

CHAPTER 05 | STUDY GUIDE

Follow the food, not just the recipe

Food safety decisions depend on what happens to food from receiving through service. A cold finished dish may still have a cooking and cooling history. A hot dish may have been reheated after storage. Trace the actual steps before choosing a control.

TCS means **time/temperature control for safety**: food that needs these controls to limit pathogen growth or toxin formation.

Process pattern	What makes it fit
No-cook	No on-site cooking step. Example: assembling a salad from properly received, protected ingredients.
Same-day cook-and-serve	Cooking is followed by holding or service, without a cooling cycle.
Complex	Cooking is followed by cooling, with or without later reheating. Example: potatoes cooked and cooled for potato salad. The calendar date does not decide the pattern.

Use one decision sequence

Identify the food and process. Select a suitable instrument. Get a valid reading. Establish the time history. Compare with the applicable rule. Resolve the food and verify the correction. This is a teaching checklist, not a named Food Code procedure.

Edition boundary

This course uses the 2026 FDA model Food Code. The Code is a model; locally adopted requirements govern restaurant operations. Device instructions and optional restaurant practices are identified separately. No exam result is guaranteed.

Memory cues and recall practice: pages 13-14.

CONTAMINATION PREVENTION

Prevent the transfer; resolve the food

Separate raw animal food from ready-to-eat food and from unwashed produce. Protect different types of raw animal food from one another during storage, preparation and holding. An exception exists for types intentionally combined as ingredients. Matching cooking temperatures alone do not remove the separation duty.

One table, different tasks

Finish and remove the raw-food task. Remove contamination, wash, rinse, sanitize, and allow proper air-drying or adequate draining. Wash hands and use a clean, appropriate barrier before handling ready-to-eat food. A properly reset surface can become contaminated again by a dirty tray, dirty hands or equipment.

The food is a separate decision

Cooked chicken touches a raw-poultry board. Stop its service. Discard the contaminated chicken unless a reconditioning procedure approved by the regulatory authority applies. Do not improvise a rescue. Cleaning the board protects the next batch; it does not fix the affected chicken.

Color is not proof

Color-coded boards and designated work zones can support a restaurant system. They are practices, not substitutes for separation and cleaning/sanitizing. A green board carrying raw juices is not safe for lettuce merely because it is green.

TIME AND TEMPERATURE

A reading needs a history

Control	Meaning
Ordinary cold holding	TCS food at 41 F or below, subject to specific Code exceptions.
Ordinary hot holding	TCS food at 135 F or above, subject to specific Code exceptions.
Ordinary two-stage cooling	135 F to 70 F within 2 hours, and 135 F to 41 F or below within 6 hours total.
High-growth context	70-125 F is particularly favorable for growth of certain pathogens. It is not a separate holding limit.

Ordinary two-stage clock math

Beans reach 135 F at 10 a.m. and 70 F at 11:30 a.m. They must reach 41 F or below by 4 p.m. The first stage took 1.5 hours, leaving 4.5 hours within the original six-hour total. Reaching 70 F does not start a fresh six hours.

Same number, different process

A pan at 90 F may be passing through a properly monitored cooling process. Another pan at 90 F in ordinary hot holding is below its holding minimum. Identify the process and time history before deciding disposition.

Cooked rice at 73 F with no qualifying time-control procedure, no established safe time history and no approved reconditioning must be discarded. Putting it back in a cooler does not prove the earlier history was safe.

2026: A Separate Approved Cooling Method

- Cooked TCS food: no more than 2 inches deep, held uncovered.
- Refrigeration: ambient air at 41 F or below, with continuous electronic monitoring of time AND ambient air temperature.
- Regulatory approval required. Not for food cooled under noncontinuous cooking (3-401.14(B)), cook-chill/sous-vide ROP (3-502.12(D)(2)(e)), or time as a public-health control (3-501.19).
- Depth alone is not an exemption or permission to reset a failed cooling clock.

THREE ROUTES | DIFFERENT CONDITIONS

Time control is planned, not improvised

Time as a public health control requires written procedures prepared in advance, kept in the operation and available to the regulator. Required cooling before time control must also be addressed. It cannot be invented after food is found warm. Operations serving a highly susceptible population cannot use these routes for raw eggs.

Route	Starting condition and deadline
Standard 4 hours	Start at 41 F or below, or 135 F or above. Mark the four-hour deadline.
Cold route: 6 hours	Start at 41 F or below. Ensure the warmest food never exceeds 70 F. Mark removal time and the six-hour deadline. Discard if food exceeds 70 F. Monitoring is required unless ambient conditions ensure that limit.
Narrow 4-hour option	Ready-to-eat produce that becomes TCS when cut, or ready-to-eat food from a hermetically sealed container that becomes TCS when opened: start and stay at 70 F or below. Mark four hours from cutting/opening. Not any covered pan.

Finish means service, not just cooking
Within the applicable deadline, cook AND serve food that needs cooking, serve ready-to-eat food, or discard it. Missing required time marks mean discard. Do not switch routes or reset clocks after a failure.

Examples: raw chicken starts standard time control at 10 a.m.; cooking at 1:45 p.m. does not extend service beyond 2 p.m. Qualifying canned tuna opened at 68 F at 10 a.m. under the narrow route must stay at or below 70 F and be served or discarded by 2 p.m.

THERMOMETER SELECTION

Choose the sensor for the task

Device or probe	Appropriate use
Bimetallic stemmed	Common dial models sense across a stem region, often tip to dimple. Typical models span 0-220 F and may have a calibration nut. Read the specific model instructions.
Thermocouple / thermistor	Electronic sensors with model-specific probes, sensing areas and response times. A digital display alone does not prove suitability.
Small-diameter penetration	Measure thin food internally; side insertion may place the sensing area correctly.
Immersion	Liquids such as soup or sauce. Confirm the range before hot-oil use.
Surface / air	Surface probe: contact measurement of equipment. Air probe: air in a storage or holding unit.

Glass exception

A glass sensor or stem cannot contact food unless encased in a shatterproof coating, such as a protected candy thermometer. The protected device must still be suitable for the food and temperature range.

PLACEMENT AND RESPONSE

Make the measurement mean something

Place the sensing area where the required measurement is made. For cooking verification, measure the coldest relevant internal area, commonly the center or thickest section, away from bone, gristle, fat pockets and the pan. Check representative items or locations. Follow probe instructions and wait for a stable reading.

Thin food needs the right fit

For a thin fish filet or patty, use a suitable small-diameter probe and insert from the side when needed. A thick dial stem partly in the food and partly in air does not give a dependable internal measurement.

Do not average away a failure

Tuna-salad portions read 39 F, 41 F and 44 F during ordinary cold holding. The average does not clear the 44 F portion. Verify the reading and establish that food's time history and permitted corrective action. Do not mix portions to hide a warm location.

Surface is not internal

An infrared reading measures a surface. It does not prove the center of soup, a roast or a packaged product meets its internal limit. A cabinet display also does not establish the food temperature. Select a suitable food probe and measure the actual food.

INSTRUMENT TOLERANCES

Accuracy is not a food-limit allowance

Device scale	Food device	Ambient air / water
Fahrenheit only	Within +/-2 F	Within +/-3 F
Celsius only or dual scale	Within +/-1 C	Within +/-1.5 C

These requirements apply in the intended range of use. A Fahrenheit-only food device that reads 103 F against a valid 100 F reference is outside its tolerance. An ambient Fahrenheit-only device that reads 38 F against a valid 40 F reference is within tolerance at that test point; that alone does not verify its entire range.

The limit does not move

A 43 F food reading is not automatically acceptable because a food thermometer has a +/-2 F tolerance. Verify the measurement and history. The ordinary cold-holding limit stays at 41 F or below.

Put cabinet sensors in the limiting location

For mechanically refrigerated equipment, locate the sensor to measure air or simulated-product temperature in the warmest part. For hot-holding equipment, use the coolest part. This helps detect the location most likely to lose control. Check actual food too. The Code contains specific exceptions for equipment where a built-in device is not practical.

PROBE CARE AND DROPPED DEVICES

A clean probe can still be inaccurate

Protect the probe from contaminating food. Remove food residue, wash, rinse and sanitize using the correct procedure. Air-dry or adequately drain before food contact; do not towel-dry. Keep the clean probe protected in storage. Follow the instrument's instructions, especially for parts that cannot be immersed.

Do both after a drop

A probe falls on the floor. Cleaning and sanitizing address contamination. An accuracy check addresses possible damage or drift. Neither step replaces the other. Return it to use only when it is sanitary, suitable and accurate.

Two different failures

Visible raw-poultry residue remains on the stem. A quick dip in sanitizer is not enough; clean before sanitizing. In a second case, the probe is spotless but reads 36 F in a correctly prepared ice reference. It fails the Fahrenheit-only food-device tolerance and needs an allowed adjustment and recheck, or removal for service/replacement.

An accuracy check compares the reading with a valid reference. Calibration adjusts the device when its maker permits it. The Food Code requires calibration according to manufacturer specifications as necessary to ensure accuracy. A restaurant may choose additional scheduled checks; do not label every such schedule a universal legal rule.

ICE AND BOILING CHECKS

Check the reference before the instrument

Method	Valid reference and technique
Ice point: 32 F / 0 C	Pack crushed ice and clean water, stir and allow the mixture to settle at its reference temperature. Immerse the whole sensing area without touching the sides or bottom. Wait for a stable reading. One ice cube in cool water is not a valid ice-point setup.
Boiling point	Use a rolling boil only if safe for the device. Confirm the expected local boiling point. Keep the sensing area away from the pot and wait for stability. 212 F / 100 C is a sea-level reference, not a universal local target.

Use the correct local value

At a location where the expected boiling point is 208 F, a reading of 208 F agrees with that reference. Adjusting it to 212 F would introduce error. Elevation and atmospheric pressure affect boiling temperature.

When a device fails

Adjust only when the maker allows it, then recheck. A nonadjustable device that fails must come out of use for service or replacement. Do not teach workers to silently add or subtract an offset from every food reading.

TEMPERATURE INDICATORS

Read what an indicator actually proves

Indicator	Evidence and limit
Maximum-registering	Retains the highest temperature sensed during its use. It does not establish how long that temperature lasted unless the device also measures time.
Irreversible threshold label	A 160 F threshold change indicates that the threshold was reached at the label's location under the product instructions. It does not establish an exact 160 F maximum.
Time-temperature indicator	A product-specific response to temperature exposure over time. Interpret its criteria, calibration and placement according to its design and the applicable receiving procedure.

Cold now does not erase earlier exposure

A shipment can arrive cold after an earlier temperature problem. If its indicator signals exceeded exposure, do not clear it solely from today's cold reading. Hold it out of use while evaluating the indicator and product-specific acceptance criteria; reject when those criteria are not met.

For hot-water mechanical warewashing, the Food Code calls for an irreversible registering indicator to measure utensil-surface temperature. The surface must reach at least 160 F. That is not the same as a machine's displayed rinse-water temperature.

WORKED DECISIONS

Explain the decision before choosing an answer

1 | Soup during the rush

Ordinary hot-held soup reads 120 F with a suitable, accurate probe. Nobody can establish how long it has been out of control and no approved reconditioning applies. Stop service and discard it. Turning up the warmer changes future temperature, not the missing history.

2 | A six-hour cold route fails early

Food starts at 40 F at noon under a prepared six-hour procedure. At 3 p.m. the warmest portion reaches 72 F. Discard it now: the 70 F ceiling failed before the six-hour deadline. Do not move it to the four-hour route to gain another hour.

3 | The display is reassuring, but incomplete

A hot-holding cabinet displays 145 F. An infrared reading on soup is 139 F. Neither proves the soup's coldest relevant internal location meets its limit. Use a suitable food probe; if a failure is confirmed, establish history and the permitted disposition.

Read the controlling condition

Before answering, identify the process, starting temperature, elapsed time, instrument and exact action being asked. Plausible choices often address a different step. A clean board does not resolve contaminated chicken; an accurate air reading does not prove an internal food temperature.

CHAPTER RECAP AND SOURCES

Carry these distinctions forward

Separate the concepts: contamination versus growth; food disposition versus equipment cleanup; process history versus a current reading; internal versus surface temperature; food accuracy versus ambient accuracy; checking versus adjusting; exact maximum versus a reached threshold.

Keep the clocks straight: ordinary holding is not planned time control. Ordinary cooling uses two hours to 70 F and six hours total to 41 F. The approved option is on page 3. Each time-control route has its own starting conditions and deadline. Cooking alone does not end a cook-and-serve deadline.

Explain your answer: name the controlling fact, state the applicable rule, choose the action and explain why the closest alternative fails. Use the practice quiz explanations to revisit the relevant slide and guide page. Exact exam questions vary.

Primary reference set

2026 FDA Food Code

2026 cooling-method conditions

USDA: food thermometer construction and use

UC ANR: thermometer reference-check methods

FDA: seafood time-temperature indicators

Use sources for the claim they support

The FDA Code supplies model rules. Device-use references explain instruments and checking methods; consumer cooking charts do not replace retail Food Code limits. Product-specific indicator guidance is not a universal acceptance rule for every food.

CHAPTER 05 | REMEMBER THE DIFFERENCE

Measure the Right Thing

Food, surface and air are three different measurements.

Choose the instrument for the decision before looking for a reassuring number. A sensor must fit the food, its range and the required measurement location.

Thin vs. thick food	Use a suitable small-diameter probe for a thin patty or fillet, inserting from the side when needed. A typical bimetallic stem senses along a region, often tip to dimple; a partly exposed sensing region can mislead.
Probe choices	Penetration: internal food. Immersion: liquids, within the device range. Surface probe: contact surface. Air probe: equipment air. Thermocouples and thermistors are sensor types; the attached probe and instructions still matter.
Infrared	Reads a surface, not the interior. It cannot establish the center temperature of soup or a roast, or read through packaging to prove the food inside is safe.
Response vs. holding time	Wait for a stable thermometer reading as the device requires. That is separate from keeping food at its required cooking/reheating temperature for a specified time. There is no universal 15-second thermometer-reading rule.

Use it on shift: A batch reheated for hot holding must meet its applicable endpoint. A fast probe that stabilizes in three seconds does not turn a required 15-second food-temperature hold into three seconds.

Cover the answers. Explain the reason.

A cold cabinet display proves cold food? No. Check actual food, unless the particular rule specifically calls for equipment air.

A clean probe is automatically accurate? No. Sanitation and accuracy are separate checks, especially after a drop.

Review: earlier guide pp. 5-8. **Sources:** 4-203.11-.12; 4-302.12; 4-502.11; 3-403.11; Annex 5 measurement guidance and device instructions. [2026 FDA Food Code](#)

CHAPTER 05 | REMEMBER THE DIFFERENCE

Two, Three, Thirty-Two: Keep the Labels

For Fahrenheit-only devices: food +/-2 F; ambient air/water +/-3 F.

Accuracy is an instrument requirement within its intended range, not permission to add degrees to a food limit. Other device scales have their own Code tolerances; the comparison here is Fahrenheit-only.

Food device: +/-2 F	At a valid 100 F reference, 103 F is outside the tolerance. Do not use that reading as proof the food is safe.
Ambient device: +/-3 F	For Fahrenheit-only air/water devices, a 38 F reading against a valid 40 F reference is within tolerance at that point. This does not verify the entire range.
Ice reference: 32 F	Use a properly prepared crushed-ice and clean-water mixture. Immerse the sensing area without touching the container and wait for stability. One ice cube in a warm cup is not that reference.
Boiling: not always 212 F	212 F is the standard sea-level reference. Elevation and pressure change boiling temperature. Check the expected local reference; do not adjust an accurate local reading to the wrong target.

Use it on shift: Food in ordinary cold holding reads 43 F. The +/-2 F instrument requirement does not change the 41 F food limit. Verify the measurement and history, then use the applicable corrective action.

Cover the answers. Explain the reason.

Which cabinet location is the useful limiting point? Warmest for mechanical cold storage; coolest for hot holding, subject to stated equipment exceptions.

Check vs. calibrate? A check compares with a valid reference. Adjust only if the manufacturer permits; then recheck, or remove for service/replacement.

Review: earlier guide pp. 7-9. **Sources:** 4-203.11-.12; 4-204.112; 4-502.11(B); 3-501.16. Ice/boiling technique: manufacturer and measurement guidance (guide p. 12).
[2026 FDA Food Code](#)