FREE EVENT TOOLKIT

Family Science Night Kit

A ready-to-run science event for children ages 5 to 9 and their grown-ups.

- Four hands-on stations
- Plans for 25, 50 or 100 participants
- Volunteer scripts and safety checks
- Printable science passport and promotion copy



Predict it. Test it. Notice the evidence. Improve one thing.

Designed for schools, libraries, PTAs and homeschool communities.

START HERE

Run the whole event in 75 minutes.

Families move through four stations in small teams. Every station uses the same simple cycle, so volunteers can focus on asking questions instead of giving a lesson.

0-10

Welcome

Give each child a passport. Explain that unexpected results are useful evidence.

10-58

Four stations

Run four 12-minute rounds. Announce a two-minute warning before each move.

58-68

Improve

Invite families to revisit one station and change one part of a design or test.

68-75

Share

Ask children to show one clue, surprise or improvement from their passports.

The host's job

Keep the pace, protect safety and celebrate evidence. Volunteers do not need to know every answer. The best prompt is often: What did you notice, and what would you change next?

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PREPARE

Choose the right size and team.

The event works as a drop-in loop or a scheduled rotation. Keep teams to two to four children when possible, with a grown-up nearby.

Expected guests	Station tables	Volunteers	Suggested rounds
Up to 25	4	1 lead + 4 station hosts	4 x 12 minutes
26 to 50	4 to 6	1 lead + 6 hosts + 1 float	4 x 12 minutes
51 to 100	8	1 lead + 8 hosts + 2 floats	4 x 12 minutes

Room layout

- Put wet stations on washable floors or trays.
- Leave a clear walking loop between tables.
- Place supplies behind hosts, not in the traffic path.
- Create one quiet observation area with seating.
- Keep food and drinks outside the investigation area.

Volunteer briefing

- Read the station card before families arrive.
- Model one test, then let children lead.
- Ask for a prediction before showing the result.
- Reset materials during each transition.
- Pause the station if safety or cleanup slips.

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GATHER

Scale the materials to your crowd.

Quantities assume teams of two to four children and several rounds. Choose large counters instead of coins when younger siblings may attend.

Material	25 guests	50 guests	100 guests
Cardstock or copy paper	75 sheets	150 sheets	300 sheets
Masking tape	4 rolls	8 rolls	16 rolls
Aluminum foil	2 rolls	4 rolls	8 rolls
Large counters or blocks	50	100	200
Shallow water tubs	2	4	8
Clear cups	30	60	120
Paper towels	2 rolls	4 rolls	8 rolls
Food coloring	1 set	2 sets	4 sets
Washable modeling clay	3 lb	6 lb	12 lb
Textured objects or toy feet	12	24	48
Trays or washable mats	4	8	12
Printed passports	30	60	120

Keep the budget low

Ask families to donate clean reusable tubs, plastic cups, toy dinosaurs, textured objects and unopened paper goods. Do not accept sharp, dirty or food-contact items that cannot be cleaned.

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REVIEW FIRST

Make curiosity safe and welcoming.

A responsible adult must review the room, materials, allergies, local policies and every station before the event. These activities are educational suggestions, not professional safety advice.

Water

Use shallow tubs on trays. Wipe spills immediately. Children do not drink or splash activity water.

Small parts

Use large counters for mixed-age events. Keep all small objects away from children who may mouth them.

Materials

Check labels and allergies. Use only washable, non-toxic modeling materials and clean objects.

Movement

Keep aisles clear. Seat anyone who benefits from a lower-stimulation or lower-standing option.

Supervision

Children stay with their adult. Volunteers control resets, spills and any adult-only steps.

Cleanup

Provide handwashing, paper towels and covered waste bins. Sanitize reusable materials afterward.

Accessible participation

- Let children point, talk, draw, dictate or use a partner to record evidence.
- Offer pre-cut materials and larger-handled tools when helpful.
- Describe colors with labels or positions so color is not the only clue.
- Allow families to observe before touching materials and to skip any station.

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1

12-MINUTE INVESTIGATION

Paper Bridge Challenge

Fold one sheet so it carries the greatest load across a gap.

MATERIALS PER TEAM

- 2 cups or blocks
- 1 sheet of paper
- 10 large counters
- 15 cm of tape

INVESTIGATION QUESTION

How can one sheet of paper hold more weight?

Predict: Draw or describe the shape you think will be strongest.

1 Make a gap

Place two cups about 15 cm apart.

2 Build

Use one sheet as the bridge. Tape is optional.

3 Test

Add counters one at a time and count the load.

4 Change

Fold or curve the paper, then test from the same gap.

NOTICE THE EVIDENCE

Where did the first bridge bend? Which part of the new shape resisted bending?

IMPROVE ONE THING

Keep the same paper, gap and counters. Change only the shape of the bridge.

SCIENCE IN PLAIN LANGUAGE

A flat sheet bends easily. Folds and curves can spread forces through more of the material. Engineers test shapes, inspect weak points and improve a design.

ADULT SAFETY CHECK

Keep counters large enough for the youngest visitor. Keep cups and counters off the floor.

Science connection: NASA describes engineering as iteration, repeating a design and making changes to learn and improve.
nasa.gov/learning-resources/career-spotlight-engineer-for-students/

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2

12-MINUTE INVESTIGATION

Dinosaur Rescue Raft

Shape one square of foil so it floats and carries the greatest safe load.

MATERIALS PER TEAM

- 1 foil square
- Shallow water tub
- 10 large counters
- Tray or towel

INVESTIGATION QUESTION

Which foil shape will carry the greatest load?

Predict: Point to where the counters should go and explain why.

1 Build

Shape the foil into a raft with raised edges.

2 Float

Place it gently on the water.

3 Load

Add counters one at a time until water enters.

4 Improve

Change the width, edges or load placement and retest.

NOTICE THE EVIDENCE

Did one side sink first? Did the foil bend, tip or let water over an edge?

IMPROVE ONE THING

Keep the foil size and counters the same. Change the shape or placement of the load.

SCIENCE IN PLAIN LANGUAGE

A floating raft pushes water out of the way. The displaced water pushes upward. A wide, stable shape and balanced load can help the raft stay above the water.

ADULT SAFETY CHECK

Use shallow water on a tray. Wipe spills immediately. Do not drink or splash the water. Watch foil edges.

Science source: NOAA, Build a Boat. noaa.gov/office-education/outreach-communication/hands-on-science-activities/build-a-boat

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3

12-MINUTE INVESTIGATION

Walking Water Race

Watch colored water move through paper towel fibers.

MATERIALS PER TEAM

- 2 clear cups
- Colored water
- 2 towel strips
- Tray
- Timer

INVESTIGATION QUESTION

Which towel strip will move water higher in five minutes?

Predict: Choose the single-layer or folded strip and mark the expected height.

1 Prepare

Put equal water in two cups and label the strips.

2 Change

Use one single layer and one strip folded lengthwise.

3 Start

Dip equal lengths into the water at the same time.

4 Compare

After five minutes, mark and compare the wet height.

NOTICE THE EVIDENCE

Look for the wet edge, color movement and differences between towel layers.

IMPROVE ONE THING

Repeat with equal strips and change one feature, such as width or towel brand.

SCIENCE IN PLAIN LANGUAGE

Water sticks to paper fibers and to other water molecules. In narrow spaces between the fibers, these forces help water move upward through capillary action.

ADULT SAFETY CHECK

Protect surfaces. Food coloring can stain. Activity water is not for drinking. Wash hands after cleanup.

Science source: U.S. Geological Survey, Capillary Action and Water. usgs.gov/water-science-school/science/capillary-action-and-water

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4

12-MINUTE INVESTIGATION

Fossil Imprint Detectives

Compare how pressure changes the detail in a model impression.

MATERIALS PER TEAM

- 2 equal clay pieces
- Clean textured object
- Craft stick
- Observation card

INVESTIGATION QUESTION

Will a gentle or firm press preserve more visible detail?

Predict: Choose one, then name a line, bump or edge you expect to see.

1 Prepare

Flatten two equal pieces to the same thickness.

2 Press gently

Use the object once and lift it straight up.

3 Press firmly

Use the same object on the second piece.

4 Compare

Count or point to details visible in each impression.

NOTICE THE EVIDENCE

Which lines, bumps and edges appear in both models? Which are missing or distorted?

IMPROVE ONE THING

Keep the object and clay thickness the same. Change pressure or pressing direction.

SCIENCE IN PLAIN LANGUAGE

An impression is a model of one part of fossil formation. Real trace fossils preserve evidence of an organism's activity, such as footprints, in rock.

ADULT SAFETY CHECK

Use clean, nonsharp objects and non-toxic modeling material. Keep clay away from mouths and wash hands.

Science source: U.S. National Park Service, Dinosaurs in the Fossil Record. nps.gov/subjects/fossils/dinosaurs-in-the-fossil-record.htm

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COPY ONE PER CHILD

My Family Science Night Passport

Name or scientist nickname: _____

1 Paper Bridge

My prediction

One clue I noticed

2 Rescue Raft

My design idea

What changed after the test

3 Walking Water

Where I think the water will move

Evidence I saw

4 Fossil Imprints

Which press will show more detail

What the imprint can tell us

The most surprising clue I found tonight was...

_____

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PRINT FOR EVERY HOST

Five prompts do the teaching.

You do not need to lecture or know every answer. Keep children thinking by asking one short question at a time.

1

What do you predict?

Ask before the test. Every prediction is allowed.

2

What did you notice?

Wait for an observation before offering an explanation.

3

What stayed the same?

Help teams recognize a fair comparison.

4

What one thing could change?

One change makes the next result easier to understand.

5

What makes you think that?

Ask for evidence, not a perfect scientific word.

WHEN SOMETHING DOES NOT WORK

Say: That is not what we expected. What clue did it leave us? An unexpected result is not a failed science night. It is evidence that gives the team something real to investigate.

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INVITE

Use copy that tells families what happens.

Replace the bracketed details, then publish the same clear description on your event page, newsletter and social posts.

EVENT DESCRIPTION

Bring a curious child and investigate four hands-on science questions together. Families will build a paper bridge, test a foil rescue raft, watch water climb and examine model fossil impressions. Designed for children ages 5 to 9 with a grown-up. No science experience is needed. [Date] [Time] [Location]. Please register at [Link].

Three outreach messages

Families	Come make, test and improve four science ideas with your child. Expect movement, water, building and useful surprises.
Volunteers	You do not need to be a scientist. We provide a station card, materials and five questions that keep children thinking.
Community partners	Help us offer a free, parent-guided science experience. We welcome space, volunteers, reusable supplies or help reaching local families.

After the event

- Count participating children and adults without collecting children's names.
- Ask grown-ups which station created the best conversation and what felt confusing.
- Record supply shortages, safety issues and reset time while they are fresh.
- Share approved event photos only when your organization has the required permission.

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USE AND SHARE

Built for community science.

You may print and use this kit for noncommercial educational events run by a school, library, PTA, nonprofit or homeschool community. Keep the Professaur credit and source notes intact. Do not resell the kit or present it as your own publication.

SCIENCE SOURCES

Buoyancy and boat design
NOAA, Build a Boat
https://www.noaa.gov/office-education/outreach-communication/hands-on-science-activities/build-a-boat

Capillary action
U.S. Geological Survey, Capillary Action and Water
https://www.usgs.gov/water-science-school/science/capillary-action-and-water

Dinosaur trace fossils
U.S. National Park Service, Dinosaurs in the Fossil Record
https://www.nps.gov/subjects/fossils/dinosaurs-in-the-fossil-record.htm

Engineering iteration
NASA, Career Spotlight: Engineer
https://www.nasa.gov/learning-resources/career-spotlight-engineer-for-students/

About Professaur

Professaur creates parent-guided science activities that help children predict, test, notice evidence and improve an idea. The parent is the lab partner, not the science lecturer.

Questions or corrections

hello@professaur.com
professaur.com/editorial-standards/

