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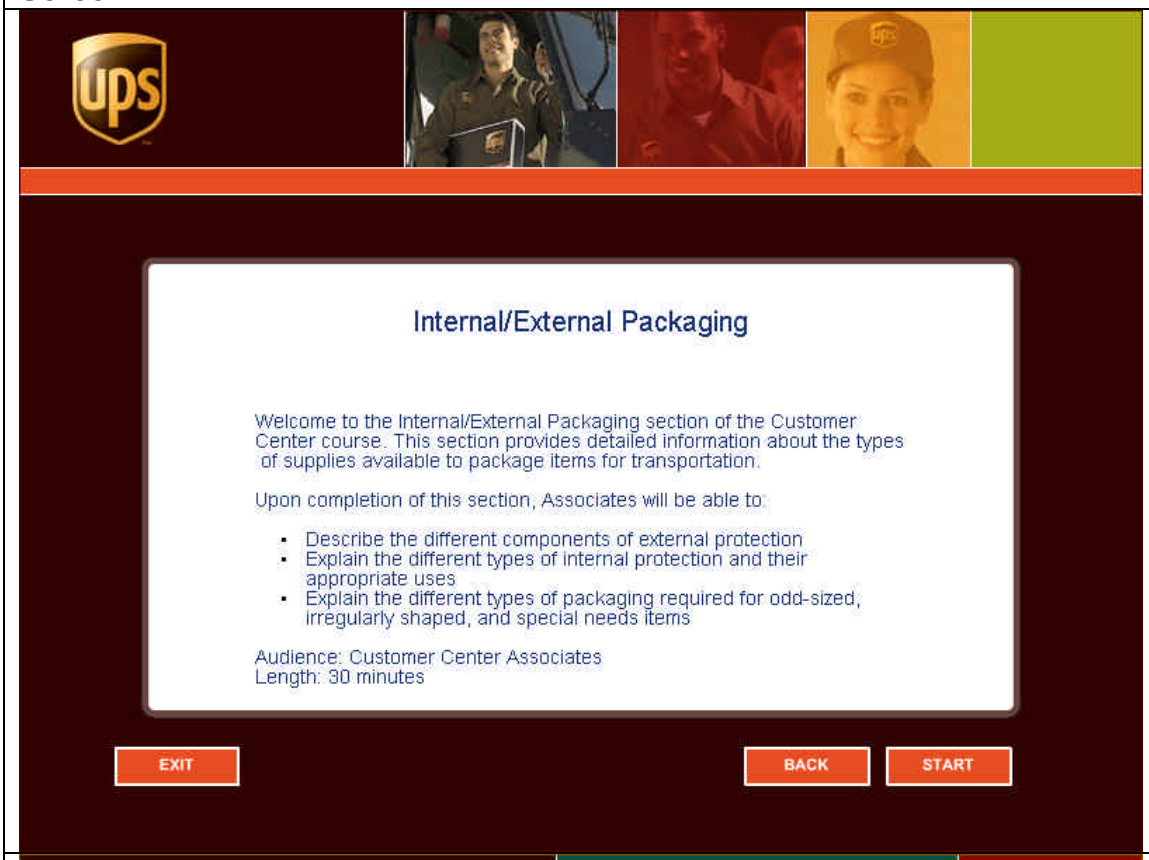	
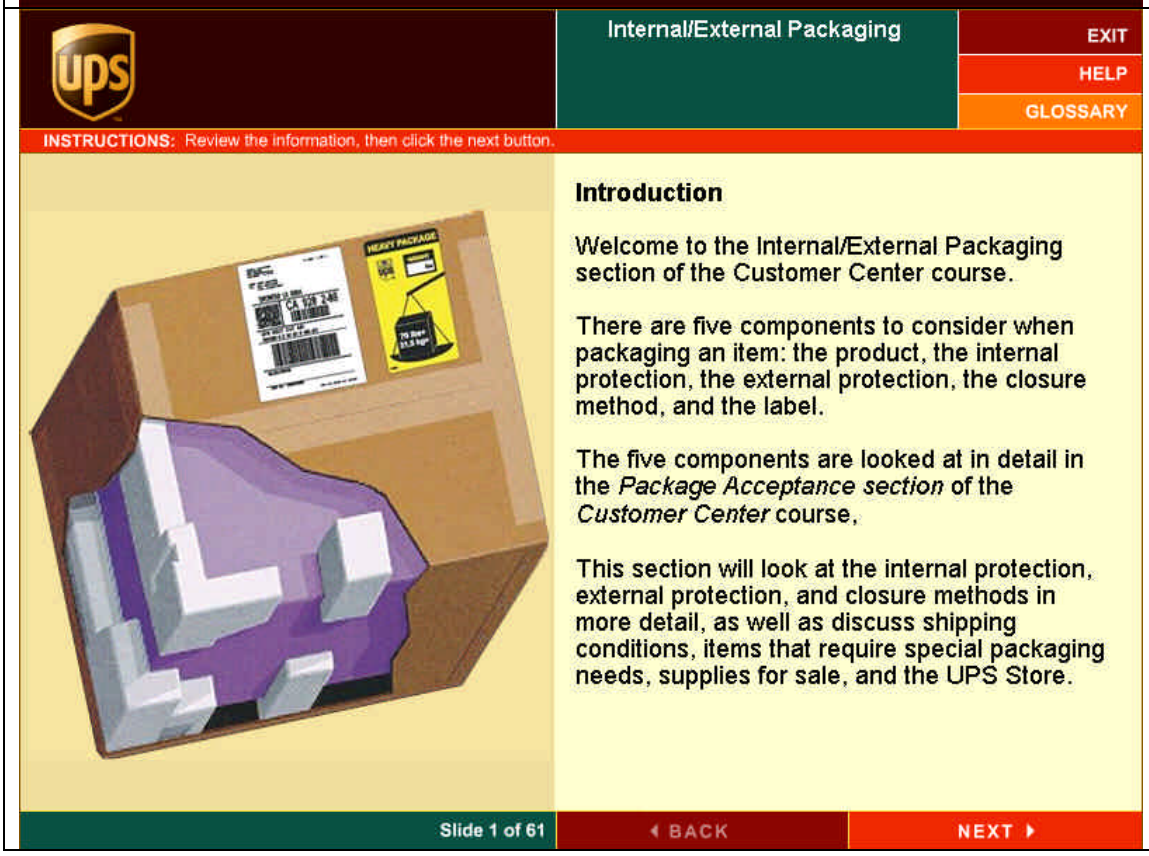	

Internal/External Packaging

Screen	Comments

Internal/External Packaging

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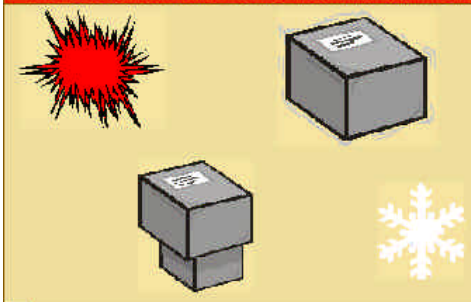

Question

If a package is not packed well enough to survive the possible shipping conditions, the Customer Center Associate must inform the customer that the package cannot be shipped as is.

Answer

A True

B False

Feedback

Shipping Conditions

During the shipping cycle, there are many conditions that can damage a package and its contents.

The conditions that could damage an item include:

- Shock
- Vibration
- Compression
- Environmental Conditions

It is important that any item shipped through UPS is packed well enough to handle these conditions and arrive at its destination undamaged. If a package is not packed well enough to survive these conditions, do not ship it until the issues are taken care of.

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INSTRUCTIONS: Review the information, then click the next button.

Shock

Vibration

Compression

Environmental

Shipping Conditions, continued

Shock occurs when a moving package hits another package or a solid object, such as the floor or a wall.

Vibration occurs when packages are transported. Delivery vehicles, tractor trailers, jet engine noise, or rail transport can cause this repeated movement that can range from mild to extreme.

Compression occurs when a package is compressed by another package or object vertically or horizontally. Compression may occur when boxes of varying weights and sizes are stacked upon each other.

Environmental Conditions such as extreme temperatures, humidity, water, and air pressure can also adversely affect the packaging materials and containers.

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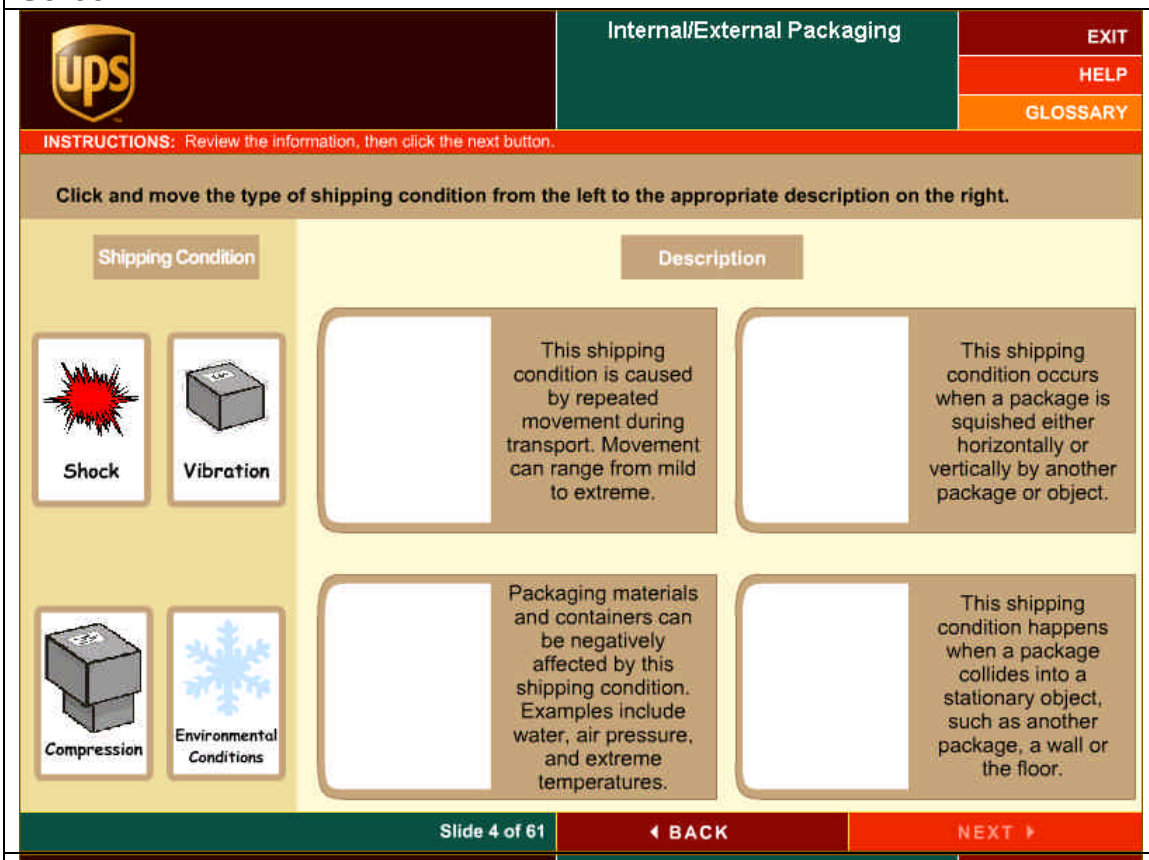
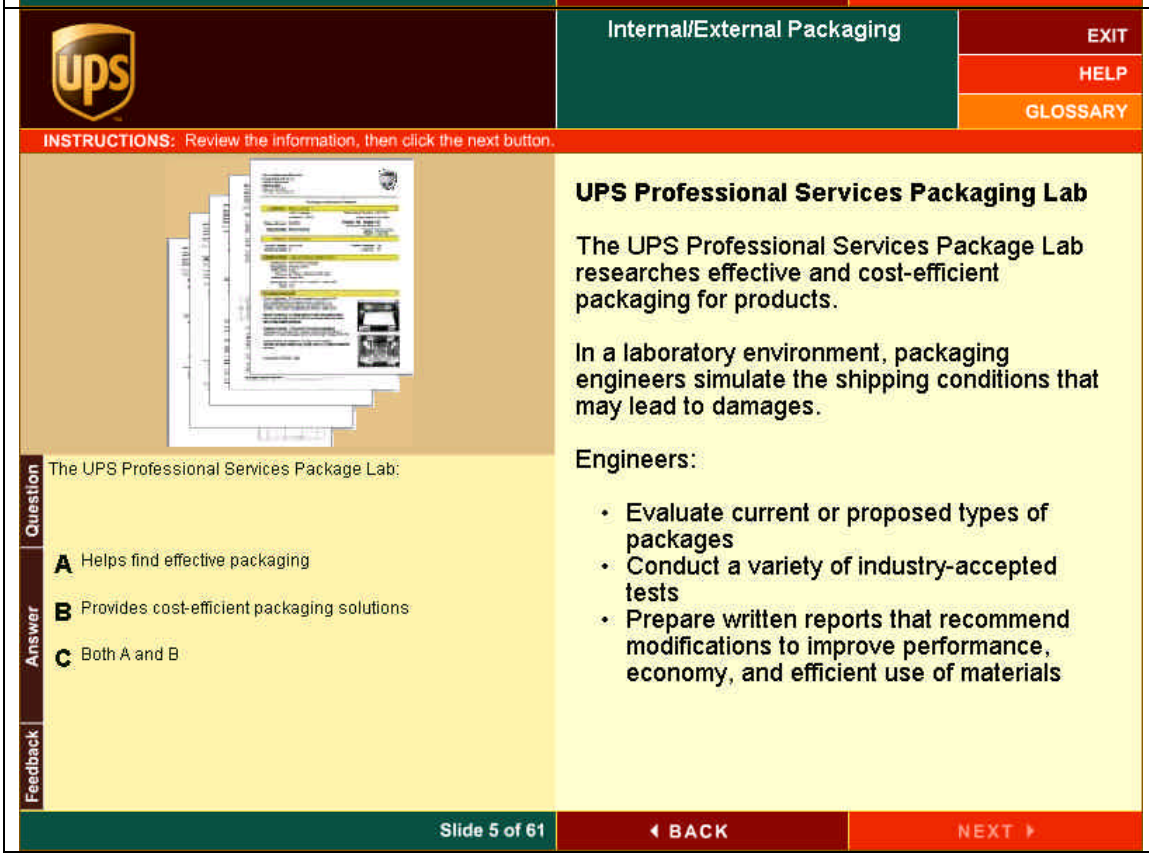
Screen	Comments
	
	

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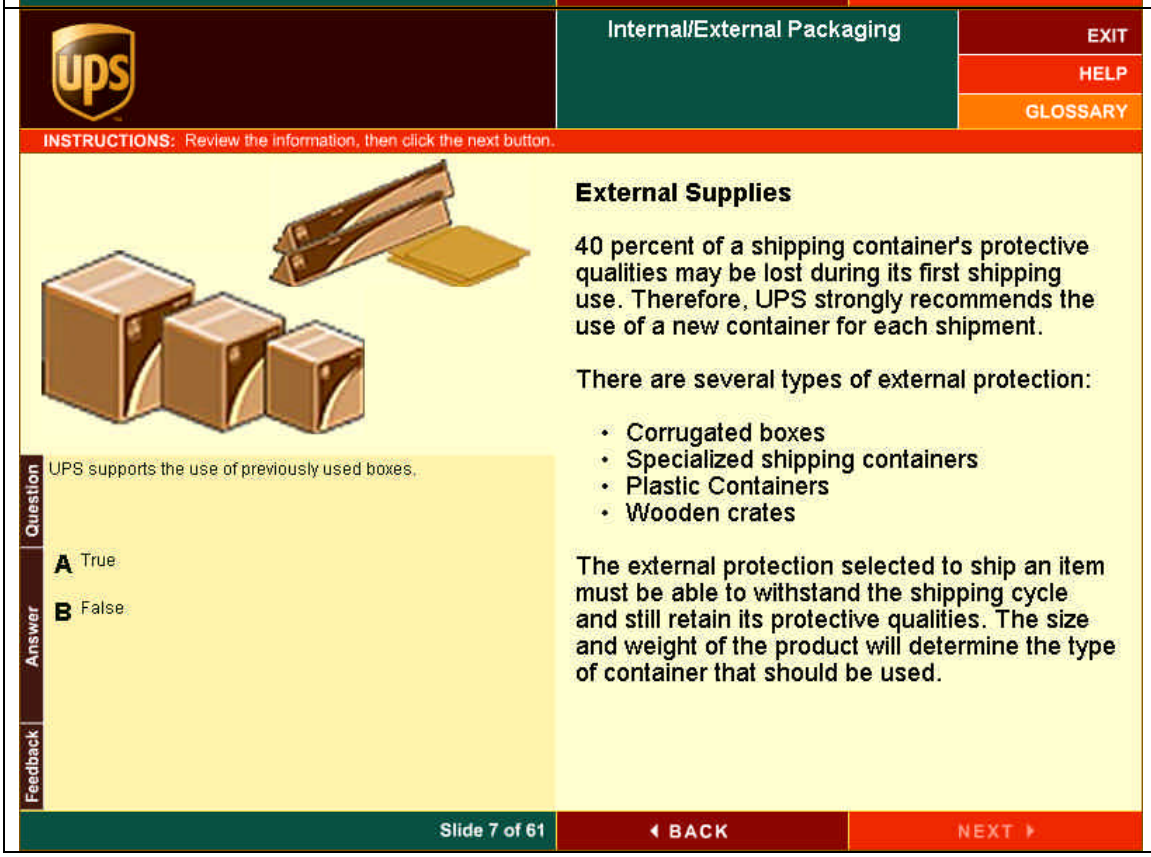

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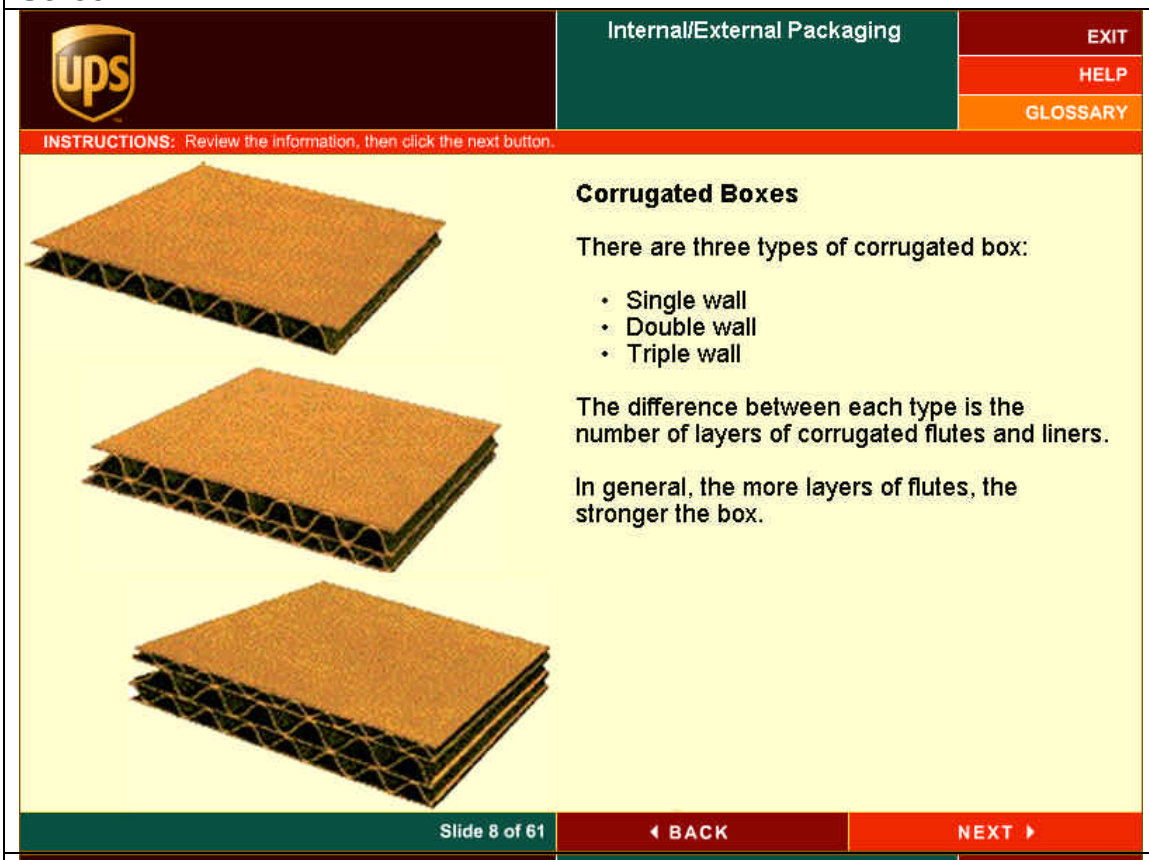

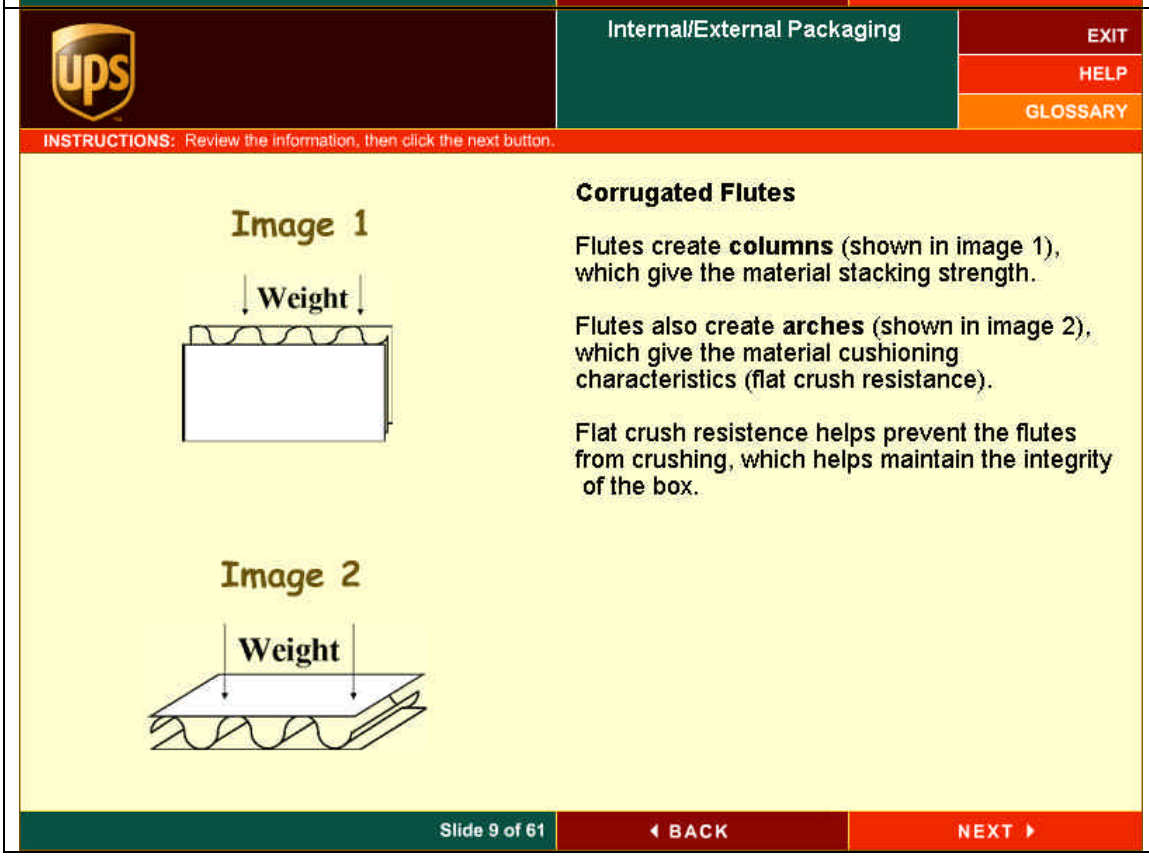

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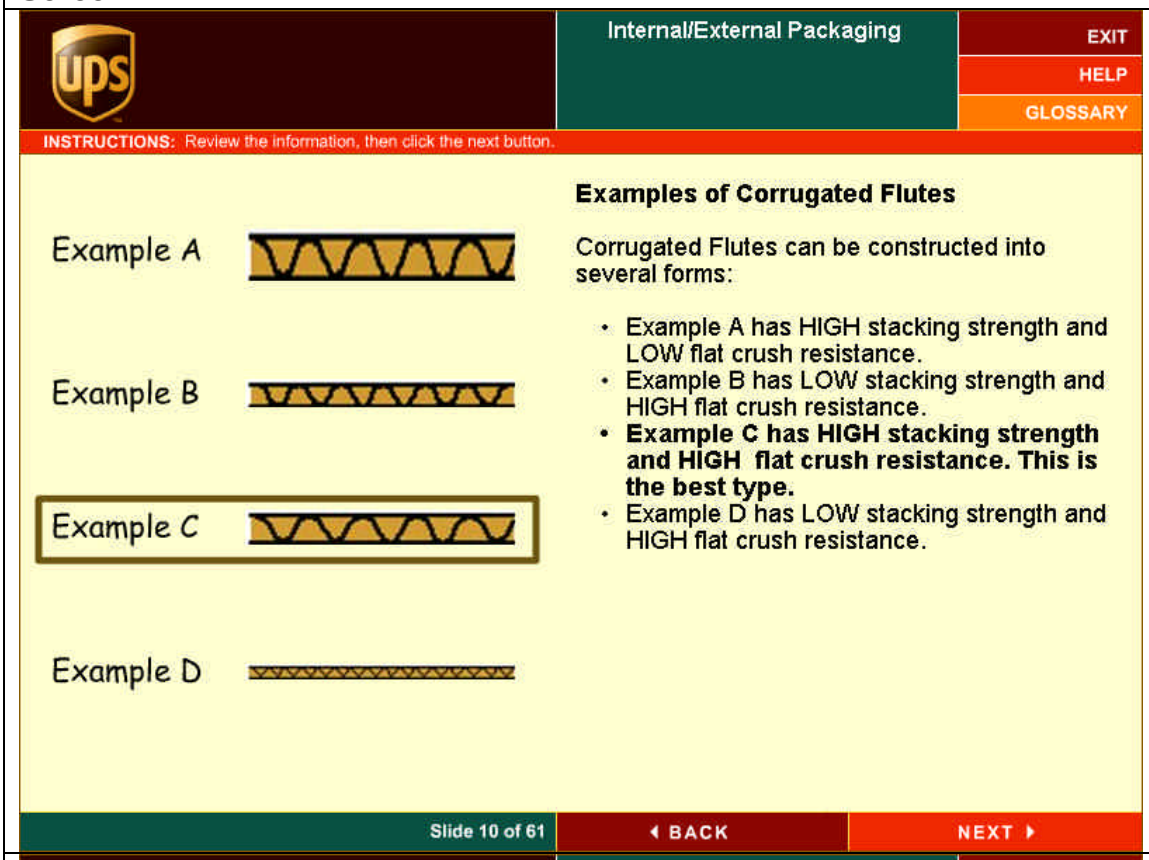	
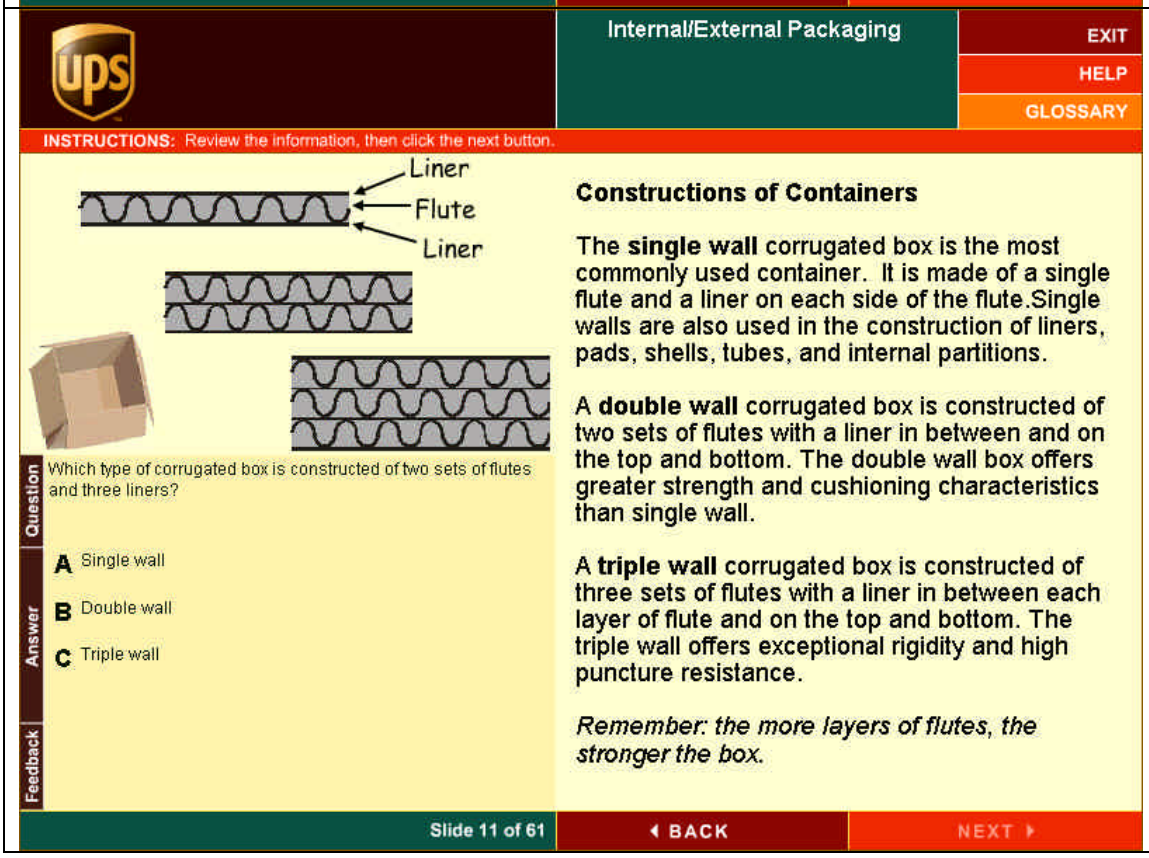	

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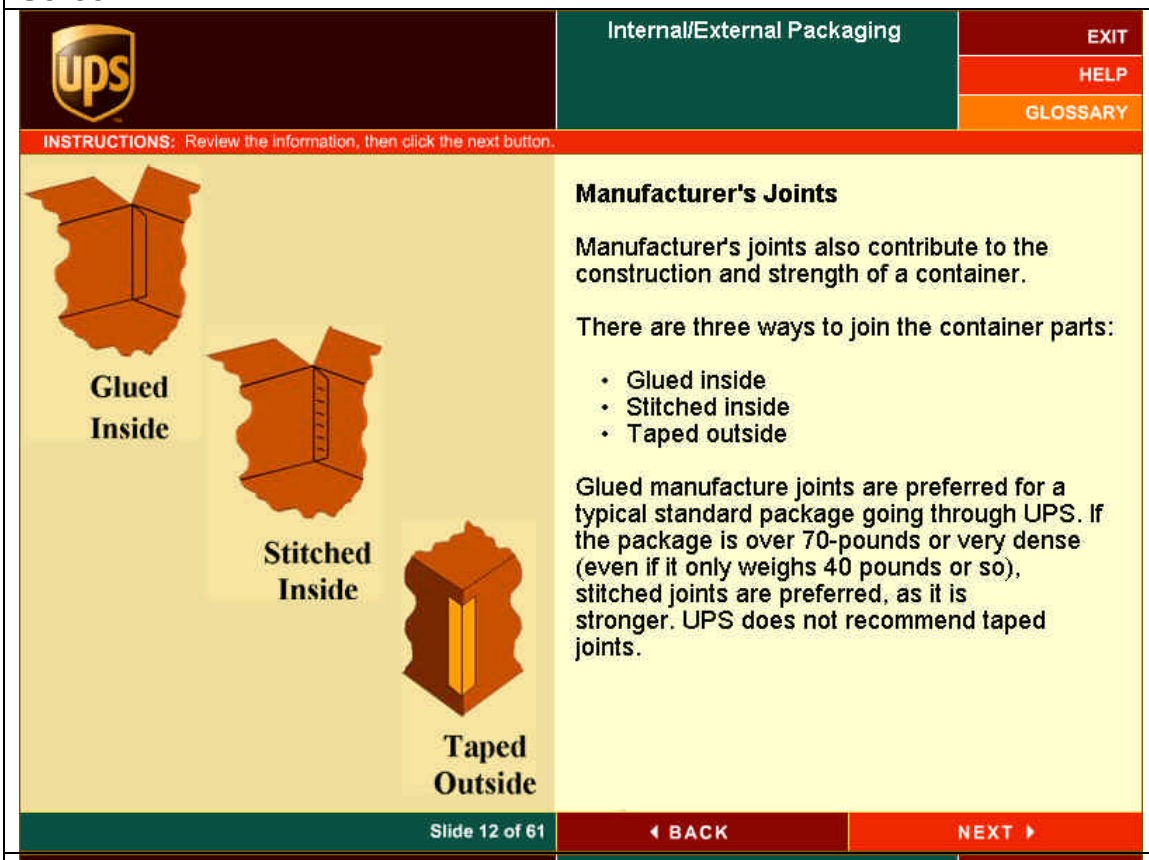

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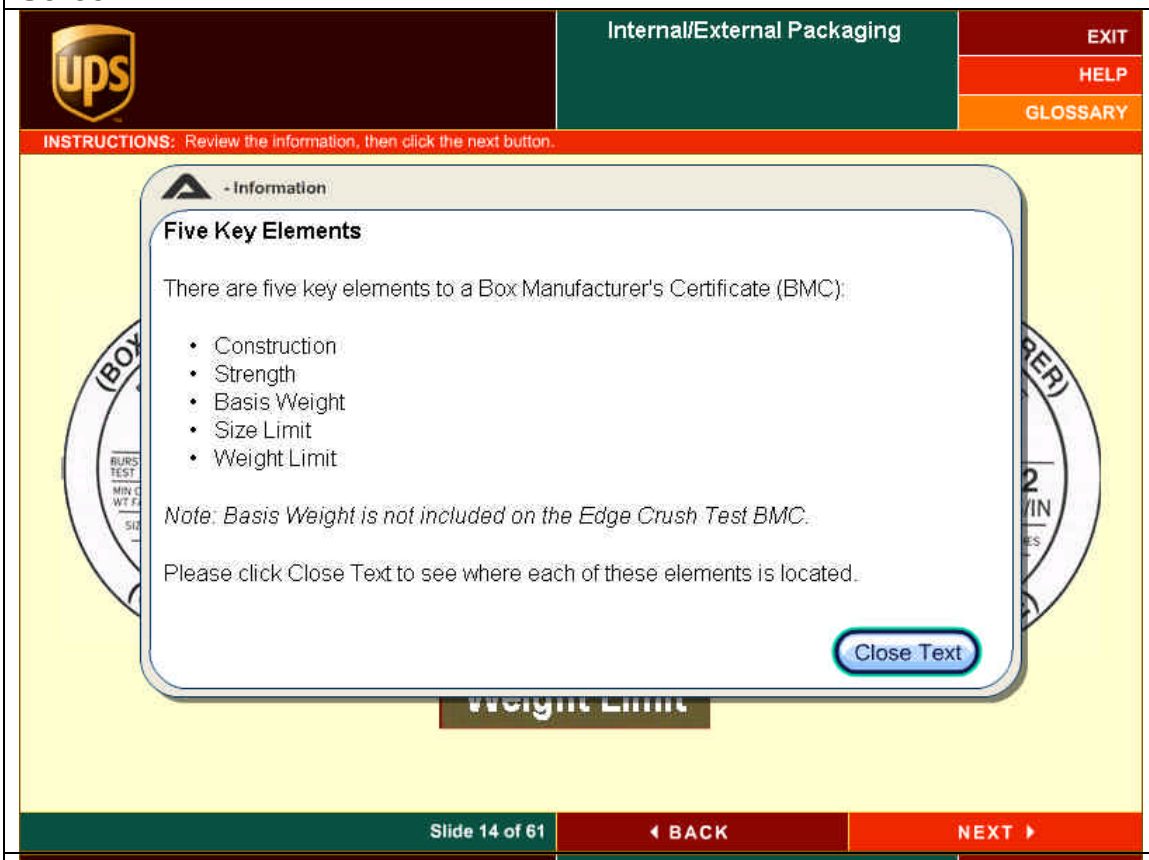	
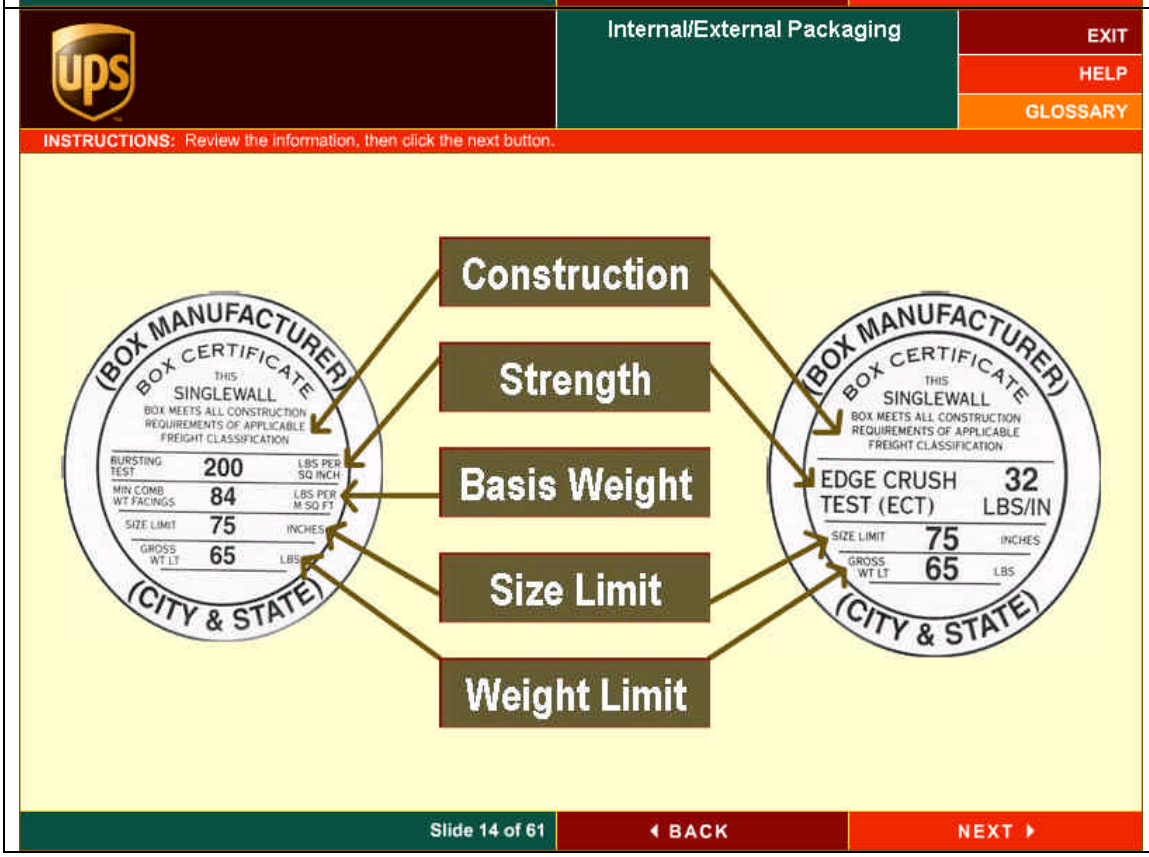	

Internal/External Packaging

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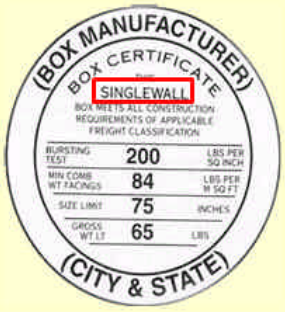

Construction

The construction line states whether the box is constructed with single wall, double wall or triple wall corrugated fiberboard.

A single wall corrugated box can be manufactured in various grades and is ideally used for packaging products under 100 pounds.

A double wall corrugated box, due to the extra linerboard and layer of fluting, offers greater strength properties than single wall. Therefore, double wall boxes are better suited for heavier products.

Triple wall corrugated boxes offer exceptional rigidity and high puncture resistance, making it an ideal material for packaging items that are close to UPS's 150 pound weight limit.

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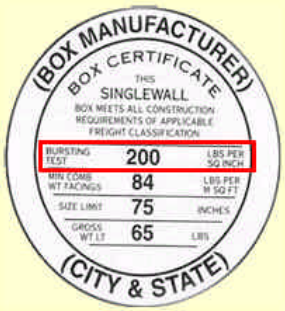
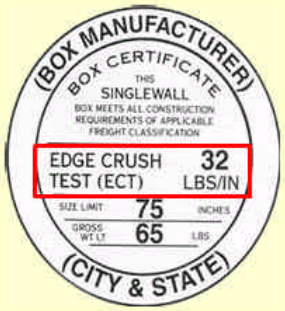
INSTRUCTIONS: Review the information, then click the next button.





Strength

The strength of corrugated material is specified as either *Bursting Test* or *Edge Crush Test*.

Bursting Test

Measures the tearing and tensile strength of corrugated materials and the resistance of a material to burst, expressed in pounds per square inch. Burst strength relates to the handling durability of the box.

Corrugated containers that specify bursting strength are typically better suited for single package shipments because containment and puncture resistance is more important than long term stacking strength.

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INSTRUCTIONS: Review the information, then click the next button.

Question

Corrugated containers that specify bursting strength are typically better for single shipping package environment, such as UPS.

Answer

A True

B False

Feedback

Edge Crush Test

The Edge Crush Test measures the edgewise-compressive strength of corrugated fiberboard, expressed in pounds per inch width. This property relates to the top-to-bottom compressive strength of corrugated shipping containers.

Corrugated containers that specify Edge Crush Test are better suited for environments where the package will be exposed to high compressive loads, for example, during storage, or when the packages are going to be loaded onto a pallet where they will travel as a single unit for most of the distribution cycle.

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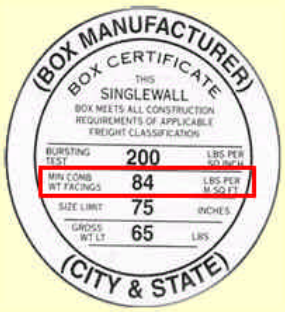

Basis Weight

In the example, the bursting strength on the Box Manufacturer's certificate specifies a basis weight of 84-pounds per thousand square feet. This tells how much paper must be used during the manufacturing process, 42 pounds each on the inside and outside liner of the corrugated material.

More paper equates to greater bursting strength. For example, increasing the basis weight from 84 lbs. to 138 lbs. increases the bursting strength from 200 lbs. to 275 lbs.

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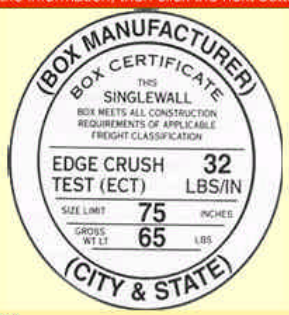
INSTRUCTIONS: Review the information, then click the next button.

Basis Weight not specified on Edge Crush Test BMCs



Question

Basis weight is included on:

Answer

A Edge Crush Test BMCs

B Burst Test BMCs

C Both A and B

Feedback

Basis Weight, continued

The Box Manufacturer's Certificate (BMC) that specifies Edge Crush Test does not specify the basis weight. This provides box manufacturers more leeway to manufacture corrugated fiberboard using less paper, which means less strength.

Tests in the UPS lab have revealed that a 32-Edge Crush Test container can have a bursting strength as low as 140 pounds per square inch.

With a potential 30% difference in strength, there is no way that a 32-Edge Crush Test container can be expected to perform equally as well as a 200 pound bursting test container.

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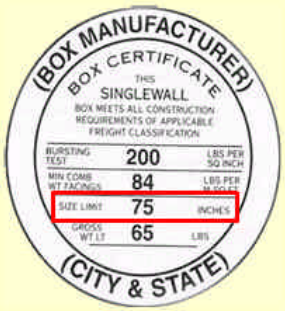

Size Limit

Size limit is the maximum size of a box that can be made based on the strength of the corrugated material. To calculate the size limit, add the length, width and depth of the package together.

For example, a 20" x 20" x 20" box equals a total size of 60".

Size limit is a critical element to consider, because as the size of the package gets larger, the overall contribution to strength decreases.

For example, in the BMC example, the size limit is 75 inches. Therefore, if the combined length, width and depth of a package exceed 75 inches, the box is too large and unable to maintain its integrity and strength during transit.

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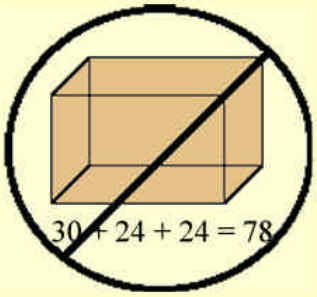

Size Limit, continued

If the combined length, width and depth of the package exceeds the size limit specified on the BMC, the strength of the corrugated material must be increased.

For example, the 30" x 24" x 24" box illustrated to the left has a total size of 78 inches.

Therefore, a 200# burst strength box would be inadequate and the strength of the corrugated material would need to be increased to either a 275# burst strength or 44 Edge Crush Test container, which offer a size limit of 95 inches.

Question

The size limit is equal to:

Answer

A The length, width and height added together

B Twice the length, twice the height, and twice the width added together

C The length and girth added together

Feedback

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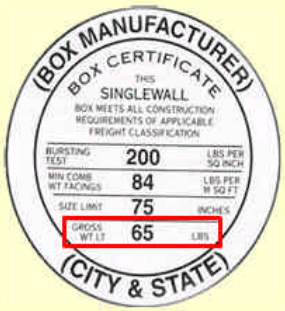

Gross Weight Limit

A simple explanation of gross weight limit is that it specifies the maximum combined weight of the product and package that the finished box should be able to contain safely.

The gross weight limits on the BMC are published and recognized by national motor freight carriers, **not single package carriers, such as UPS and FedEx**.

Therefore, the gross weight limits specified on the BMC are not really applicable to the single package delivery environment.

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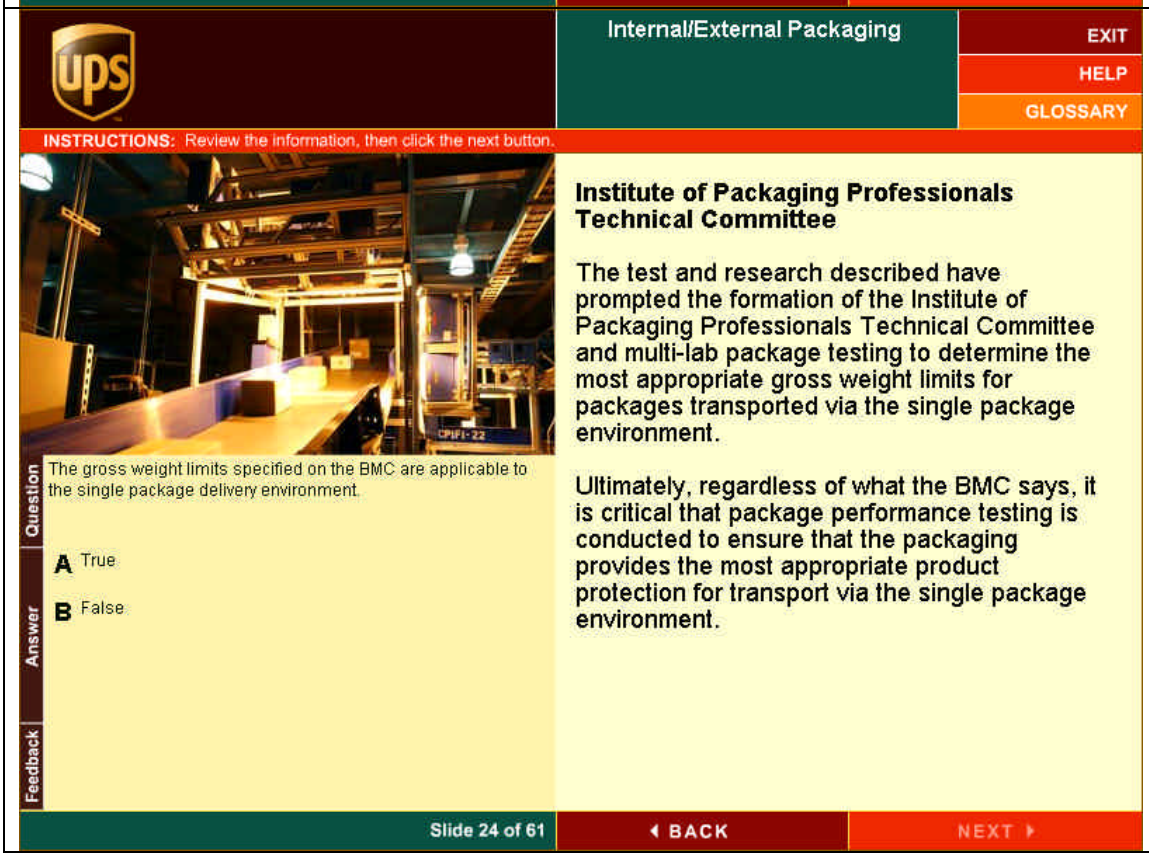

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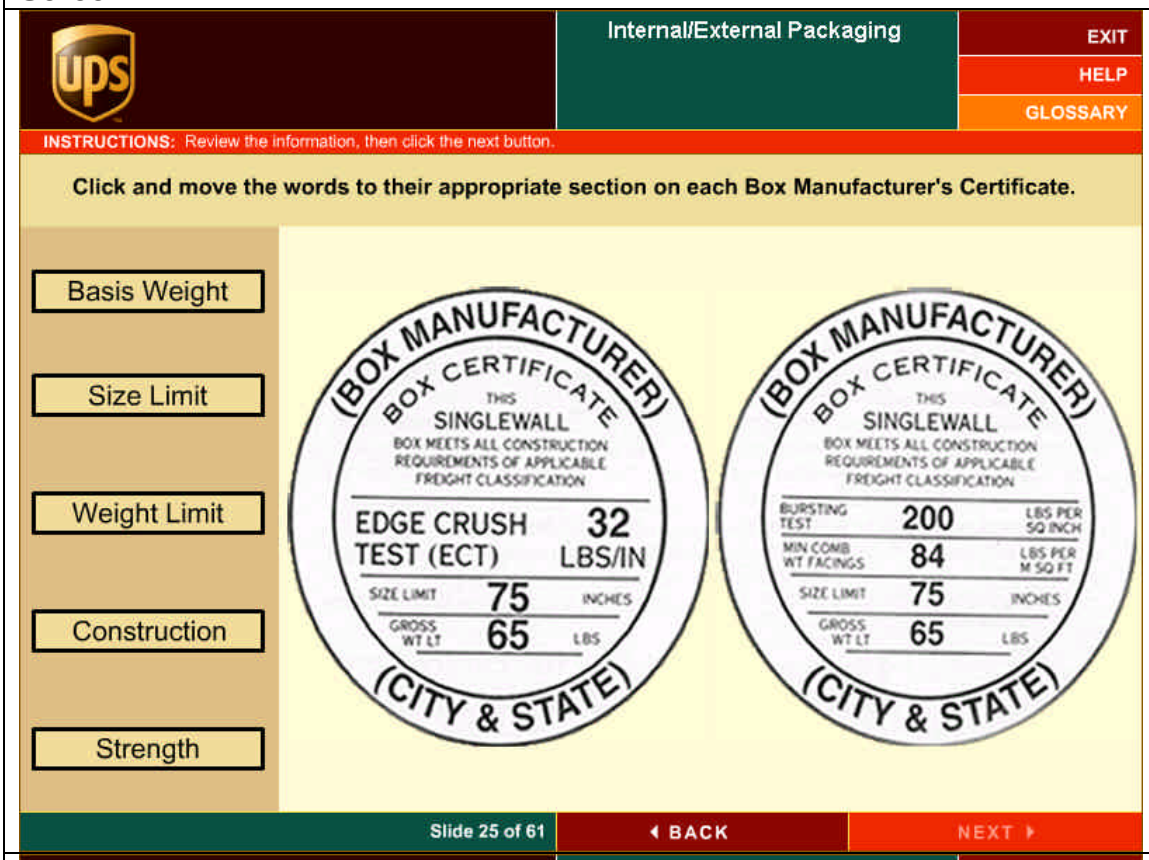

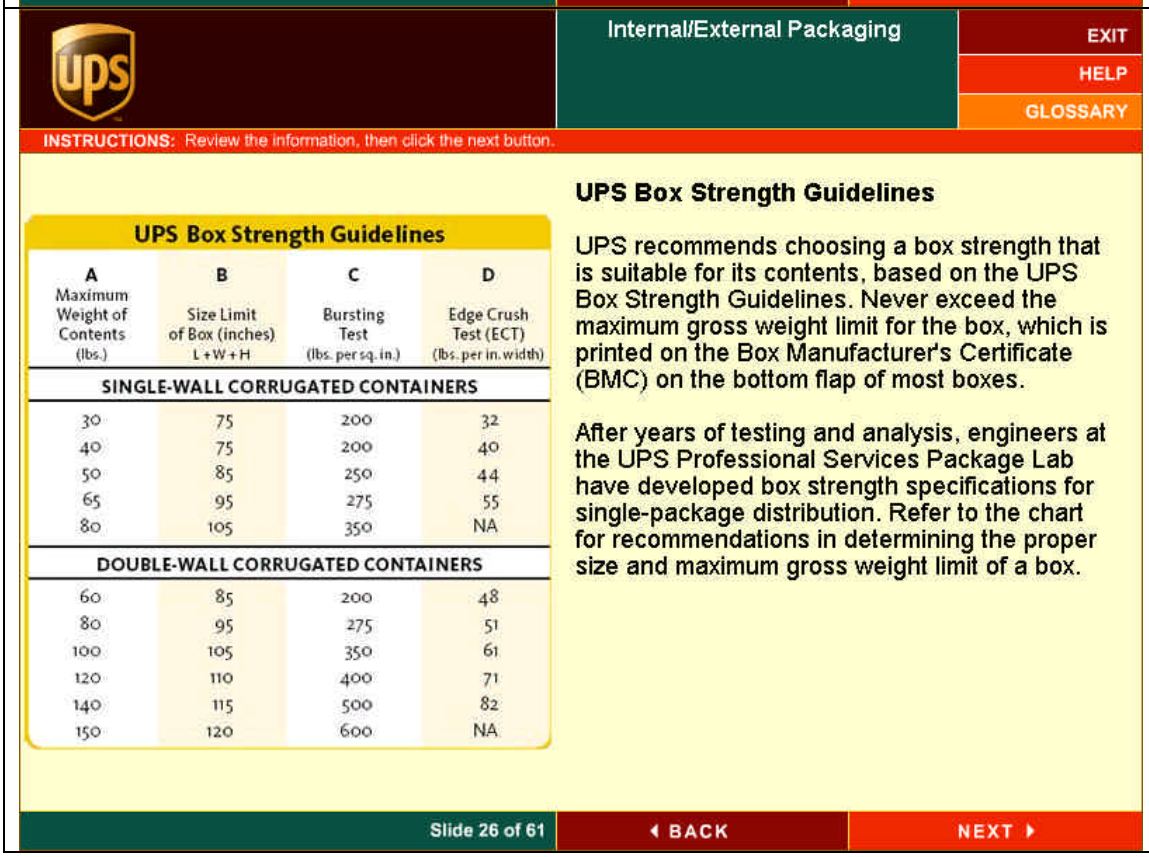

UPS Box Strength Guidelines

A Maximum Weight of Contents (lbs.)	B Size Limit of Box (inches) L+W+H	C Bursting Test (lbs. per sq. in.)	D Edge Crush Test (ECT) (lbs. per in. width)
SINGLE-WALL CORRUGATED CONTAINERS			
30	75	200	32
40	75	200	40
50	85	250	44
65	95	275	55
80	105	350	NA
DOUBLE-WALL CORRUGATED CONTAINERS			
60	85	200	48
80	95	275	51
100	105	350	61
120	110	400	71
140	115	500	82
150	120	600	NA

Screen	Comments

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INSTRUCTIONS: Review the information, then click the next button.

UPS Box Strength Guidelines

A Maximum Weight of Contents (lbs.)	B Size Limit of Box (inches) L+W+H	C Bursting Test (lbs. per sq. in.)	D Edge Crush Test (ECT) (lbs. per in. width)
SINGLE-WALL CORRUGATED CONTAINERS			
30	75	200	32
40	75	200	40
50	85	250	44
65	95	275	55
80	105	350	NA
DOUBLE-WALL CORRUGATED CONTAINERS			
60	85	200	48
80	95	275	51
100	105	350	61
120	110	400	71
140	115	500	82
150	120	600	NA

UPS Box Strength Guidelines, continued

Follow these steps when using the UPS Box Strength Guidelines chart to select the most appropriate box for your shipment.

1. Weigh items to be shipped.

2. Measure and add together the length, width, and height of the box.

3. Select the appropriate row where the criteria in both columns A and B are met.

4. Use column C to identify the recommended Bursting Test strength box. Or, use column D to identify the recommended Edge Crush Test strength box. At least one of these specifications can be found on the *Box Manufacturer's Certificate*.

Note: A double-wall container should be used for items weighing more than 80 pounds.

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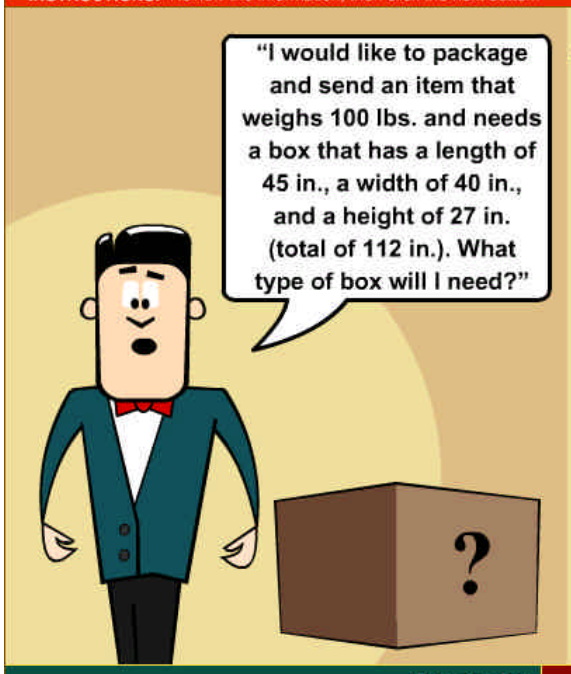
INSTRUCTIONS: Review the information, then click the next button.



Answer the customer's question by clicking the correct horizontal row to locate a proper box.

UPS Box Strength Guidelines

A Maximum Weight of Contents (lbs.)	B Size Limit of Box (inches) L+W+H	C Bursting Test (lbs. per sq. in.)	D Edge Crush Test (ECT) (lbs. per in. width)
SINGLE-WALL CORRUGATED CONTAINERS			
30	75	200	32
40	75	200	40
50	85	250	44
65	95	275	55
80	105	350	NA
DOUBLE-WALL CORRUGATED CONTAINERS			
60	85	200	48
80	95	275	51
100	105	350	61
120	110	400	71
140	115	500	82
150	120	600	NA

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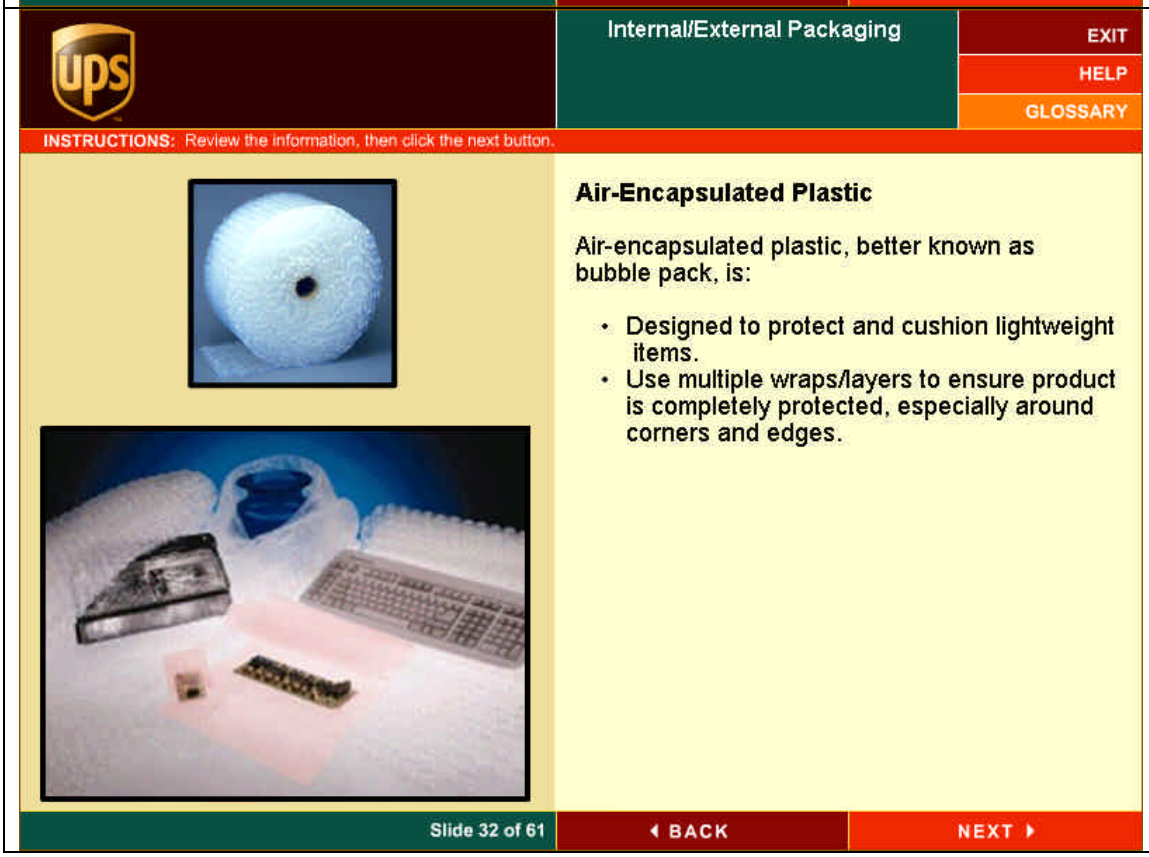	

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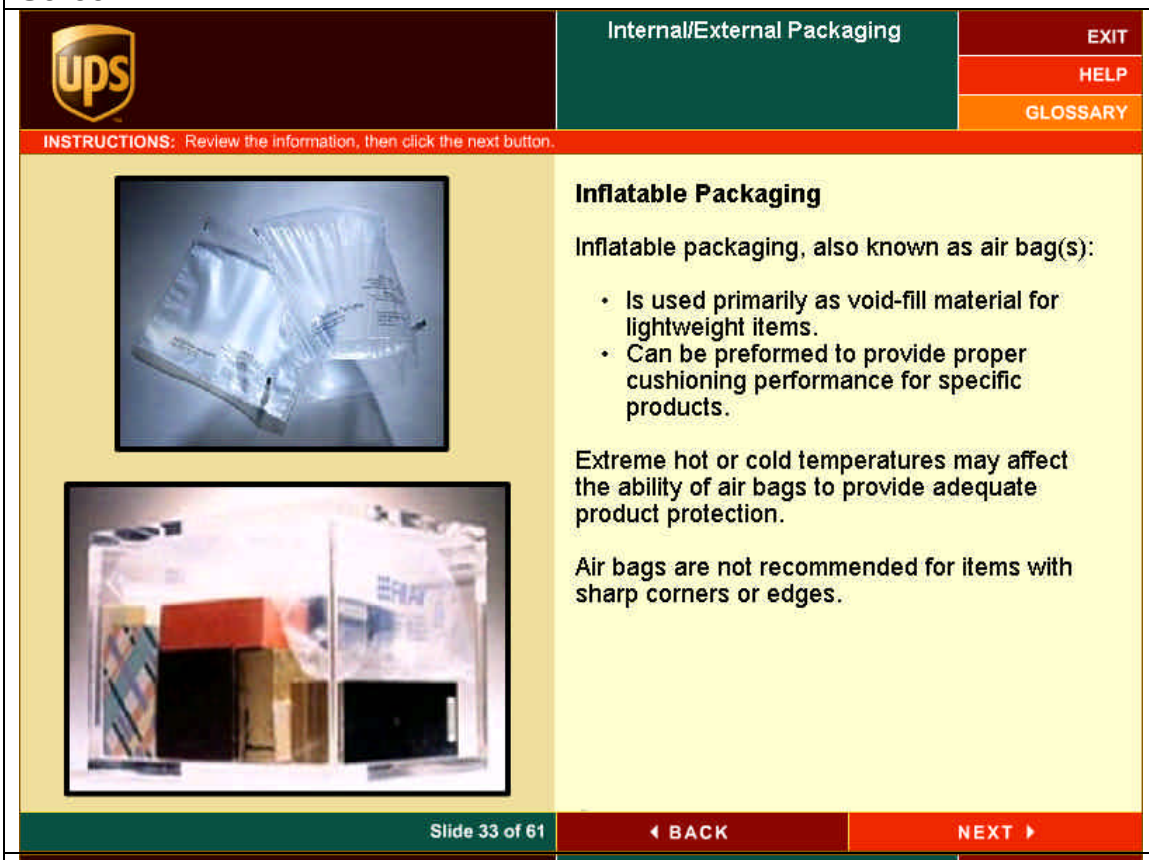

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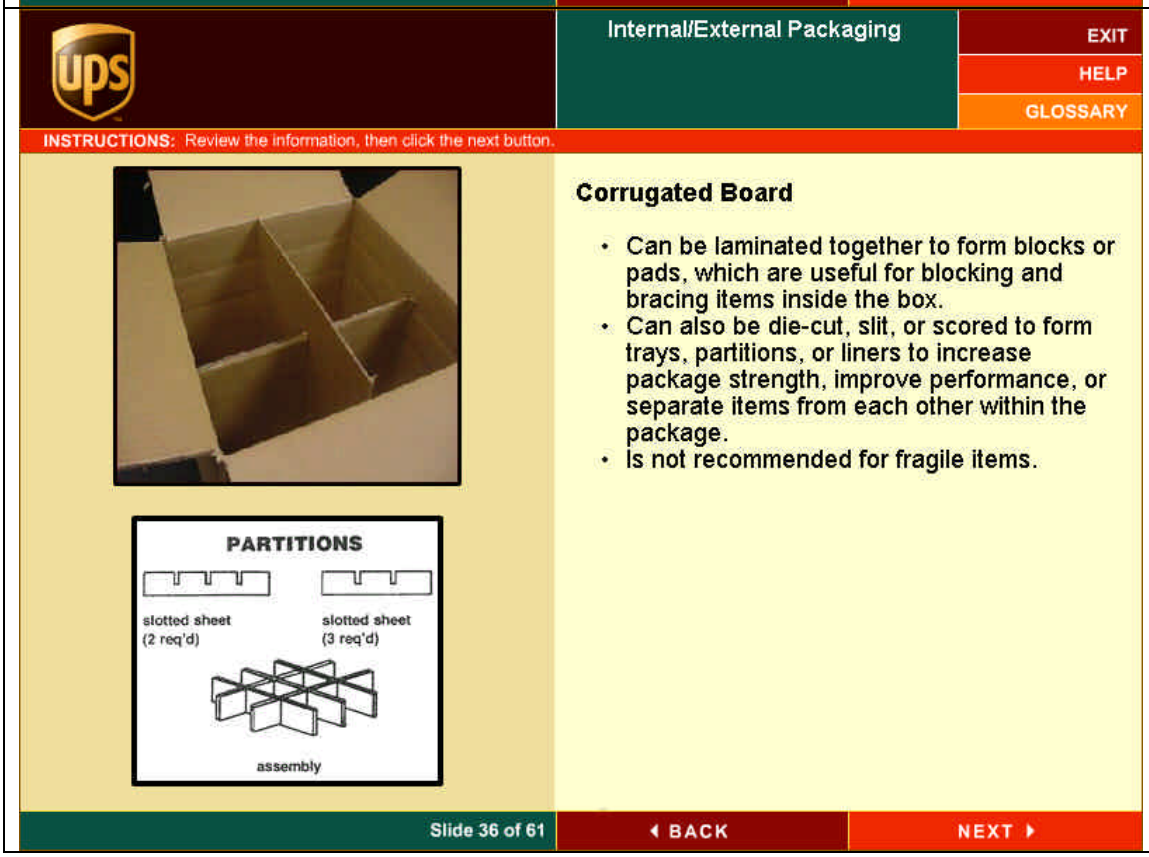	

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Screen	Comments

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INSTRUCTIONS: Review the information, then click the next button.

Types of Tapes

There are two commonly recommended types of tape--Pressure Sensitive Plastic Tape and Water-Activated Reinforced Kraft Paper Tape.

Do not use masking tape, duct tape, cellophane tape, water-activated paper tape, string or paper over-wrap.

Question

What types of tape should be used?

Answer

A Pressure sensitive plastic tape and water-activated reinforced kraft paper tape

B Masking tape and duct tape

C Water-activated paper tape and cellophane tape

Feedback

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INSTRUCTIONS: Review the information, then click the next button.

Pressure Sensitive Plastic Tape

Generally, this is the easiest, most convenient tape to use. It is versatile because it will adhere without water and can stick to a wide variety of surfaces and shapes.

Use a pressure sensitive tape that is at least two-inches or more in width. Always use the Six-Strip method to tape a package.

The film backing and adhesive can be increased for greater strength.

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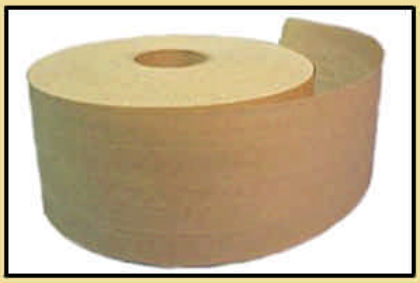

Water-Activated Reinforced Kraft Paper Tape

Water-Activated Reinforced Kraft Paper Tape is made up of reinforced threads that provide additional strength, making it less susceptible to splitting or tearing. It works well for heavyweight packages.

Adhesion to the container may be affected by elements such as high humidity conditions, wetness of the tape or dust. Always use the Six-Strip method to tape a package.

Question

Of the tapes listed, which tape is preferred?

Answer

A Water-activated paper tape

B Water-activated reinforced kraft paper tape

C Both A and B

Feedback

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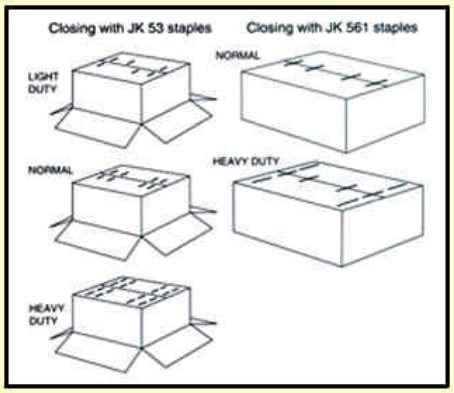
INSTRUCTIONS: Review the information, then click the next button.



Stapling

Stapling uses preformed metal fasteners.

When using staples to secure your container, you should make sure to staple each side of the center seam where the outer flaps overlay the inner flaps, and along the outer flaps.

You should space your staples no more than 2 ½ inches apart. Stapling is mainly used for packages weighing over 70 pounds or for book shipments.

- Fasten flaps on each side of center seam where outer flaps overlay inner flaps
- Staple along edge seams
- Crown needs to be long enough to securely clasp outer and inner flaps

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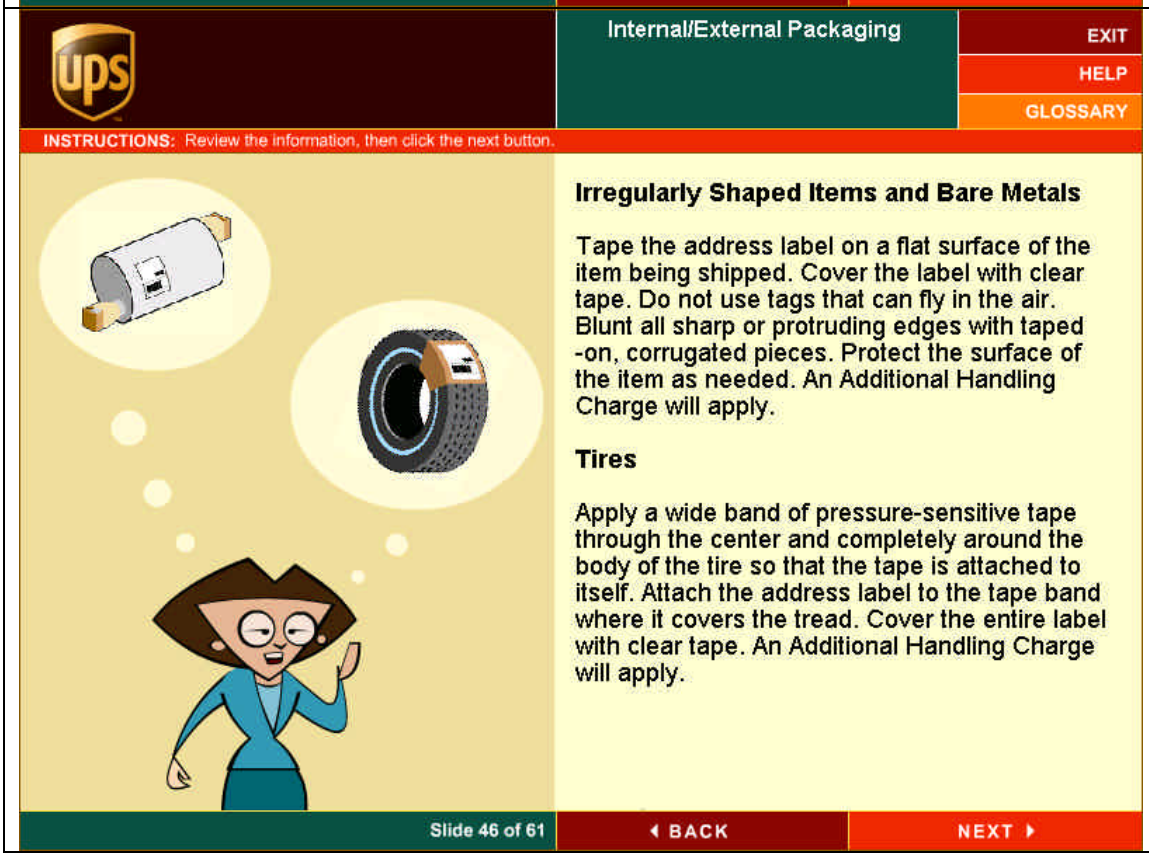	

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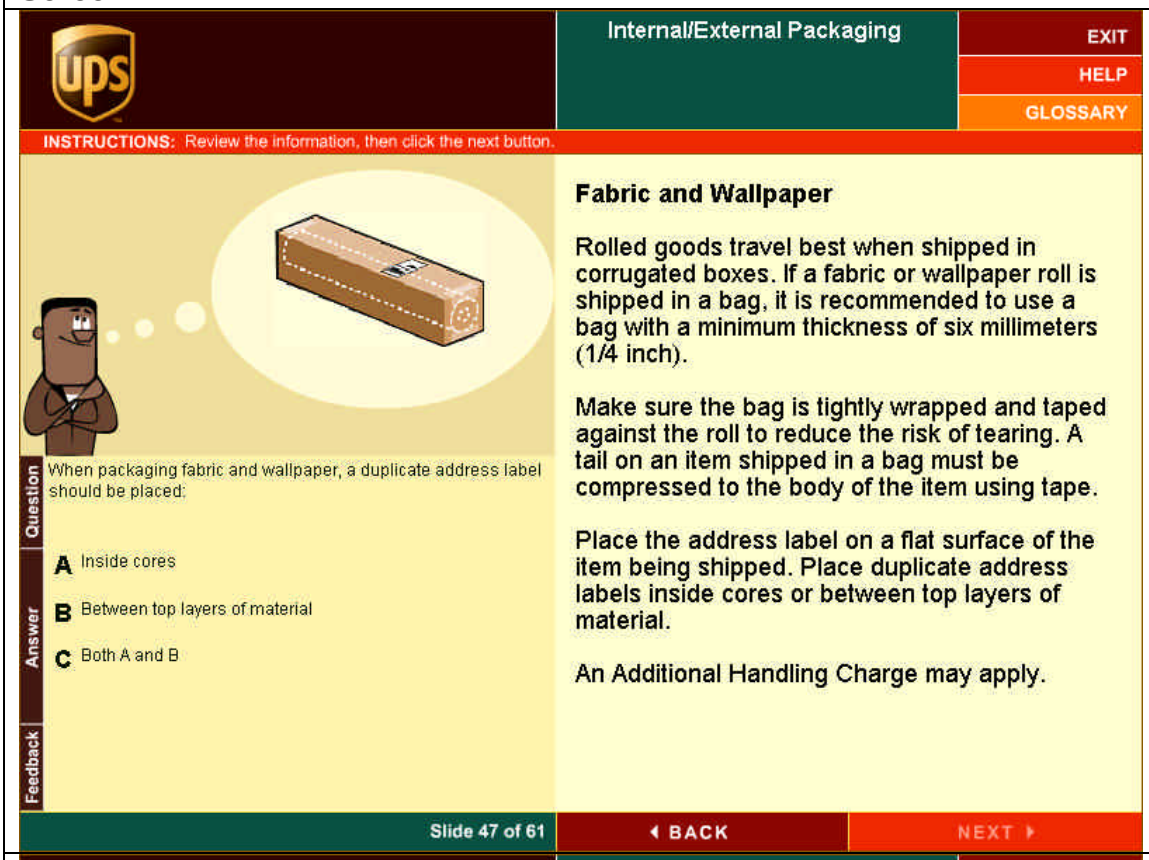

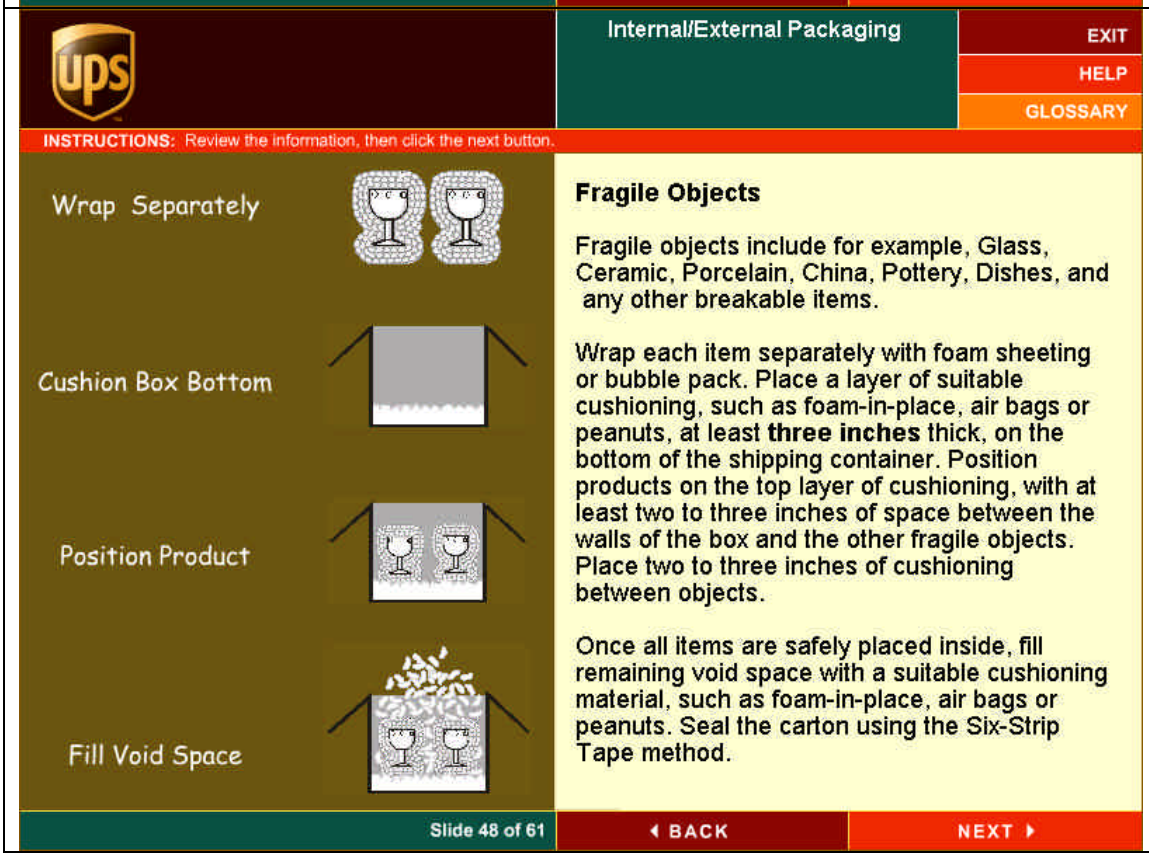

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INSTRUCTIONS: Review the information, then click the next button.

Framed Artwork

Variations in frame size, thickness, material, construction, as well as style, type and quality of glass all add to the complexity of designing a packaging system for framed art.

Framed Artwork Without Glass

Place the framed art in a plastic bag, then cushion it with medium density packing foam or bubble pack.

UPS recommends a minimum thickness of two inches on all sides and edges and a three-inch depth at the corners.

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INSTRUCTIONS: Review the information, then click the next button.

Framed Artwork With Glass

Face-protection sheets of bubble cushioning, corrugated board or foam should be cut to the size of the mounted glass and have a depth great enough to fill the internal cavity of the frame.

Center the bagged art piece (print side down) on a sheet of double-wall 200-pound burst corrugated board that is at least two inches wider and longer than the art piece.

Using a knife, slit the flaps along the four sides of the corrugated sheet. Fold the flaps around the sides of the framed art. Secure the flaps with strips of nylon filament tape. Staple double -wall 200-pound burst corrugated spring pads to both sides of the corrugated sheet, at the top and bottom. The corrugated spring pads need to be positioned along the top and bottom edges of the frame for optimum support.

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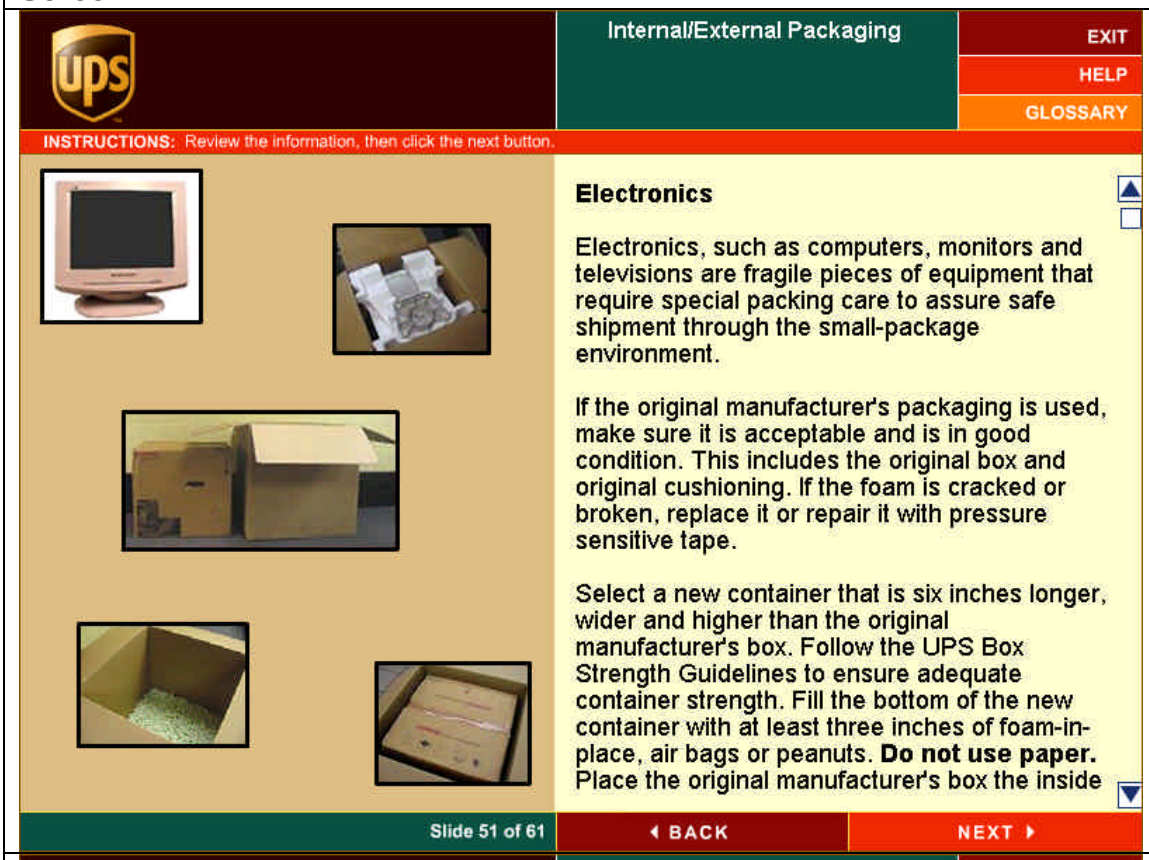
Internal/External Packaging

Screen	Comments
	

Internal/External Packaging

Screen	Comments

Internal/External Packaging

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INSTRUCTIONS: Review the information, then click the next button.

Size (mm)	Torque (in-lbs)
22	9 - 14
24	10 - 18
28	12 - 21
30	13 - 23
33	15 - 25
38	17 - 26
43	17 - 27

Liquids

Liquids present unique packaging challenges. When a liquid comes free of its container, not only is its container damaged, but it has the potential to damage numerous other packages.

Use continuous thread (CT) closures with taller finishes whenever possible to achieve a higher level of thread engagement. Secure the CT closure with the correct amount of application torque (see chart to the left). Use an inner seal whenever possible, such as a heat induction foil seal. Add tape around the cap and bottle to eliminate potential leaking.

Once the liquid has been sealed with a CT closure and secured with tape, pack the liquid in a strong shipping container and use extended cell partitions and top and bottom corrugated pads to protect the bottles. Seal the container using the six-strip method.

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INSTRUCTIONS: Review the information, then click the next button.

Flowable Bulk

Nuts, bolts, washers, fasteners, keys and bearings, all shipped in bulk, are examples of flowable bulk shipments. The "fluid" and dense nature of the items can cause the package to bulge and accelerates the breakdown of the container.

Choose a box that is strong enough. It is recommended to use a box with a stitched manufacturers joint for added strength. Place a pad of corrugated board on the bottom of the container. Place your flowable bulk items inside a plastic bag (recommend a 6-millimeter bag). This will keep them together as a unit and add to the stability of the package.

Fill the remaining void space with tightly crumpled 60-pound kraft paper. **Peanuts, air bags or newsprint are not acceptable.** Place another corrugated board pad on top of the cushioning. Seal the box using the six-strip

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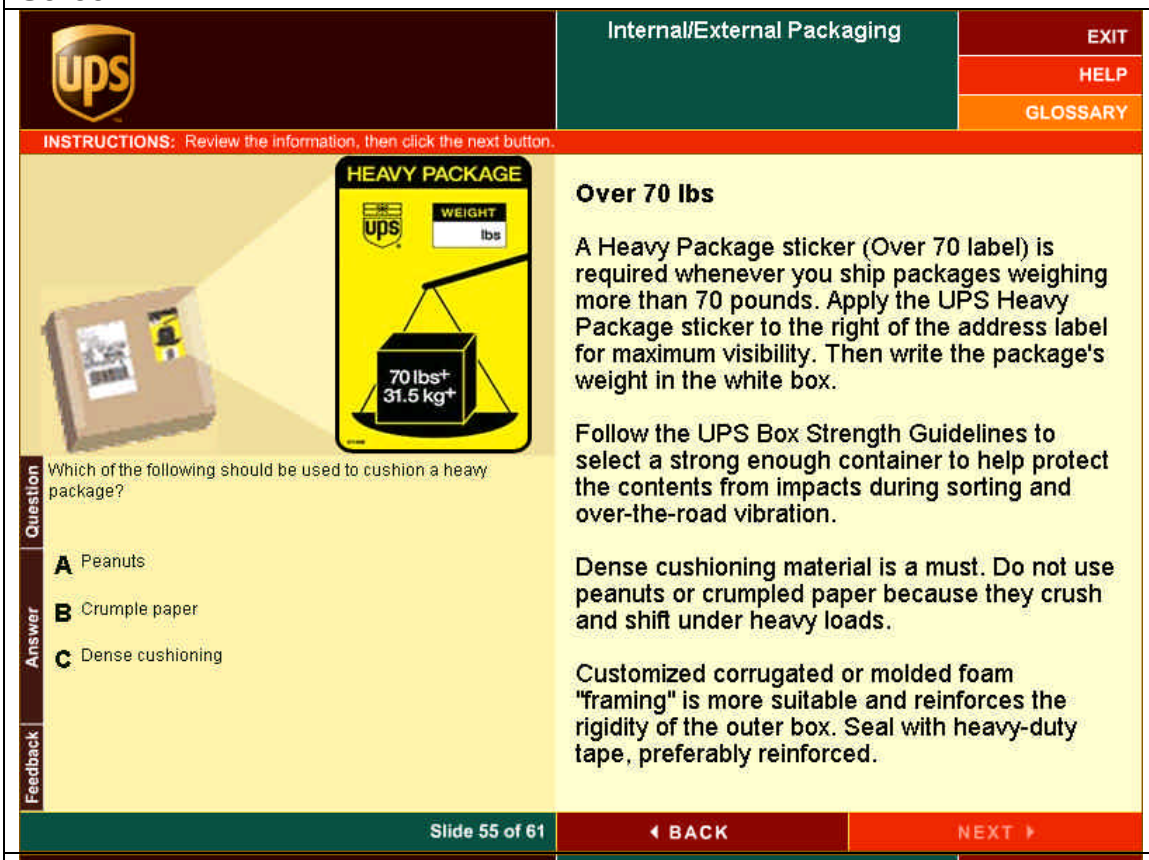
Screen	Comments
	

Internal/External Packaging

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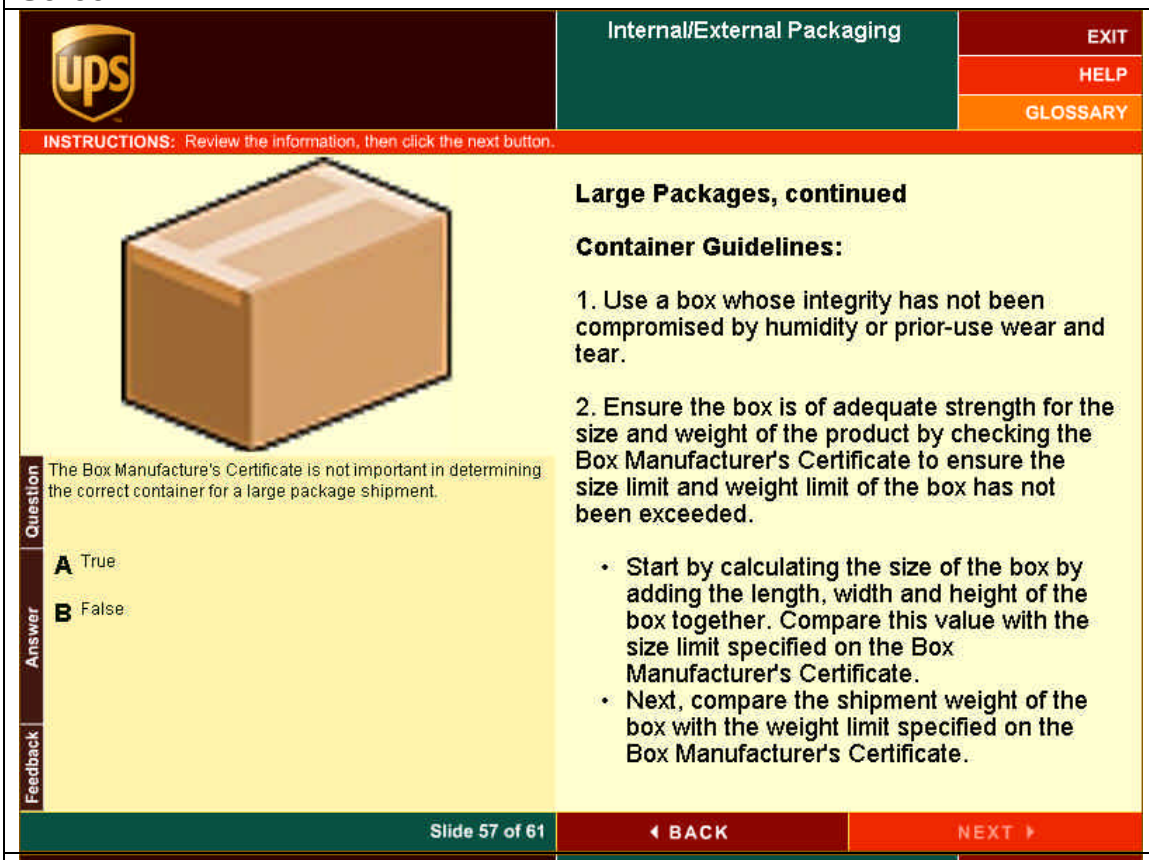	
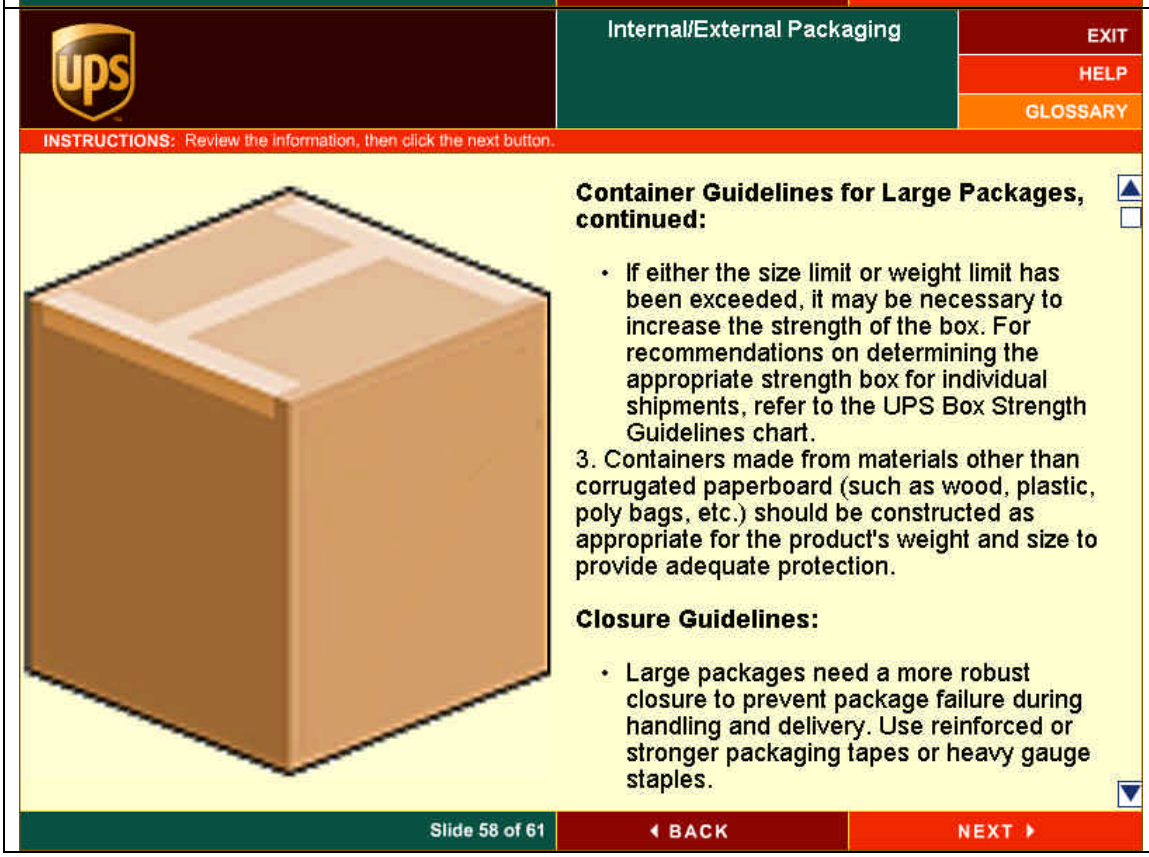	

Internal/External Packaging

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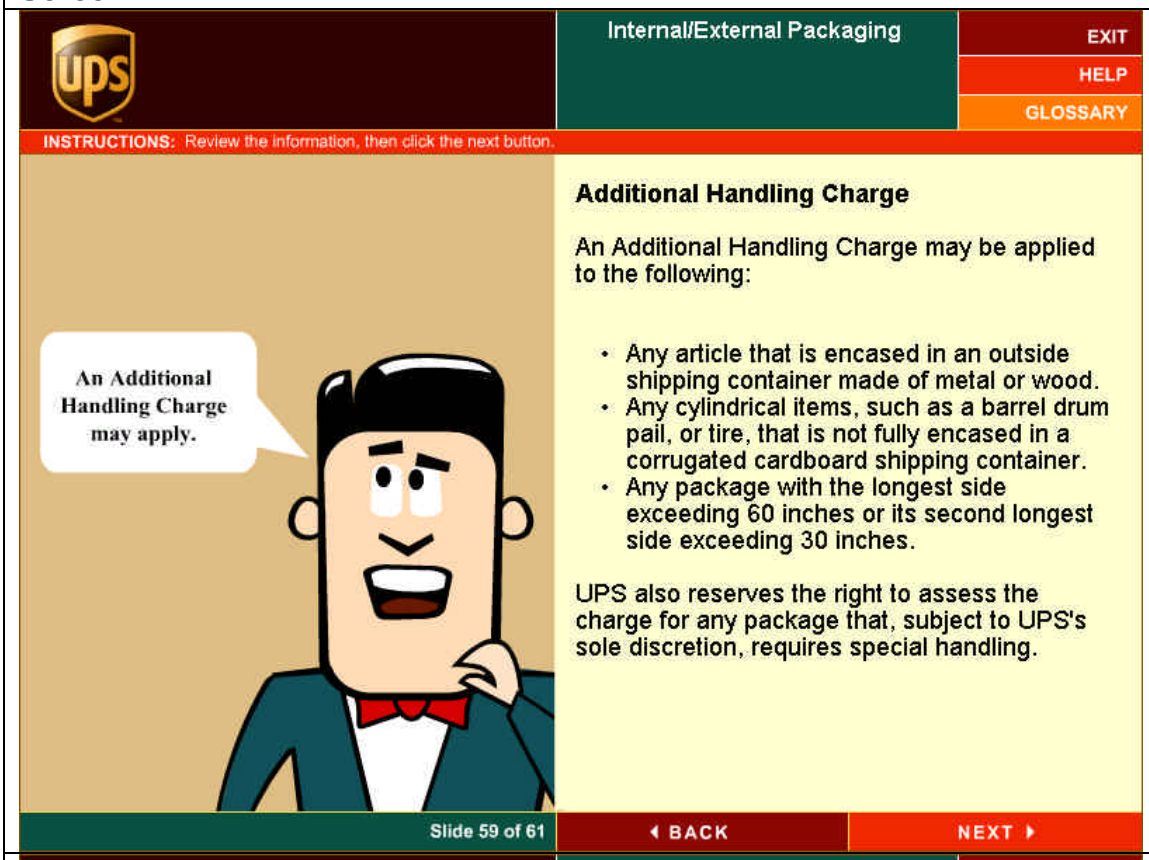	

Internal/External Packaging

Screen	Comments
Internal/External Packaging EXIT HELP GLOSSARY INSTRUCTIONS: Review the information, then click the next button. **The UPS Store** The UPS Store offers freight services, photocopying, mail box and unusual packaging services, etc. Certain pack jobs may be referred to The UPS Store if the Customer Center is not equipped to handle the customer's need. This includes: • Highly fragile items (framed art, ceramics, etc.) • Delicate electronics (televisions, computers, servers, monitors, etc.) • Most items over 50 pounds in weight See your supervisor for your Customer Center's policy. Slide 61 of 61 ◀ BACK NEXT ▶	
Internal/External Packaging EXIT HELP GLOSSARY INSTRUCTIONS: Review the summary. Click the next button to continue. Summary **Summary** This section examined: • Shipping conditions • External protection construction and supplies • Internal protection supplies • Closure methods • Special packaging needs • Supplies for sale • The UPS Store for pack job referrals It is important that Customer Center Associates have an in-depth knowledge of packaging concepts so that they can advise and help customers to ship packages that will reach their destinations on time and in good condition. Summary Slide ◀ BACK NEXT ▶	