

# Paper helicopter

Help students explore concepts of science and engineering as they create a paper helicopter and experiment with it.

## Prepare the material station

### Necessary materials

Template  
Paper clip  
Sign pens

### Optional materials

Construction paper  
Masking tape

*Note: Underlined materials are to be shared among the students*

## Curiosity

Ask students if they have seen a helicopter. Get them to talk about how they think a helicopter works. Then question them about parachutes and how it works. Ask them if it's possible to combine the two and build a helicopter that can bring things down slowly.

## Activity

### Scaffolding

Explain the use of the template to the students. Get them to understand which lines are to be cut and which lines are to be folded.

Once students have cut out the templates they want to use, ask them to color them by drawing hatching lines using sign pens. Encourage them to use different colors for each side of the template.

Ask students who are struggling to refer to the lesson in the student guide.

### Experimentation

Help students feel comfortable making changes to their helicopters, trying new ideas, designs and seeing what happens. There are 9 templates of different dimensions and students can observe how their flights are different.

You can ask questions to encourage experimentation among students.

- Do you think a smaller helicopter will fall differently than a larger one?
- Would the weight of the helicopter make a difference to the flight?
- What do you think will happen if you reverse the direction in which the wings are bent?

The student guide has a section to help students experiment. You can ask them to refer to it to make

things more clear.

## Designing their own helicopters

Once students have experimented with the templates, ask them to design their own helicopter template on blank paper, and cut, fold and test it.

## Suggestions for the facilitator

We found these insights and tips to be helpful while facilitating this session.

- Students might find it confusing to cut and fold the template. Providing an initial demonstration helps.
- While experimenting students might not be sure what to observe, or what kind of changes to make. Ask them questions to get them thinking.
- Encourage students to launch their helicopters in various ways. They can simply release them from height, or they can throw them upwards, etc.
- Coloring the templates before folding into helicopters makes them look aesthetically pleasing. It also makes them more visible during flight.

## Thinking

### Reflection

Ask questions to help students reflect on their learning.

- What insights did you get in the process of making your paper helicopter?
- What part of the activity was most interesting for you? Why was it so?

You can also provide structures to support their thinking.

- Two things I learnt are \_\_\_\_\_
- I used to think \_\_\_\_\_ and I now think \_\_\_\_\_
- The most interesting part for me was \_\_\_\_\_ because \_\_\_\_\_

### Think like a ...

Ask thought provoking questions to make students think from the perspective of a professional

#### Think like a physicist

- What do you think is the role of paper clips in this activity?
- What happens if you reverse the direction in which the wings are folded? Why might it be so?
- What is the relation between the speed at which the helicopter rotates and the speed at which it falls?
- What would be the result if you released this helicopter on the moon?

#### Think like an engineer

- How can you make the helicopter spin faster or slower?
- How might the fall of the helicopter be if the two flaps are positioned in a coinciding manner?

#### Think like a biologist

- The seeds of Sycamore tree fall in a similar manner to our paper helicopter. How do you think it benefits the tree?

## Concepts and skills

This lesson can also be used to emphasize on scientific concepts and skills.

Some concepts and skills students explore in this lesson are:

- **Energy transformation**  
The helicopter gets the energy to rotate rapidly and fall vertically from the gravitational potential energy.
- **Experimentation**  
Designing experiments to find out “What happens if we do this?” is a key process in scientific work. Students learn this skill by making deliberate changes to their project and observing the results..

## Sample lesson plans

### 1. A 60 minute class

#### Learning Objectives

To get students to experience the play based learning approach by building a paper helicopter. The emphasis is on getting them to play and have fun while making.

#### Classroom context

This sample lesson is designed for grade 4 students. The time available for the class is 60 minutes.

#### Lesson Flow

##### Curiosity (5/5 mins)

Divide students into groups of 2 or 3. Have an engaging conversation on helicopters to get them curious.

- What are helicopters used for?
- What do you find fascinating about helicopters?

Tell them that today they'll build a different type of helicopter that lowers to ground slowly instead of lifting upwards.

##### Activity (45/50 mins)

###### Safety precautions

Before handing them the material packs, caution them against careless handling of tools like scissors. Remind students about teamwork and sustainability as they build.

###### Building the helicopter

Distribute one template sheet to each group. Give them 10 minutes to build it.

Provide suggestions and ask questions to support groups who are struggling more than others.

- Let's start by selecting a template to work on and cutting it out.
- Did you figure out how to cut and fold it?

### Testing and sharing

After they are done, get students to test the helicopter. Encourage them to note the interesting observations. Ask questions to support their thinking.

- Did it work as you had expected? What was different?
- What insights do you have?

### Iteration

Ask students to experiment with new changes to their helicopter. Give them 10 minutes for it. Ask questions to encourage experimentation.

- Do you think the different sized templates will work the same?
- Can you fold your own paper helicopter without the template?

### Sharing

Get students to share about their experiments and the interesting observations they made.

### Thinking (10/60 mins)

Use structures or questions to get students to reflect on their learning experience.

- Two things I learnt are \_\_\_\_\_
- What part of the activity did you enjoy most? Why was it so?
- What was most frustrating during the activity? Why was it so?

## 2. Two 45 minutes classes

### Learning Objectives

To get students to experience the play based learning approach by building a paper helicopter. The emphasis is on getting them to experiment and observe.

### Classroom context

This sample lesson is designed for grade 8 students. The time available for the lesson is two classes of 45 minutes each.

### Lesson Flow

#### Class I

#### Curiosity (5/5 mins)

Ask students if they find helicopters fascinating. Ask them to be specific about what they find fascinating. Get their responses and ask them if they could make a helicopter, a bit different from the one one they are used to seeing.

*"This helicopter will descend slowly while spinning when dropped from a height."*

**Activity (30/35 mins)****Building**

Distribute the templates among the students. Ask them to go through the instruction sheets and build their paper helicopters. Give them 10 minutes to fold and test their first helicopter.

**Experimenting**

Ask them to refer to the lesson in student guide and experiment with their paper helicopters. Give them 20 minutes for this.

**Thinking (10/45 mins)**

Ask questions or provide structure to help students reflect on their learning experience.

- What challenges did you face while building your paper helicopters? How did you overcome them?
- Share any two things you learnt from this lesson.

**Class II****Recalling(5/5 mins)**

Ask students to think about the previous class and recall the things they had done and learnt there.

**Activity (30/35 mins)****Sharing insights from experiment**

Ask students to think about their insights from the experiments in the previous class. Ask each group to note down the insights and take turns to share.

**Designing their own helicopters**

Ask students to use their understanding from the experiments to design their own helicopters from scratch. Ask these questions to help them think:

- What kind of wings help a helicopter fly better?
- What will your helicopter look like?

**Thinking (10/45 mins)**

Ask questions or provide structure to help students reflect on their learning experience.

- What new questions do you have?
- What design of paper helicopter worked best for you? Why might it be so?