

Kansas Agronomy CDE Guidelines

Monday, May 05

Check-in: 2:00-3:30pm (Throckmorton Hall, First Floor Lobby)

Contest: 3:15 – 6:15pm (Throckmorton Hall, First Floor)

Coordinator: Dr. Rachel Cott (rveenstra@ksu.edu)

College Contact: Abby Johnson (abbyjohnson@ksu.edu)

Updated: December 2025

Major Changes for 2025

Grain grading and seed analysis are no longer distinct components of the Kansas Agronomy CDE. This rotation has been replaced with an extended “Pest and Equipment Identification” section, which is now separate from the traditional practicum section (“Applied Agronomics”). Vegetative weeds have been added to the Plant and Seed Identification section. More insects and equipment have been added to the official lists. All lists have been renumbered. Scoring for each contest rotation has been updated, and new answer forms are provided in this document.

General Information

Team information

Teams will consist of up to four members, with the three high individual scores used for the total team score. Teams must participate in their appropriate District Agronomy Event to be eligible to participate in the State Agronomy Event. Each team member will complete 4 rotations of 40-minutes each to determine their individually contributing score. Official dress is not required for this event.

Student success and contest accessibility is very important to us. Thank you for your assistance in ensuring students have access to what they need and the contest coordinator is well-informed and prepared. Advisors with teams or individuals requiring accommodations should request these in writing with appropriate documentation to the contest coordinator as soon as possible, at least one week prior to the contest. Accommodations requested at check-in on contest day are not guaranteed, due to staffing and scheduling logistics.

Equipment

Required materials (provided by competing schools) include unmarked clipboards, pencil or pen, and an electronic calculator. Calculators must be non-programmable and silent. Cell phones, smart phones, or iPads cannot be used as calculators.

Recommended materials (provided by competing schools) include lighted magnifying lenses.

Items listed above are the only items that may be taken into the event by a contestant.

Other general rules

No communication with anyone other than officials will be permitted while the event is underway.

No cell phones, smart phones, iPads, or other personal digital devices (including smart watches) will be allowed in the contest rooms. If anyone has a cell phone ring during the contest, they will be disqualified and removed from the contest.

Infraction of any rules presented in this document will be followed by penalties varying from a deduction in points to dismissal from the event.

General announcements

Coaches are invited to join a quick meeting during the first rotation with the contest coordinator to discuss and provide input on desired/potential changes to the Agronomy contest for 2026.

Contest and evaluation format

This contest will consist of four rotations – each with unique aspects to test students agronomic knowledge from different perspectives. These four rotations are listed and described below. The contest coordinator will provide score sheets and answer forms for students at the contest. **No scantrons will be utilized.** Complete rotation descriptions, lists, form examples, and resources for study and purchase are listed in subsequent sections.

Rotation	Section	Evaluation	Points
A	Plant and Seed Identification	75 specimens (4 pt each)	300
B	Pest and Equipment Identification	50 stations (4 pt each)	200
C	Agronomic Quiz and Calculations	35 multiple choice (5 pt each) 5 calculations (5 pt each)	200
D	Agronomic Applications	40 stations (5 pt each)	200
		TOTAL	900

- Rotation A. Plant and Seed Identification*
Identification of 75 live or pressed plants or seeds of select crop and weed species. Hard copies of the lists will be provided to students on contest day. More information below.
- Rotation B. Pest and Equipment Identification*
Identification of 50 images, mounts, specimens, or models of insects, diseases, and equipment from the provided lists. Hard copies of the lists will be provided to students on contest day. More information below.
- Rotation C. Agronomic Exam and Calculations*
General knowledge quiz consisting of 35 multiple choice questions, plus 5 calculation problems related to fertilizer application, seeding rates, pure live seed, plant population, harvest losses, yield estimation, sprayer calibration, etc. General knowledge questions will cover basic principles of crop production and soil management, including plant growth processes and crop development, tillage and seedbed preparation, variety selection, seeding, essential nutrients and fertilization practices, pest development and pest control (weeds, insects, diseases), water management, harvest factors and crop quality effects, and residue management. Focus will be on major grain crops (wheat, corn, sorghum, soybean, sunflowers, canola) and forages (alfalfa, fescue, bromegrass, native range) grown in Kansas. Some questions will require comparison of different crops for production data (KS, USA, world), uses and products, grain or forage quality, growth habit or adaptation, critical growth stages for stress, etc. Questions may include topics related to best management practices for preserving environmental quality, water quality, soil conservation, and sustainability.

- *Rotation D. Agronomic Applications*

Applied practicum consisting of 40 stations where students will perform simple analyses or answer questions such as (not an exclusive list): determine soil texture by feel; interpret herbicide, seed, and/or fertilizer labels; answer questions from publications such as a Soil Survey Report, Weed Control Handbook, Crop Planting Guide, or Crop Variety Trial reports; write or interpret legal land descriptions; interpret soil test recommendation reports; identify common fertilizer carriers, ag lime, inoculum, etc.; name common nutrient deficiencies shown on crop plants (N, P, K, S, Fe); identify the crop from which various feed ingredients are made (ie. soybean meal, wheat bran, alfalfa pellets); identify growth stages of major crop plants (corn, wheat, sorghum, soybean, sunflower); name common plant structures (on seeds, seedlings, roots, stems, leaves, or flowers).

Tiebreakers

Legible writing is important and the judges will consider this factor in determining scores. Correct spelling is encouraged but will not be scored. Spelling may be used to break tied scores.

Tied scores for both team (top three individuals per school) and individual rankings will be broken by: first, Calculations points (total of last 5 questions from Rotation C); second, Plant and Seed Identification total points; and third, Agronomic Applications total points.

Study Resources

Identification study kits and contest sets are available from the Kansas State University Department of Agronomy. **To order, please complete this online order form:**
https://kstate.qualtrics.com/jfe/form/SV_eL5KxAWNYcFpaGW

Please email Sarah Frye (sezerger@ksu.edu) and Lakin Giager (lakin1@ksu.edu) with questions.

Item	Description	Price
Plant samples	Crop and weed plants each mounted with clear tape on blue 8 ½ x 11 inch cardstock.	\$1.00 each
Laminated plant samples	Same as above but laminated on blue 8 ½ x 11 inch cardstock.	\$2.00 each
Seed samples	Coin envelope containing approximately one tablespoon of seed.	\$0.75 each
Plant and Seed Identification Book	Written description of all plants and seeds on the official list with specific identification tips. Spiral bound.	\$5.00 each
Plant and Seed Identification USB Drive	Animated PowerPoint slides of all plants and seeds on the official list. <i>*pictures being updated</i>	\$5.00 each

Other materials

Excellent plant and seed images are available at the USDA Plants Database at www.plants.usda.gov, a searchable database for both crops and weeds. This is one of the best sites for seed photos. Another excellent searchable database for plant and pest images is the Bugwood Center for Invasive Species site at <http://www.bugwood.org> or go directly to the image database at <https://images.bugwood.org/>. Click on Forestry Images, Invasive.org, Insect Images, or Weed Images.

Rotation Descriptions

Rotation A. Plant and Seed Identification

Identification of grain crop plants and/or seeds; forage crop plants or seeds; and weed plants or seeds. A complete list of species is provided at the end of this document.

1. 75 samples will be provided for identification. A total of 40 minutes are allowed to identify the 75 samples. Scoring will be 4 points per sample for a total of 300 points.
2. All event samples will come from the official identification list on the following pages.
3. Samples will be identified using the official species name in the master list. (*not the matching number as in previous years*) Lists will be provided to each contestant by the contest coordinator day-of-contest. The list is organized alphabetically within three sections: Grain Crops, Forage Crops, and Weeds.
4. Spelling will not be graded, but writing must be legible. As previously mentioned, please reach out to the contest coordinator if you have students requiring accommodations.

Rotation B. Pest and Equipment Identification

Identification of insects, diseases, and equipment. Samples may be images, mounts, specimens, or models. A complete list is provided at the end of this document.

1. 50 stations will be provided for identification. A total of 40 minutes are allowed to identify the 50 stations. Scoring will be 4 points per sample for a total of 200 points.
2. All event samples will come from the official identification list on the following pages.
3. Samples will be identified using the official species name in the master list. (*not the matching number as in previous years*) Lists will be provided to each contestant by the contest coordinator day-of-contest. The list is organized alphabetically within category (Insects, Diseases, Equipment).
4. Spelling will not be graded, but writing must be legible. As previously mentioned, please reach out to the contest coordinator if you have students requiring accommodations.

Rotation C. Agronomic Quiz and Calculations

Written exam covering basic knowledge and calculations required of farmers and agronomists.

1. 35 multiple choice questions worth 5 points each (175 points) and 5 math problems worth 5 points each (25 points) for a combined total of 200 points. A total of 40 minutes are allowed to complete all of these questions. A separate answer sheet will be provided.
2. The general knowledge questions will focus primarily on crop science, but will also include questions from weeds and soil science (including soil conservation and environmental quality). Questions will cover basic principles of crop production and soil management, including plant growth processes and crop development, tillage and seedbed preparation, variety selection, seeding, essential nutrients and fertilization practices, pest development and pest control (weeds, insects, diseases), water management, harvest factors and crop quality effects, and residue management. Focus will be on major grain crops (wheat, corn, sorghum, soybean, sunflowers, canola) and forages (alfalfa, fescue, brome grass, native range) grown in Kansas. Some questions will require comparison of different crops for production data (KS, USA, world), uses and products, grain or forage quality, growth habit or adaptation, critical growth stages for stress, etc. Questions may include topics related best management practices for preserving environmental quality, water quality, soil conservation, and sustainability.

Example questions:

- | | | |
|----------|----|------------------------------------------------------------------------------------------------------------------------------------|
| <u>a</u> | 1. | Corn is a: a) summer annual b) winter annual c) perennial d) biennial. |
| <u>c</u> | 2. | The wheat variety brought to KS by Mennonites (1874) that began our industry:
a) Newton b) Pawnee c) Turkey d) Karl e) Crimean. |
| <u>a</u> | 3. | The test weight per bushel for soybeans is: a) 60 b) 56 c) 50 d) 48 pounds. |

3. The calculation questions may include pure-live seed content, seeding rate, plant population, harvest loss, fertilizer application, pesticide application, cost comparisons of active ingredients, equipment calibration (e.g., sprayers and box drills), or other relevant agronomic calculations. Contestants are expected to know common conversions such as square feet/acre, oz/pint, pints/gal, standard bushel weights, feet/mile, etc. Some conversion factors and equations may be given, but are not guaranteed. Work must be shown to allow graders to evaluate for correct procedures of “rounded” answers. Correct units must be included in the final answer to receive full points. All answers will be rounded to the nearest tenth unless otherwise indicated in the question (e.g., “round to the nearest cent”, or “round your plant population to the nearest whole number”). A logical range will be accepted for rounded answers, as determined fitting for each question.

Example questions:

- | | | |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| 1. | If a producer counts an average of 2 plants per foot of row in 8-inch drill rows, what is the plant population per acre? (round to the nearest whole number)
<i>(work shown here)</i> | Answer: <u>130,680 plants/acre</u> |
| 2. | A producer wants to check the seeding rate of a 30 foot grain drill. In a 100-foot long test strip, 4.0 pounds of wheat are collected. What is the seeding rate in lbs/acre? (round to the nearest tenth)
<i>(work shown here)</i> | Answer: <u>58.1 lbs/acre</u> |
| 3. | “Superstuff” pesticide is a liquid formulation that contains 40% a.i., weighs 9 lb/gal, and costs \$18.95 per gallon. What is the cost per pound of a.i.? (round to the nearest cent)
<i>(work shown here)</i> | Answer: <u>\$5.26/pound a.i.</u> |
| 4. | If a producer finds 8 soybeans per square foot on the ground after harvest and the variety has 2,500 seeds/pound, what is the yield loss in bu/acre? (round to the nearest tenth)
<i>(work shown here)</i> | Answer: <u>2.3 bu/acre</u> |

Rotation D. Agronomic Applications

Applied agronomy practicum to showcase students' practical knowledge of how to apply various plant, soil, and environmental science concepts.

1. 40 stations will be provided for evaluation. A total of 40 minutes are allowed to review the 40 stations. Scoring will be 5 points per sample for a total of 200 points.
2. Students will perform simple analyses or answer questions such as: assign grain quality grades based on factors and tables provided; describe the quality or use of seed samples based on seed analysis reports; determine soil texture by feel; interpret herbicide, seed, and/or fertilizer labels; answer questions from publications such as a *Soil Survey Report*, *Weed Control Handbook*, *Crop Planting Guide*, or *Crop Variety Trial* reports; write or interpret legal land descriptions; interpret soil test recommendation reports; identify common fertilizer carriers, ag lime, inoculum, etc.; name common nutrient deficiencies shown on crop plants (e.g., N, P, K, S, Fe); identify the crop from which various feed ingredients are made (e.g., soybean meal, wheat bran, alfalfa pellets); identify growth stages of major crop plants (e.g., corn, wheat, sorghum, soybean, sunflower); name common plant structures (on seeds, seedlings, roots, stems, leaves, or flowers).
3. Suggested study resources (*not intended to be all-inclusive*):
 - Kansas State Research and Extension – Crops publications available at <https://www.ksre.ksu.edu/bookstore>
 - Soil Texture by Feel Procedure - S.J. Thien, KSU Agronomy Department
 - Soil Texture Triangle
 - County Soil Survey Publications - Local NRCS or County Extension Office, or Web Soil Survey at <https://www.websoilsurvey.nrcs.usda.gov>
 - Most recent Chemical Weed Control Handbook. KSRE Report of Progress.
 - Kansas Crop Planting Guide – KSRE Publ. L-818.
 - Identifying Caterpillars in Corn, Sorghum, Soybeans. KSRE Publ. (Entomology Dept.)
 - How a Corn Plant Develops (SR 0048) Iowa State Univ. Extension
 - Soybean Growth and Development (PM 1945) Iowa State Univ. Extension
 - How a Sorghum Plant Develops (KSRE Publication – Agronomy Dept.)
 - High Plains Sunflower Production Handbook (KSRE – Agronomy Dept.)
 - Grain grading tutorials: <https://www.ams.usda.gov/resources/interactive-resources>
 - Grain grading handbook: <https://www.ams.usda.gov/sites/default/files/media/Book2.pdf>
 - Kansas noxious weeds list: <https://www.agriculture.ks.gov/divisions-programs/plant-protection-weed-control/noxious-weed-control-program/kansas-noxious-weed-list>

Official Plant and Seed Identification List
Kansas - Agronomy Career Development Event

- b** both pressed and seed together
p pressed (with bud or fruit visible)
v vegetative (live, pre-flowering)
s seed (mature)

Cultivated Crops

001	barley	p		s*
002	canola			s
003	cotton			s
004	dent corn			s
005	grain sorghum	p		s
006	oat	p		s*
007	pop corn			s
008	rice			s*
009	rye	p		s
010	soybean			s
011	sunflower			s
012	Karl 92 wheat	b		
013	Jagger wheat	b		
014	Trego wheat	b		
015	durum wheat			s
016	hard red winter wheat			s
017	hard red spring wheat			s
018	hard white wheat			s
019	soft red winter wheat			s
020	soft white wheat			s

Forage Crops

021	alfalfa	p		s
022	big bluestem	p		
023	birdsfoot trefoil	p		s
024	blue grama	p		
025	buffalograss	p		s
026	foxtail millet	p		s
027	Indiangrass	p		
028	Kentucky bluegrass	p		s
029	Korean lespedeza	p		s
030	little bluestem	p		
031	orange sorgo			s
032	orchardgrass	p		s
033	red clover	p		s
034	sand lovegrass	p		
035	sideoats grama	p		
036	smooth bromegrass	p		s
037	sudangrass			s
038	sumac sorgo			s
039	sweetclover	p		s
040	switchgrass	p		
041	tall fescue	p		s
042	white clover	p		s

Weeds

043	barnyardgrass	p	v	s
044	buffalobur	p		s
045	bull thistle	p		
046	bushy wallflower	p		
047	Canada thistle	p		s
048	cheat	p	v	s
049	common broomweed	p		
050	common chickweed	p		
051	common cocklebur	p	v	s*
052	common lambsquarters	p	v	s
053	common ragweed	p	v	s
054	curly dock	p		s
055	dodder	p		s
056	downy brome	p		s
057	field bindweed	p	v	s
058	field pennycress	p	v	s
059	giant foxtail	p		
060	giant ragweed	p		s
061	green foxtail	p	v	s
062	henbit	p		
063	hoary cress	p		
064	horsenettle	p		s
065	horseweed	p		
066	ironweed	p		
067	johnsongrass	p		s
068	jointed goatgrass	p		s
069	kochia	p		s
070	large crabgrass	p	v	s
071	little barley	p		
072	morningglory	p	v	s
073	musk thistle	p		
074	Pennsylvania smartweed	p		s
075	prairie threeawn	p		
076	prickly lettuce	p		
077	prostrate knotweed	p		
078	puncturevine	p		s
079	quackgrass	p		s
080	redroot pigweed	p	v	s
081	Russian thistle	p		s
082	sand sagebrush	p		
083	sericea lespedeza	p		
084	shattercane	p		s
085	shepherdspurse	p		
086	silverleaf nightshade	p		
087	velvetleaf	p	v	s
088	Venice mallow	p	v	s
089	wild buckwheat	p		s
090	wild carrot	p		
091	wild onion/wild garlic	p		s
092	wild sunflower	p	v	s
093	yellow foxtail	p	v	s
094	yellow nutsedge	p	v	

Echinochloa crusgalli
Solanum rostratum
Cirsium vulgare
Erysimum repandum
Cirsium arvense
Bromus secalinus
Gutierrezia dracunculoides
Stellaria media
Xanthium strumarium
Chenopodium album
Ambrosia artemisiifolia
Rumex crispus
Cuscuta spp.
Bromus tectorum
Convolvulus arvensis
Thlaspi arvense
Setaria faberi
Ambrosia trifida
Setaria viridis
Lamium amplexicaule
Cardaria draba
Solanum carolinense
Conyza canadensis
Veronia spp.
Sorghum halepense
Adgilops cylindrica
Kochia scoparia
Digitaria sanguinalis
Hordeum pusillum
Ipomoea hederacea/purpurea
Carduus nutans
Polygonum pensylvanicum
Aristada oligantha
Lactuca serriola
Polygonum aviculare
Tribulus terrestris
Elymus repens
Amaranthus retroflexus
Salsola tragus
Artemisia filifolia
Lespedeza cuneata
Sorghum bicolor
Capsella bursa-pastoris
Solanum elaeagnifolium
Abutilon theophrasti
Hibiscus trionum
Polygonum convolvulus
Daucus carota
Allium canadense/vineale
Helianthus anuus
Setaria pumila
Cyperus esculentus

* only shown in-hull/fruit

Official Insect, Disease, and Equipment Identification List

Kansas - Agronomy Career Development Event

Insects

001	alfalfa weevil	a	l
002	aphid	a	
003	bean leaf beetle	a	
004	black cutworm		l
005	blister beetle	a	
006	boll weevil	a	
007	chinch bug	a	
008	Colorado potato beetle	a	l
009	corn earworm		l
010	corn rootworm		l
011	northern corn rootworm	a	
012	southern corn rootworm	a	
013	western corn rootworm	a	
014	cotton bollworm		l
015	European corn borer	a	l
016	fall armyworm		l

017	granary weevil	a	
018	grasshopper	a	
019	green cloverworm		l
020	honeybee	a	
021	Japanese beetle	a	
022	lacewing	a	
023	lady beetle	a	l
024	leafhopper	a	
025	lesser grain borer	a	
026	Mexican bean beetle	a	
027	spider mite	a	
028	squash bug	a	
029	stinkbug	a	
030	thrips	a	
031	wireworm		l

(a) adult (l) larva

Diseases

040	bacterial blight of soybean	sy
041	bacterial wilt of alfalfa	a
042	barley yellow dwarf virus	w
043	black point of wheat	w
044	blue eye mold	c
045	bean pod mottle virus	sy
046	charcoal rot of sorghum	sr
047	corn smut	c
048	ergot	sr/w
049	ear rot	c
050	Gibberella stalk rot	c
051	gray leaf spot	sr/c

052	leaf rust	w
053	leaf spot	a
054	loose smut	w
055	Northern corn leaf blight	c
056	Phytophthora root rot	sy
057	rust	c/sy/sr
058	pod and stem rot of soybean	sy
059	purple seed stain of soybean	sy
060	stem rust of wheat	w
061	wheat scab	w
062	wheat streak mosaic virus	w

(a) alfalfa, (c) corn, (sy) soybean, (sr) sorghum, (w) wheat

Equipment

070	anhydrous ammonia applicator
071	bermudagrass sprigger
072	broadcast fertilizer spreader
073	center pivot irrigation system
074	chisel plow
075	combine yield monitor system
076	cotton picker
077	disk
078	drainage tile installation system
079	field cultivator
080	field sprayer
081	forage chopper
082	global positioning system
083	grain auger
084	grain combine
085	grain drill
086	grain moisture tester

087	grain storage bin/dryer
088	hay baler
089	hay rake
090	moldboard plow
091	nozzle bodies
092	rod weeder
093	rotary hoe
094	rotary mower
095	row crop planter
096	self-unloading forage wagon
097	soil probe
098	soil thermometer
099	spiketooth harrow
100	subsoiler/ripper
101	swather/windrower
102	tractor

Place Label Here

Write legibly or no points will be given. Blanks are worth 4 pt each. (300 pt total)
Answer with the complete name provided on your official identification list, NOT the number.

- | | |
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| 1. _____ | 20. _____ |
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Pest and Equipment Identification

Place Label Here

Write legibly or no points will be given. Blanks are worth 4 pt each. (200 pt total)
Answer with the complete name provided on your official identification list, NOT the number.

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| 1. _____ | 20. _____ |
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50. _____

Kansas Agronomy CDE

Agronomic Quiz and Calculations

Place Label Here

Multiple Choice (5 pts each) Please write legibly with capital letters.

- | | | |
|-----------|-----------|-----------|
| 1. _____ | 13. _____ | 25. _____ |
| 2. _____ | 14. _____ | 26. _____ |
| 3. _____ | 15. _____ | 27. _____ |
| 4. _____ | 16. _____ | 28. _____ |
| 5. _____ | 17. _____ | 29. _____ |
| 6. _____ | 18. _____ | 30. _____ |
| 7. _____ | 19. _____ | 31. _____ |
| 8. _____ | 20. _____ | 32. _____ |
| 9. _____ | 21. _____ | 33. _____ |
| 10. _____ | 22. _____ | 34. _____ |
| 11. _____ | 23. _____ | 35. _____ |
| 12. _____ | 24. _____ | |

Work the calculations on this form and write your answer with units in the box provided!

Round all answers to the nearest tenth unless otherwise instructed (ex: 0.1).

Calculations (5 pts each)

36.

answer:

37.

answer:

38.

answer:

39.

answer:

40.

answer:

Place Label Here

Write legibly or no points will be given. Blanks are worth 5 pt each. (200 pt total)

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40. _____

Kansas State University

FFA AGRONOMY CDE ORDER OPTIONS

Listed below are the materials provided by Kansas State University

Item	Description	Price
Plant Samples	Crop and weed plants each mounted with clear tape on blue 8 ½ x 11-inch cardstock.	\$1.00 each
Laminated Plant Samples	Same as above but laminated on blue 8 ½ x 11-inch cardstock.	\$2.00 each
Seed Samples	Coin envelope containing approximately one tablespoon of seed.	\$0.75 each
Plant and Seed Identification Book	Written description of all the plants and seeds on the official list with specific identification tips. Spiral bound.	\$5.00 each
Plant and Seed Identification USB Drive	Animated PowerPoint slides of all plants and seeds on the official list. *Currently updating pictures **Both KS and CO seed PowerPoints available**	\$5.00 each

Grain Grading Samples, Seed Analysis Samples and U.S. Grain Standard Books available upon request

For out of state orders, we will accommodate as best we can, but we will mostly only be able to add what is also on the Kansas FFA Agronomy CDE list.

CONTACT INFORMATION

To order or if you have any questions please email both Sarah Frye at sezerger@ksu.edu and Lakin Giager at lakin1@ksu.edu

2024-25 ORDER FORM

Scan the QR Code to take you to the order form. We will contact you within 3-5 business days of submitting your order to confirm and send an invoice.

