

Choice Board – Friction (Class 8 Science)

What is a Choice Board?

A **Choice Board** is a structured graphic organiser that presents students with a menu of activity options related to a specific topic or learning goal. The board is usually arranged in a grid, with each cell containing a different task or project. These tasks are intentionally designed to:

- Address the same key concept or skills from different angles
- Cater to diverse learning styles and interests
- Vary in complexity and format (e.g., writing, drawing, experiments, creative design)
- Allow students to choose tasks, promoting autonomy and engagement

Key Features

- **Student Voice and Choice:** Empowers students to select tasks that interest them or suit their preferred learning styles.
- **Differentiation:** Offers varied levels of challenge and multiple modalities, supporting all learners.
- **Assessment Versatility:** Can be used for formative or summative assessment, practice, review, or enrichment.
- **Engagement:** Increases motivation through meaningful, relevant activities.

Purpose in Teaching

Choice Boards help teachers:

- Differentiate instruction efficiently
- Assess understanding in creative, authentic ways
- Encourage self-directed and independent learning

- Foster creativity, critical thinking, and problem-solving

Example Structure

A typical Choice Board might use a 3x3 grid, where students must complete one or more tasks from the options. Tasks can involve drawing, writing, building, researching, presenting, experimenting, or other formats, all aligned to the core topic—such as “Friction” in science.

Table 1 - Low difficulty and effort

1. Draw & Label Types of Friction	2. Describe “Friction in Action”	3. Build a Simple Friction Tester
Drawing	Short Paragraph	Model/Hands-on
Make a clear diagram comparing static, sliding, and rolling friction. Label and add one example for each.	Write a 4-sentence description of a real-world scenario (e.g., cycling, writing, sports) where you notice friction at work.	Use materials from home (like a book and string) to create a basic tester—observe how a book moves across different surfaces.

Table 2 - Medium difficulty and effort

4. Compare Friction on Surfaces	5. Make an Info Poster	6. Investigate “Friend & Foe” Aspects
Chart/Table	Infographic/Poster	Chart + Explanation
Organise your findings about how friction changes between sandpaper, towel, wood, and marble.	Create a poster about ways to increase and decrease friction (shoes, ball bearings, lubes, treads, etc.).	Make a T-chart showing situations where friction helps and where it causes problems. Explain each with an example.

Table 3 - Higher difficulty and effort

7. Design a “No Friction Day” Story	8. Evaluate Shoes/Tyres for Friction	9. Invent a Friction Reducing Solution
Creative Story	Photo Presentation/Slide Deck	Model/Prototype or Detailed Sketch
Imagine if friction vanished for a day. Write a creative story or comic about 3 ways daily life would change.	Take or find pictures of various shoe soles or tyres. Present which designs increase grip (friction) and why.	Invent a device or method to reduce friction in machines. Create a model/drawing. Explain how it works and why it is useful.

Activity Details

Activity 1: Draw & Label Types of Friction

- Type of Output: Drawing
- Brief Description: Make a clear diagram comparing static, sliding, and rolling friction. Label and add one example for each.
- Detailed Instructions: Take an A4 sheet and draw three sections for static, sliding, and rolling friction. Draw an example for each type, label the parts, and use arrows to show the direction of forces. Examples: book at rest (static), book sliding (sliding), luggage on wheels (rolling).
- Objectives:
 - Identify types of friction
 - Visualise and explain real-life examples of friction
 - Practice clear scientific diagramming
- Success Criteria:
 - All three types of friction shown with accurate labels
 - Examples are clear and relevant
 - Neat, well-organised diagram with arrows for forces

Activity 2: Describe “Friction in Action”

- Type of Output: Short Paragraph
- Brief Description: Write a 4-sentence description of a real-world scenario (e.g., cycling, writing, sports) where you notice friction at work.
- Detailed Instructions: Choose one daily activity where friction is important. Describe how friction affects what you do, what would happen without friction, and who benefits.
- Objectives:
 - Connect the concept of friction to daily life
 - Explain effects using clear language
 - Practice concise writing
- Success Criteria:
 - 4 meaningful sentences, each on a different aspect
 - Scenario chosen involves clear role of friction
 - Accurate, logical explanation

Activity 3: Build a Simple Friction Tester

- Type of Output: Model/Hands-on
 - Brief Description: Use materials from home (like a book and string) to create a basic tester—observe how a book moves across different surfaces.
 - Detailed Instructions: Find a textbook and a string. Gently pull the book across a table, a towel, and a tiled floor. Record which surface is harder or easier to pull across and why.
 - Objectives:
 - Investigate friction with a simple experiment
 - Collect and compare data
 - Draw conclusions about surfaces
 - Success Criteria:
 - Test performed on at least three surfaces
 - Observations are recorded in a table
 - Explanation given for differences
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Activity 4: Compare Friction on Surfaces

- Type of Output: Chart/Table
- Brief Description: Organise your findings about how friction changes between sandpaper, towel, wood, and marble.

- Detailed Instructions: Research or experiment by dragging a small object across 3–4 types of surfaces at home/school. Make a neat table showing amount of friction for each. Give a reason for differences.
- Objectives:
 - Recognise variation of friction depending on surface
 - Use a table to present scientific data
 - Practice comparative reasoning
- Success Criteria:
 - Data for at least three surfaces included
 - Table is clear and logical
 - Brief, accurate explanations are provided

Activity 5: Make an Info Poster

- Type of Output: Infographic/Poster
- Brief Description: Create a poster about ways to increase and decrease friction (shoes, ball bearings, lubes, treads, etc.).
- Detailed Instructions: Design a colourful poster showing examples and strategies humans use to adjust friction in daily life. Use captions, diagrams, and labels for impact.
- Objectives:
 - Summarise key methods for managing friction
 - Use visual communication skills
 - Link science to practical design
- Success Criteria:
 - At least two methods to increase and two to reduce friction presented
 - Poster is clear, eye-catching and informative
 - Illustrations or pictures are labelled

Activity 6: Investigate “Friend & Foe” Aspects

- Type of Output: Chart + Explanation
- Brief Description: Make a T-chart showing situations where friction helps and where it causes problems. Explain each with an example.
- Detailed Instructions: Draw a two-column chart. On one side, list at least three ways friction helps us (friend). On the other side, list three ways it causes issues (foe). For each, explain in 1–2 sentences.
- Objectives:
 - Understand friction’s positive and negative roles

- Organise and balance arguments
 - Use examples and reasoning
 - Success Criteria:
 - Three examples for each side, with explanations
 - Chart is well-structured and readable
 - Each example relates to real life
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Activity 7: Design a “No Friction Day” Story

- Type of Output: Creative Story
- Brief Description: Imagine if friction vanished for a day. Write a creative story or comic about 3 ways daily life would change.
- Detailed Instructions: Invent a short story or comic panel set on a “frictionless day.” Describe what would happen—consider walking, writing, driving, cooking, etc.
- Objectives:
 - Apply scientific understanding to imaginative scenarios
 - Communicate through narrative or comics
 - Demonstrate cause and effect thinking
- Success Criteria:
 - At least three consequences described
 - Ideas show understanding of friction’s role
 - Story/comic is creative, logical, and complete

Activity 8: Evaluate Shoes/Tyres for Friction

- Type of Output: Photo Presentation/Slide Deck
- Brief Description: Take or find pictures of various shoe soles or tyres. Present which designs increase grip (friction) and why.
- Detailed Instructions: Look at different shoe or tyre treads (in person or photos). Insert 3–5 pictures into a digital or paper slide deck. For each, explain how the pattern affects friction.
- Objectives:
 - Evaluate real-world designs for effectiveness
 - Explain friction’s role in safety and performance
 - Practice presentation skills
- Success Criteria:
 - 3–5 designs shown and explained

- Each explanation addresses friction and safety
- Clear, logical presentation format

Activity 9: Invent a Friction Reducing Solution

- Type of Output: Model/Prototype or Detailed Sketch
 - Brief Description: Invent a device or method to reduce friction in machines. Create a model/drawing. Explain how it works and why it is useful.
 - Detailed Instructions: Think of a simple machine or gadget where friction is a problem (e.g. bicycle chain, door hinges, etc.). Design a method/device using lubricants, ball bearings or other means. Build a small model (if possible) or draw/sketch your idea. Add a short paragraph explaining your design and its benefits.
 - Objectives:
 - Apply scientific ideas to engineering design
 - Practice creativity and technical drawing
 - Justify choices using science
 - Success Criteria:
 - Model or drawing is logical and clear
 - Explanation links to methods of reducing friction
 - Usefulness and scientific basis are described
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Student Self-Assessment

For each selected task, reflect on:

- Why did you choose this task?
- What part of the task did you do well?
- What would you improve next time?
- Grade the level of difficulty of the task (Easy, Somewhat difficult, Definitely difficult), and why?

Additional Activities for Higher Order Thinking and Hands-on Practice

10. Engineer a “Better Grip” Solution	11. Experiment: Test Lubricants	12. Debate: Essential or Evil?
Prototype/Investigation	Scientific Experiment	Debate/Socratic Discussion
Design and build a modification to a basic object (like a pencil, bottle, or handle) that improves its grip using knowledge of friction.	Conduct an experiment to test and compare the effectiveness of different lubricants (oil, powder, grease) on reducing friction between surfaces.	In pairs/groups, research and organise a classroom debate: “Is friction more of a friend or a foe?” Prepare arguments, examples, and use evidence from experiments or readings.

Activity 10: Engineer a “Better Grip” Solution

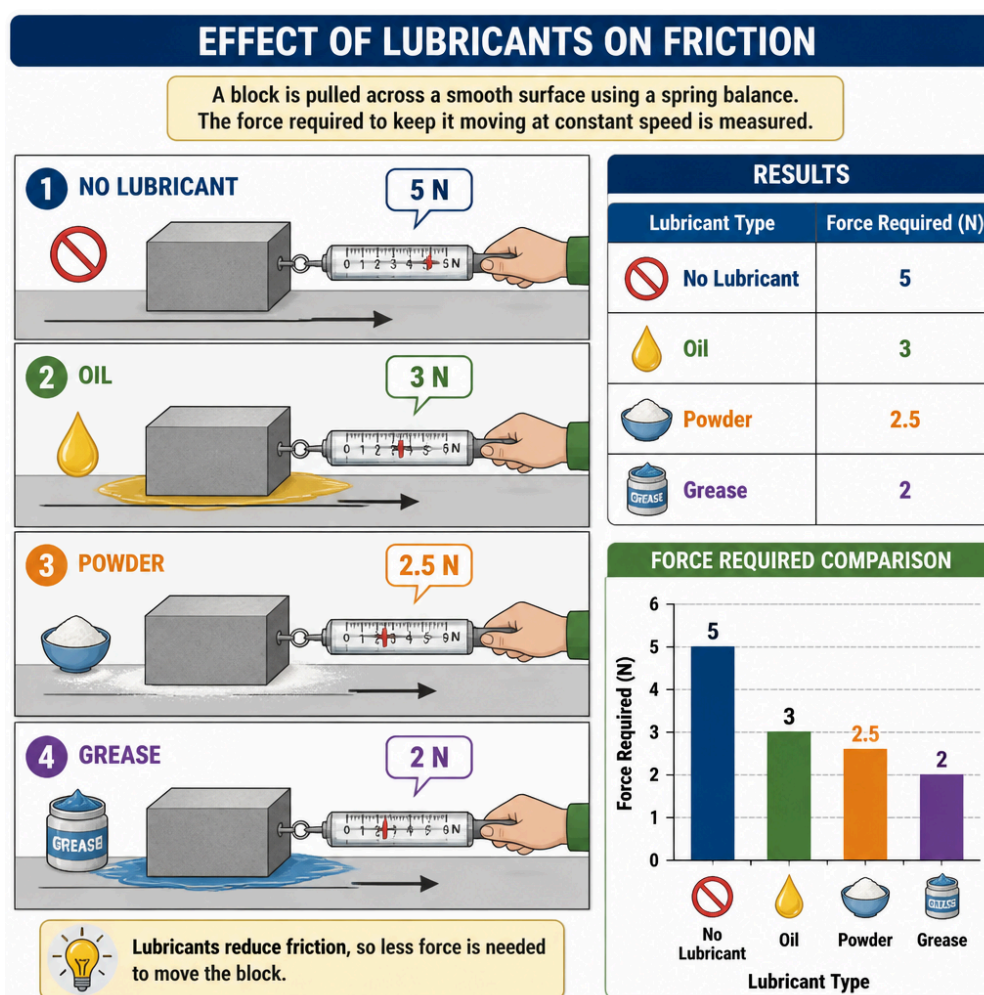
- Type of Output: Prototype/Investigation
- Detailed Description: Choose an everyday object that sometimes slips from hands (e.g., bottle, pen, cup). Design add-ons or surface treatments (ridges, tape, rubber bands, coatings, etc.) to make it less slippery. Test and present which design works best and why, using friction concepts.
- Objectives:
 - Apply creative engineering to increase friction.
 - Analyse the effectiveness of different materials/designs for grip.
 - Communicate findings through demonstration or presentation.
- Success Criteria:
 - Clear prototype(s) made and tested
 - Data or qualitative feedback collected and presented
 - Explanation explicitly links results to friction principles

Activity 11: Experiment: Test Lubricants

- Type of Output: Scientific Experiment & Report
- Detailed Description: Set up an experiment to measure the effect of lubricants on friction. Use a spring balance to drag an object across the

same surface, first with no lubricant, then with oil, powder, and grease. Record force required in each case and illustrate data in a graph/table.

- Objectives:
 - Design and conduct a controlled experiment
 - Analyse quantitative results and draw scientifically valid conclusions
 - Represent and interpret data using graphs/tables
- Success Criteria:
 - Procedure is logical and fair
 - Observations/data clearly organised
 - Explanation connects results to the scientific theory of friction and lubrication



Effect of Lubricants on Friction

AI generated image, please review carefully for accuracy.

Activity 12: Debate: Essential or Evil?

Debate/Socratic Discussion

An engaging formative assessment where students examine the dual roles of friction—both beneficial and problematic—through structured debate or discussion. This activity supports critical thinking, evidence-based reasoning, and collaborative argumentation.

Steps for Teachers:

THE 5 STAGES OF THE SOCRACTIC DIALOG

1. WONDER

Receive what the other person has to say, listen to their view or premise.

2. REFLECT

Sum up the person's viewpoint and clarify your understanding of what you have heard.



3. REFINE AND CROSS-EXAMINE

Ask the person to provide evidence that supports their view. Discover the thoughts, assumptions and facts underlying their beliefs. Challenge these assumptions to test their validity.

4. RESTATE

Note the new assumption resulting from the inquiry.

5. REPEAT

Start back at the beginning with the new assumptions. This process helps drill down to the core issues to arrive at the best version of whatever you're looking for.

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Source: <https://management30.com/wp-content/uploads/2022/10/stages-socratic-dialog.jpg>

1. Prepare the Topic:

- Announce the debate prompt: "Friction: Essential for Life or a Trouble Maker?"

2. Assign Roles:

- Divide class into two teams (or have individuals/pairs take sides). Assign one side to argue for the benefits ("friend") of friction and the other for its drawbacks ("foe").

3. Research and Preparation:

- Allow time for students to gather supporting evidence, examples (such as sports, transport, daily activities), and results from class experiments.

4. Structure the Debate:

- Establish clear rules: opening statements, main arguments, rebuttals, supporting evidence, and conclusions.

5. Conduct the Debate:

- Have each side present arguments in turn, followed by open discussion or rebuttal. Use prompts like "Give a real-life example..." or "How does this relate to our experiments?"

6. Reflection:

- Conclude with a short reflection or whole-class summary on the complexity of friction's role in life.

7. Variation:

- This activity can also be done as a Socratic discussion where students explore the topic in a round-table format, building on each other's ideas.

Tips:

Encourage respectful listening, logical reasoning, and use of scientific vocabulary. Optionally, have students write a short reflection summarising which arguments were most persuasive and why.

- Detailed Description: Organise a class (or written) debate on "Friction: Essential for Life or a Trouble Maker?" Prepare points, examples, and counterexamples showing friction's helpful and harmful roles. Include findings from your own investigations or research.
- Objectives:
 - Critically evaluate evidence and build an argument
 - Practice respectful discussion, reasoning, and persuasive speaking

- Synthesize research and personal experience for deeper understanding
- Success Criteria:
 - At least three well-reasoned points per side, using evidence
 - Clear, organised debate structure
 - Uses scientific examples from experiments/readings to justify arguments