

Compound Chance Events



Grade 7 | NC.7.SP.8

Statistics and Probability

Teacher scripts, original models and student records

30 multiple-choice + 30 open/performance tasks

Worked keys, scoring and evidence records

Current NC standards for 2026-27 and 2027-28. Choose tasks across multiple sessions.
This bank is not one test.

Free sample | Contents

NC.7.SP.8 | Seventh Grade mathematics

This sample contains 20 complete selected pages from the 93-page resource, plus this sample contents page. Original printed page numbers are retained. Gaps are intentional.

Included original pages: 1-16, 31-32, 61, 76

Representative activities

M01: sample PDF page(s) 17; original page(s) 16

M02: sample PDF page(s) 17; original page(s) 16

O01: sample PDF page(s) 18; original page(s) 31

O02: sample PDF page(s) 19; original page(s) 32

Selected teacher prompts and keys: original page(s) 61, 76

Using this sample

Read the preparation and access guidance before using a selected activity.
Keep teacher keys and private preparation pages separate from student copies.
Use the original resource contents to see the scope of the complete packet.

Complete paid download

The complete resource includes the full PDF task bank and teaching materials.

TEACHER GUIDE

Exact standard and scope

Determine probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

- a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.
- b. For an event described in everyday language, identify the outcomes in the sample space which compose the event, when the sample space is represented using organized lists, tables, and tree diagrams.
- c. Design and use a simulation to generate frequencies for compound events.

Domain: STATISTICS AND PROBABILITY

Cluster: Investigate chance processes and develop, use, and evaluate probability models.

Current NC wording and numbering are retained. Adopted 2026 revisions beginning in 2028-29 are not substituted.

TEACHER GUIDE

Targets and evidence

Use an organized list to identify a compound event and its probability.

Evidence: M04, M12, M14, M22, M30, O01, O02, O03, O11, O28

Use an organized table to identify a compound event and its probability.

Evidence: M18, M19, M20, M27, M28, O10, O15, O19, O20, O21

Use an organized tree to identify a compound event and its probability.

Evidence: M07, M09, M10, M21, M26, O12, O13, O14, O22, O23

Account for replacement and dependence when building sample spaces.

Evidence: M01, M03, M11, M13, M17, O04, O06, O08, O24, O25

Design, evaluate and carry out compound-event simulations.

Evidence: M02, M05, M24, M25, M29, O09, O16, O17, O26, O30

Interpret compound-event simulation frequencies and compare to a sample-space model.

Evidence: M06, M08, M15, M16, M23, O05, O07, O18, O27, O29

MP2: interpret probabilities. MP3: justify models. MP4: simulate chance. MP5: choose records and representations. MP6: state assumptions and distinguish estimates from guarantees.

TEACHER GUIDE

Plan and navigation

Use four sessions of about 30-40 minutes: warm-up/model; shared/partner work; individual work; reteach/exit. Actual experiments may need an additional session. Select one M and one O task per section first, including a trial task when available. Use the rest for spaced practice; do not assign all 60 tasks in one sitting.

Warm-up: M01-M04 and O01-O04

I Do: M05-M08 and O05-O08

We Do: M09-M13 and O09-O13

Collaborative practice: M14-M18 and O14-O18

Independent practice: M19-M23 and O19-O23

Small-group reteach: M24-M27 and O24-O27

Exit ticket: M28-M30 and O28-O30

Navigation: exact standard and targets; plan/access; model and anchor; blank organizer; seven teaching scripts; choice bank; open bank; worked keys; scoring and record; official sources. Print selected student pages only; keep teacher models and keys separate.

TEACHER GUIDE

Preparation and access

Prerequisites: fractions as part of a whole, decimal comparison, equivalent fractions, multiplication of fractions and organized counting. For compound events, distinguish a whole trial from one stage.

Materials: pencils and supplied records; same-size paper cards prepared by an adult; opaque container for blind draws; optional fair number cube. No money, prizes or gambling are involved. Adults handle cutting. Use large cards; avoid small loose objects when unsuitable.

For uniform card models, each physical card must be equally likely; mix thoroughly and draw without looking. Replace and remix whenever directed. Independent stages use separate random draws. Without replacement, later choices depend on earlier draws.

Access: neutral read-aloud, enlarged print, AAC/signing, dictated explanations, student-directed scribe and assistance with motor actions. The learner must define events and direct the model. Record calculations and assistance separately; do not score handwriting or accent.

Answer-supplying cues include naming the favorable outcomes, selecting the denominator, giving the next branch or telling a learner whether the event is likely. Preserve the first response; score supported attempts separately.

Differentiate with fewer equally likely cards and a physical outcome list; extend by changing replacement or comparing nonuniform label models. N/O means unobserved, inaccessible or insufficient evidence; 0 requires an observed interpretable incorrect response. No official mastery threshold is claimed.

WORKED TEACHER MODEL

Think aloud and connect

Say: "Draw A or B with equal probability, then independently draw 1,2 or 3 with equal probability. The complete ordered sample space is A1,A2,A3,B1,B2,B3. All six have probability 1/6. The event letter A and number greater than 1 is A2,A3, so its probability is 2/6=1/3. A list, a 2-by-3 outcome table and a two-stage tree describe the same six outcomes. To simulate repeated trials, replace and remix both sets after every pair and record all pairs. Count event pairs divided by total pairs."

Letter / number	1	2	3
A	A1	A2	A3
B	B1	B2	B3

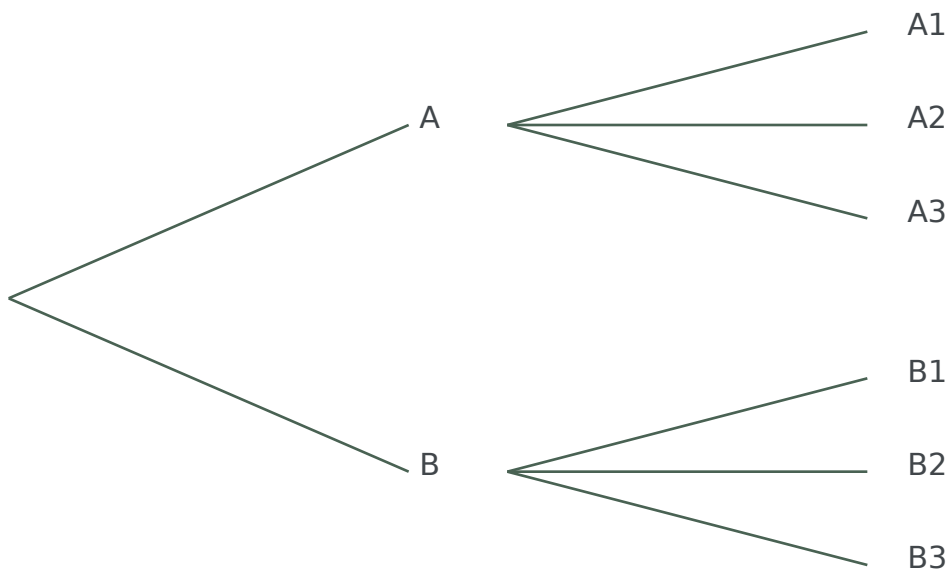
Event A and number greater than 1: A2, A3. Count favorable pairs, not individual stage labels.

WORKED TEACHER TREE

Same space, different views

Organized list: A1, A2, A3, B1, B2, B3.

Tree: first branch letter A or B; each has number branches 1, 2, 3.



Each complete path is one outcome. Independent fair stages give each path $(1/2) \times (1/3) = 1/6$. The tree has $2 \times 3 = 6$ leaves. Highlight A2 and A3 for the worked event.

REPRODUCIBLE STUDENT TOOL

Chance reasoning organizer

Name: _____ Date: _____ Item: _____

Process / one complete trial / assumptions / replacement**All outcomes or trial records / event definition****Favorable count or observed count / full denominator / probability****Interpretation / model comparison / prediction limitations**

TEACHER GUIDE

Warm-up teaching script

Core: M01 and O01; other items through 04 are a later bank. Target: Use an organized list to identify a compound event and its probability.

Launch | 2-3 minutes

Say: "What is one whole trial? What is the event? What outcomes are possible?" Have learners restate the event before any calculation.

Model or elicit | 5-8 minutes

Say: "Organize what can happen or what did happen. Which outcomes count for this event? Show why your denominator includes the whole space or whole run." On independent/exist tasks do not supply outcomes or counts.

Listen and probe | 3-5 minutes

Ask: "Are the outcomes equally likely? What makes that assumption reasonable? Did replacement occur? Is this a theoretical model or an experimental estimate?" Look for a number from 0 to 1 and an interpretation tied to the event.

Respond | 3-5 minutes

Preserve the first response. If the denominator omits outcomes, enumerate a smaller process. If a prediction is treated as certain, compare two short authentic runs. If paths are missing, trace one first-stage branch at a time. Retry a fresh item after supported practice.

Close and record | 2-4 minutes

Each learner records an individual explanation before partner comparison. For experiments, retain every trial and tally before estimating. Early finishers change one condition and explain how the model changes. Record model, computation, interpretation, access support and any answer-supplying cue separately.

TEACHER GUIDE

I Do teaching script

Core: M05 and O05; other items through 08 are a later bank. Target: Interpret compound-event simulation frequencies and compare to a sample-space model.

Launch | 2-3 minutes

Say: "What is one whole trial? What is the event? What outcomes are possible?" Have learners restate the event before any calculation.

Model or elicit | 5-8 minutes

Use the worked model. Name every outcome and explain the denominator. Contrast model probabilities with observed frequencies. Pause so the learner supplies the next step.

Listen and probe | 3-5 minutes

Ask: "Are the outcomes equally likely? What makes that assumption reasonable? Did replacement occur? Is this a theoretical model or an experimental estimate?" Look for a number from 0 to 1 and an interpretation tied to the event.

Respond | 3-5 minutes

Preserve the first response. If the denominator omits outcomes, enumerate a smaller process. If a prediction is treated as certain, compare two short authentic runs. If paths are missing, trace one first-stage branch at a time. Retry a fresh item after supported practice.

Close and record | 2-4 minutes

Each learner records an individual explanation before partner comparison. For experiments, retain every trial and tally before estimating. Early finishers change one condition and explain how the model changes. Record model, computation, interpretation, access support and any answer-supplying cue separately.

TEACHER GUIDE

We Do teaching script

Core: M09 and O09; other items through 13 are a later bank. Target: Design and carry out a compound-event simulation.

Launch | 2-3 minutes

Say: "What is one whole trial? What is the event? What outcomes are possible?" Have learners restate the event before any calculation.

Model or elicit | 5-8 minutes

Say: "Organize what can happen or what did happen. Which outcomes count for this event? Show why your denominator includes the whole space or whole run." On independent/exit tasks do not supply outcomes or counts.

Listen and probe | 3-5 minutes

Ask: "Are the outcomes equally likely? What makes that assumption reasonable? Did replacement occur? Is this a theoretical model or an experimental estimate?" Look for a number from 0 to 1 and an interpretation tied to the event.

Respond | 3-5 minutes

Preserve the first response. If the denominator omits outcomes, enumerate a smaller process. If a prediction is treated as certain, compare two short authentic runs. If paths are missing, trace one first-stage branch at a time. Retry a fresh item after supported practice.

Close and record | 2-4 minutes

Each learner records an individual explanation before partner comparison. For experiments, retain every trial and tally before estimating. Early finishers change one condition and explain how the model changes. Record model, computation, interpretation, access support and any answer-supplying cue separately.

TEACHER GUIDE

Collaborative practice teaching script

Core: M14 and O14; other items through 18 are a later bank. Target: Use an organized tree to identify a compound event and its probability.

Launch | 2-3 minutes

Say: "What is one whole trial? What is the event? What outcomes are possible?" Have learners restate the event before any calculation.

Model or elicit | 5-8 minutes

Say: "Organize what can happen or what did happen. Which outcomes count for this event? Show why your denominator includes the whole space or whole run." On independent/exist tasks do not supply outcomes or counts.

Listen and probe | 3-5 minutes

Ask: "Are the outcomes equally likely? What makes that assumption reasonable? Did replacement occur? Is this a theoretical model or an experimental estimate?" Look for a number from 0 to 1 and an interpretation tied to the event.

Respond | 3-5 minutes

Preserve the first response. If the denominator omits outcomes, enumerate a smaller process. If a prediction is treated as certain, compare two short authentic runs. If paths are missing, trace one first-stage branch at a time. Retry a fresh item after supported practice.

Close and record | 2-4 minutes

Each learner records an individual explanation before partner comparison. For experiments, retain every trial and tally before estimating. Early finishers change one condition and explain how the model changes. Record model, computation, interpretation, access support and any answer-supplying cue separately.

TEACHER GUIDE

Independent practice teaching script

Core: M19 and O19; other items through 23 are a later bank. Target: Use an organized table to identify a compound event and its probability.

Launch | 2-3 minutes

Say: "What is one whole trial? What is the event? What outcomes are possible?" Have learners restate the event before any calculation.

Model or elicit | 5-8 minutes

Say: "Organize what can happen or what did happen. Which outcomes count for this event? Show why your denominator includes the whole space or whole run." On independent/exit tasks do not supply outcomes or counts.

Listen and probe | 3-5 minutes

Ask: "Are the outcomes equally likely? What makes that assumption reasonable? Did replacement occur? Is this a theoretical model or an experimental estimate?" Look for a number from 0 to 1 and an interpretation tied to the event.

Respond | 3-5 minutes

Preserve the first response. If the denominator omits outcomes, enumerate a smaller process. If a prediction is treated as certain, compare two short authentic runs. If paths are missing, trace one first-stage branch at a time. Retry a fresh item after supported practice.

Close and record | 2-4 minutes

Each learner records an individual explanation before partner comparison. For experiments, retain every trial and tally before estimating. Early finishers change one condition and explain how the model changes. Record model, computation, interpretation, access support and any answer-supplying cue separately.

TEACHER GUIDE

Small-group reteach teaching script

Core: M24 and O24; other items through 27 are a later bank. Target: Account for replacement and dependence when building sample spaces.

Launch | 2-3 minutes

Say: "What is one whole trial? What is the event? What outcomes are possible?" Have learners restate the event before any calculation.

Model or elicit | 5-8 minutes

Say: "Organize what can happen or what did happen. Which outcomes count for this event? Show why your denominator includes the whole space or whole run." On independent/exit tasks do not supply outcomes or counts.

Listen and probe | 3-5 minutes

Ask: "Are the outcomes equally likely? What makes that assumption reasonable? Did replacement occur? Is this a theoretical model or an experimental estimate?" Look for a number from 0 to 1 and an interpretation tied to the event.

Respond | 3-5 minutes

Preserve the first response. If the denominator omits outcomes, enumerate a smaller process. If a prediction is treated as certain, compare two short authentic runs. If paths are missing, trace one first-stage branch at a time. Retry a fresh item after supported practice.

Close and record | 2-4 minutes

Each learner records an individual explanation before partner comparison. For experiments, retain every trial and tally before estimating. Early finishers change one condition and explain how the model changes. Record model, computation, interpretation, access support and any answer-supplying cue separately.

TEACHER GUIDE

Exit ticket teaching script

Core: M28 and O28; other items through 30 are a later bank. Target: Use an organized list to identify a compound event and its probability.

Launch | 2-3 minutes

Say: "What is one whole trial? What is the event? What outcomes are possible?" Have learners restate the event before any calculation.

Model or elicit | 5-8 minutes

Say: "Organize what can happen or what did happen. Which outcomes count for this event? Show why your denominator includes the whole space or whole run." On independent/exit tasks do not supply outcomes or counts.

Listen and probe | 3-5 minutes

Ask: "Are the outcomes equally likely? What makes that assumption reasonable? Did replacement occur? Is this a theoretical model or an experimental estimate?" Look for a number from 0 to 1 and an interpretation tied to the event.

Respond | 3-5 minutes

Preserve the first response. If the denominator omits outcomes, enumerate a smaller process. If a prediction is treated as certain, compare two short authentic runs. If paths are missing, trace one first-stage branch at a time. Retry a fresh item after supported practice.

Close and record | 2-4 minutes

Each learner records an individual explanation before partner comparison. For experiments, retain every trial and tally before estimating. Early finishers change one condition and explain how the model changes. Record model, computation, interpretation, access support and any answer-supplying cue separately.

STUDENT CHOICE

Choice practice 1-2

M01 | A bag has one card of each label A,B,C,D,E. Draw two in order, uniformly at each draw, replacing and remixing after the first draw. What is $P(\text{different labels})$?

- A. 1
- B. $\frac{1}{2}$
- C. $\frac{4}{5}$
- D. $\frac{1}{25}$

Reasoning notes: _____

M02 | To simulate two independent days with activation chance $\frac{1}{4}$ each day, a student uses four equal-size cards, one YES. What must happen between the two draws?

- A. Leave the first card out until the pair ends
- B. Replace the drawn card and remix
- C. Force the second draw to match the first
- D. Draw again only when the first card is YES

Reasoning notes: _____

STUDENT PERFORMANCE

001 | Warm-up

Target: Use an organized list to identify a compound event and its probability.

Independently draw one of two equally likely letter cards A,B and one of 8 equally likely number cards 1-8. What is $P(A \text{ and a number at most } 7)$? Construct a complete list, mark every outcome in the event and calculate its probability. Explain why the outcomes are equally likely.

Organized model, list, table or calculations

Answer / interpretation / justification

STUDENT PERFORMANCE

002 | Warm-up

Target: Use an organized list to identify a compound event and its probability.

Independently draw one of two equally likely letter cards A,B and one of 3 equally likely number cards 1-3. What is $P(A \text{ and a number at most } 1)$? Construct a complete list, mark every outcome in the event and calculate its probability. Explain why the outcomes are equally likely.

Organized model, list, table or calculations

Answer / interpretation / justification

TEACHER ONLY

M worked keys 1-2

M01: C. 4/5

Target: Account for replacement and dependence when building sample spaces.

Ordered outcomes: AA, AB, AC, AD, AE, BA, BB, BC, BD, BE, CA, CB, CC, CD, CE, DA, DB, DC, DD, DE, EA, EB, EC, ED, EE. There are 25 equally likely outcomes and 20 favorable outcomes: AB, AC, AD, AE, BA, BC, BD, BE, CA, CB, CD, CE, DA, DB, DC, DE, EA, EB, EC, ED. Probability = $\frac{4}{5}$.

Replacement allows repeated labels; each second draw has the original choices.

Option checks: 1: This differs from the required result by $\frac{1}{5}$. Check the event definition, success count and full outcome/trial denominator; a choice alone does not diagnose the learner. $\frac{1}{2}$: This differs from the required result by $-\frac{3}{10}$. Check the event definition, success count and full outcome/trial denominator; a choice alone does not diagnose the learner. $\frac{1}{25}$: This differs from the required result by $-\frac{19}{25}$. Check the event definition, success count and full outcome/trial denominator; a choice alone does not diagnose the learner.

M02: B. Replace the drawn card and remix

Target: Preserve independence and stage probabilities in a simulation.

Replacement restores the same $\frac{1}{4}$ chance on each day; remixing makes a fresh random draw. Record both results on every trial.

Option checks: Leave the first card out until the pair ends: Removing it changes the second-day chance and creates dependence. Force the second draw to match the first: This changes independence to forced agreement. Draw again only when the first card is YES: This omits complete trials beginning with NO.

TEACHER ONLY

O worked keys 1-2

001: 7/16

Target: Use an organized list to identify a compound event and its probability.

Sample space: A1, A2, A3, A4, A5, A6, A7, A8, B1, B2, B3, B4, B5, B6, B7, B8. Event: A1, A2, A3, A4, A5, A6, A7. The 16 ordered outcomes are equally likely, each $1/16$; $P = 7/16 = 7/16$.

Accept equivalent exact fractions/decimals and valid reasoning. Require the requested model, list, table, tree or authentic record; a probability alone is incomplete evidence.

002: 1/6

Target: Use an organized list to identify a compound event and its probability.

Sample space: A1, A2, A3, B1, B2, B3. Event: A1. The 6 ordered outcomes are equally likely, each $1/6$; $P = 1/6 = 1/6$.

Accept equivalent exact fractions/decimals and valid reasoning. Require the requested model, list, table, tree or authentic record; a probability alone is incomplete evidence.