeters from the end in the middle of the wood.

Also drill one hole in both 10 centimeter laths in the middle of the wood at a distance of 2 centimeters from the end.

In the face ends of all three short laths, drill shallow holes into which you can later drive a screw.

Be careful: take a good look at the drawing to see on which side you should drill!

Finally, drill three holes in the plank at the places where the short laths are going to be fixed.

5. Now screw the stand together as shown in the drawing. For this, use the wood screws, the screwdriver, the bolt and the wing nut.

6. Now attach the drier to the long lath with the opening pointing upwards. For this, use two tie-ribs (find out what they are and how they work).

**HOW DOES IT WORK?**

The exhibit is ready. It works as follows. Unscrew the wing nut and point the hair dryer straight up with the opening at the top. Tighten the wing nut again. Switch on the drier at its highest setting. Hold the ping pong ball in the current of air and let go of it.

**WHAT DO YOU SEE HAPPENING?**

Now look for the science behind the exhibit. This exhibit is about air and air pressure. Do the research below. Write the answers in your *workbook* under ‘Research report 1’.
1. Let the ping pong ball float above the hairdryer. After that, hold the ball a bit to the right or left of the current of air. What do you feel? Let go of the ball. What do you see?

2. Carefully unscrew the wing nut and hold the hairdryer firmly. Now very carefully tilt the hairdryer slightly. Does the ball continue to float? Try out how far you can tilt the hairdryer before the ball falls.

△ WHAT’S THE ANSWER?

Now you are going to find information about air and air pressure. You can look for information in the school media library, the library or the Internet.

Go to www.sciencecenteropschool.nl and then to ‘primary school pupils’ and click on ‘links’. Under the title of your exhibit, you will find a number of websites with background information.

Answer the questions below and write the answers in your workbook under ‘Research report 2’.

**Operation:**
How does this exhibit work?
What keeps the ping pong ball in the air?

**Science:**
What is air? What are the properties of air?
What is air pressure?

**Discovery:**
What happens in this exhibit can be explained by a law of physics. This is called Bernoulli’s Law and was named after Daniel Bernoulli. What exactly did he discover about air pressure?

**Application:**
In what other equipment is Bernoulli’s Law used?

Let your teacher read your answers.