

Charge Trail

Use test evidence to compare how charge behaves in different materials.

S8P5.b "Plan and carry out investigations to demonstrate the distribution of charge in conductors and insulators."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each action that makes an investigation fair, and circle each observation that would show where charge is located.

Following Charge Evidence

- ① A student places a clean aluminum can on a dry plastic tray to insulate it from the table. She holds a negatively charged balloon nearby without touching the can. Mobile electrons shift away from the balloon, leaving the near side relatively positive and the far side relatively negative. This induced charge separation can attract the can toward the balloon. It does not mean the can has gained net charge. Removing the balloon ends this separation.
- ② For a charge-transfer test, the teacher first verifies a method that leaves detectable charge on the insulated can, such as rubbing a charged balloon against one marked region. A simple touch may not work. The student removes the balloon before testing near that region and the opposite side with fresh paper bits, without contact. She compares with an uncharged can, keeping detector size, distance, and timing the same. Attraction at both sites above the control supports charge spreading.
- ③ For the insulator test, the teacher verifies that rubbing only one marked region of a plastic strip with wool leaves detectable charge. The distant test region stays untouched. The student removes the wool and tests both regions at the same distance with fresh paper bits. Stronger attraction near the rubbed region supports localized charge; paper bits do not measure charge exactly. She records actual observations, including no attraction. Before each repeat, she uses fresh uncharged plastic or a teacher-verified reset; the can is discharged and rechecked against its uncharged control.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 Why does the student place the aluminum can on a dry plastic tray?

2 After charging the can and removing the balloon, which two locations are tested, and what result supports charge spreading?

3 Name two conditions the student keeps the same during the can investigation. Why is keeping conditions the same useful?

4 What paper-bit result on the plastic strip would support the claim that charge stays localized on an insulator?

3 YOUR TURN _____ Your own words

Plan and actually carry out a fair comparison of a metal pie pan and a plastic lid. Teacher supplies insulated supports, balloons, wool, fresh paper bits and recording paper, and verifies safe charging and reset methods before class. No outlets or powered devices. Complete the plan below, including two sites on each object, uncharged controls, removal of charging materials and constant detector size/distance/timing.

With teacher approval, test the uncharged baseline, charge only one marked region using the verified method, remove the charging material, and actually test near that region and the opposite site without touching the object. Record each site's paper-bit attraction and control result on extra paper. Reset and verify the baseline before each of three trials. Compare the two materials and explain what the actual evidence suggests about charge spreading or localization. Record no attraction or inconsistent evidence honestly; never force a prediction.

OBJECT	HOW IT IS CHARGED AND ISOLATED	TWO TEST LOCATIONS	PREDICTED RESULT AND CONSTANT CONDITIONS

PART 1 • READ AND MARK

Underline each action that makes an investigation fair, and circle each observation that would show where charge is located. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Why does the student place the aluminum can on a dry plastic tray?	The plastic tray insulates the can from the table.
2	After charging the can and removing the balloon, which two locations are tested, and what result supports charge spreading?	The charged region and the opposite side are tested. Attraction at both sites above the uncharged control supports charge spreading.
3	Name two conditions the student keeps the same during the can investigation. Why is keeping conditions the same useful?	Any two: detector size, distance, or timing. Keeping these constant makes location the main difference; an uncharged control checks the baseline.
4	What paper-bit result on the plastic strip would support the claim that charge stays localized on an insulator?	Stronger attraction near the rubbed region than at the untouched far region supports localized charge. Compare with uncharged controls and record actual results.

PART 3 • YOUR TURN (SAMPLE ANSWER)

After carrying out the plan, complete an actual record for each of three trials: object; uncharged control; attraction near charged region; attraction at opposite site; reset/baseline check. Compare observed sites and objects in your conclusion. Attraction at both metal sites above control would support spreading; stronger attraction near the rubbed plastic site would support localization. These are testable patterns, not required outcomes, and paper bits do not give an exact charge map.

OBJECT	HOW IT IS CHARGED AND ISOLATED	TWO TEST LOCATIONS	PREDICTED RESULT AND CONSTANT CONDITIONS
Metal pie pan	Rest on a dry plastic cup; use a teacher-verified balloon-contact method at one region, then remove the balloon	Charged region and opposite edge	Predict attraction at both sites above an uncharged control; keep detector size, distance, and timing fixed. Discharge and check the baseline before repeating.
Plastic lid	Rest on a dry plastic cup; rub only one marked region with wool using a teacher-verified method, then remove the wool	Rubbed region and untouched opposite edge	Predict stronger attraction near the rubbed region; use the same detector size, distance, and timing. Compare with an uncharged lid and use fresh uncharged plastic or a verified reset for repeats.

Preserve all four correct source keys and valid plan controls. Before class verify detectable localized charging, insulated supports and resets for both supplied objects; simple balloon touching may fail. Observe learner testing and inspect actual two-site/control records for all three trials plus evidence-based comparison. Accept no detectable attraction or inconclusive results with method checks. Keep charging materials removed and detector conditions constant. Planning or repeating narrated results alone is insufficient; use fresh detectors and teacher-supported resets, never mains electricity.