



EduTrend Contents

EDUTECH · STEM RESOURCES FOR TEACHERS · MIDDLE SCHOOL

Predict, Simulate, Explain

Use a science simulation with a question, a prediction and one change at a time

Ages 11–14

Level: Intermediate

60 minutes

Pairs · up to 30

Activity 03

Inside: activity at a glance · step-by-step session plan · facilitator notes · 3 student worksheets · assessment checklist

ACTIVITY 03 · AT A GLANCE

Predict, Simulate, Explain

Students receive a question before opening a simulation, such as “Will a larger block of wood float or sink?” They write a prediction, then use a free density simulation to change one setting at a time: mass, volume or material. They record results, find the pattern and explain it using density.

Learning outcomes

By the end of the session students can:

- make predictions before simulating;
- change one variable at a time;
- record simulation results;
- explain results with a scientific idea.

KEY WORDS

simulation · prediction · variable · density · mass · volume

CURRICULUM LINKS

Maths: ratio and division.
Technology: models and simulations. Geography: ships and icebergs.

1**QUESTION**

What will we find out?

2**PREDICT**

What do we expect?

3**EXPLORE**

Use the resource

4**RECORD**

Capture evidence

5**EXPLAIN**

What did we learn?

6**EXTEND**

Where next?

Materials (per pair)

- Devices with a browser
- A free density simulation (for example from PhET)
- Worksheets 1, 2 and 3

Before the session

- Test the simulation on school devices.
- Prepare prediction questions.
- Print worksheets.
- Plan pairs.

SAFETY

Follow school internet policy. Simulations run in a browser; no accounts needed.

ACTIVITY 03 · SESSION PLAN

Step by step

Simulations work best when students have a question to answer before they open them.

Time	What happens	Say or ask
0–8 min Question	Pose floating questions.	<i>“What do you predict?”</i>
8–15 min Predict	Write predictions with reasons.	<i>“Why do you think so?”</i>
15–38 min Simulate	Change one setting at a time.	<i>“What stayed the same?”</i>
38–50 min Explain	Find the pattern.	<i>“Is it size or density?”</i>
50–60 min Evaluate	Limits of the simulation.	<i>“What does it leave out?”</i>

CHALLENGE CARD (print or copy onto the board)

Test predictions about floating and sinking with a simulation, changing one variable at a time, and explain the results using density.

ACTIVITY 03 · FACILITATOR NOTES

The teaching know-how in brief

An object floats in water if its density is less than the density of water, and sinks if it is greater. Density is mass divided by volume, so size alone does not decide.

Simulations let students change variables quickly and safely. They are models, so they simplify reality; discussing what they leave out is part of good science.

Common ideas to listen for

- “Big things sink.” Density matters, not size.
- “Heavy things always sink.” Ships float.
- “Simulations are reality.” They are simplified models.

Adapting the activity

Support

Provide a table with one variable pre-filled.

Stretch

Test floating in a different liquid in the simulation.

WORKSHEET 1

Predictions

Name: _____

Class: _____ Date: _____

Predict first.

Predictions

Question	Prediction	Reason
1		
2		
3		
4		

WORKSHEET 2

Simulation results

Change one thing at a time.

Simulation results

Setting changed	Mass	Volume	Floats?
1			
2			
3			
4			
5			

WORKSHEET 3

Explanation

Use density.

What decides floating and sinking

FOR THE TEACHER

Assessment checklist

Use during the session. One sheet covers up to eight students; copy as needed.

Student	Predicts with reasons	Controls variables	Explains with density

Suggested codes: W = working towards · E = expected · G = greater depth

ABOUT THIS ACTIVITY

Predict, Simulate, Explain is a sample activity from the EduTrend Contents Edutech STEM Resources for Teachers programme (middle school, level: intermediate). Every activity in the programme follows the same format: a practical challenge, a clear session plan, facilitator notes and ready-to-print worksheets, so that teachers, club leaders and parents can run it without extra preparation.

Full 15-, 20- and 32-week programmes are available from EduStore at edutrend.org.

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