Firefighting Foam Updates

Study Guide ..... Name_____ Date _____

3M Foam contains a Persistent Bioaccumulative Toxic Pollutant (PBT) called __ __ __ __ and was removed from service for employee safety, health and potential damage to the environment.

It is important to note that only the 3%-3% AR AFFF new foam (Engine __ & __) can be used on polar solvent fires and the Class A/B type on Engine __ cannot.

Flammable liquids such as gasoline, diesel and several other products have a _____ specific gravity than water.

Any disruption of the fuel's surface increases surface area available to release vapors. While any water stream can increase fire activity, solid streams _____ into the liquid will cause a dramatic increase.

A hydrocarbon's characteristic is a lack of affinity (_____ _____) with water.

Match the Hydrocarbons

Flammable liquid	Hydrocarbon family
A. benzene, toluene	___ **Light hydrocarbons**
B. gasoline, heptane, cyclohexane, terpene	___ **Heavy hydrocarbons**
C. fuel-oil, diesel, kerosene	___ **Aromatic hydrocarbons**

One Polar Solvent characteristic is the affinity for water (*They mix* _____ *with it*).

Foam is still made up of a lot of water so polar solvents can "blend" with the water in foam and _____ _____ its structure.

Methanol is in the _____ group of Polar Solvents.

Fuels such as E-85 contain ___% ethanol/ ___% hydrocarbon fuel such as gasoline.

E-10 is ___%ethanol / ___% gasoline, also referred to as _____.

Gasoline has a flashpoint of ___°F, while Jet A has a flashpoint of just less than _____°F

Which listed fuel has the highest flashpoint? _____

"Currently, 10% ethanol is added to approximately _____ of all the gasoline used in the United States."

Biodeisel blend (B20) is a blend of 20% biodiesel fuel, and 80% _____.

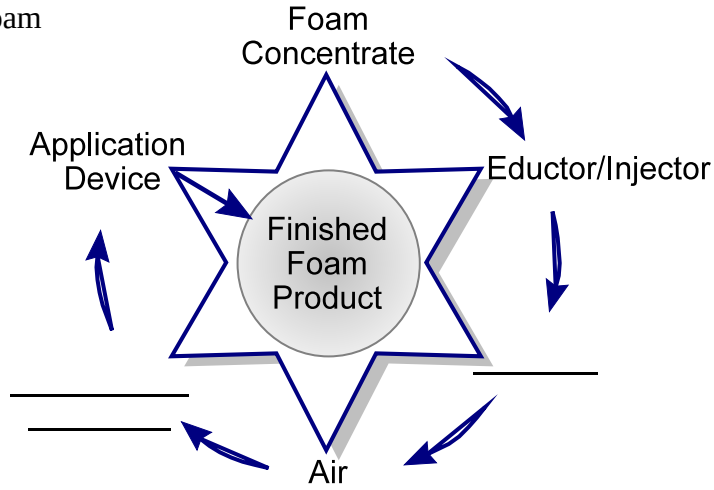
While glycerin does not have any specific flammability concerns and is used in several safe products, burning of glycerin produces "_____." Concentrations of 2 ppm are immediately harmful and a suspected human _____.

A_____ F_____ F_____ F_____

AFFF works by creating a _____ that stays on top of the flammable liquid to suppress vapors and a foam substance that helps cooling, insulates and separates other ignition sources or hostile fire from reigniting the vapors.

The nozzle/eductor selection we use is a ___ expansion foam

Label the missing info on the "Foam Star"



Identify the correct information				
Type	❑By-Pass	❑In-line	❑By-Pass	❑In-line
PSI required	❑150psi	❑200psi	❑150psi	❑200psi
Flow rating	❑200gpm	❑125gpm	❑125gpm	❑95gpm
Location	❑Engine 63	❑Engine 6	❑Engine 63	❑Engine 6

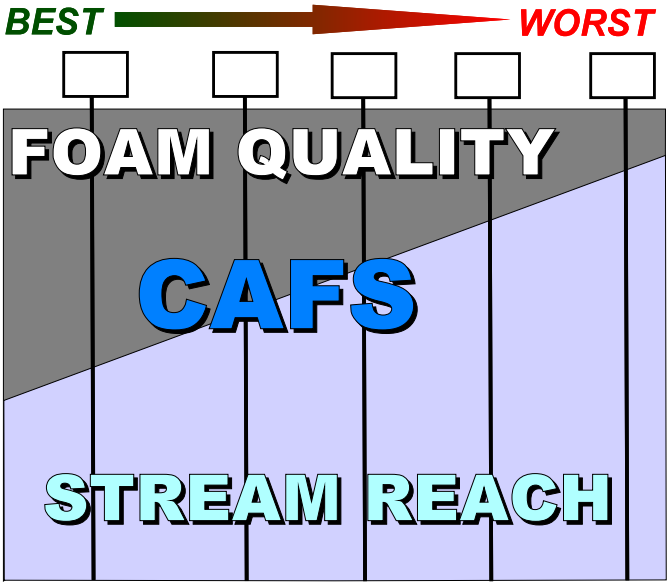
On Engine 62, he control head can be set to inject various percentage rates such as the _____% required for flammable liquid fires.

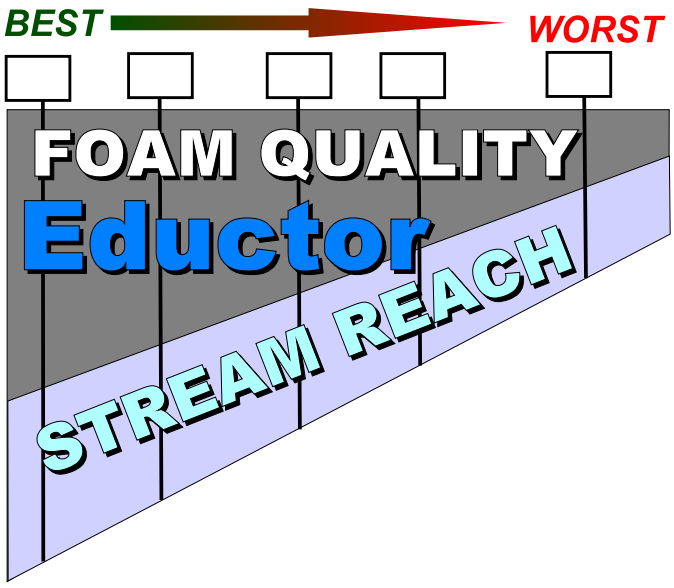
Engine 62's foam tank and system can only be used <u>on flammable liquid fires</u> if the Class ___/___ foam concentrate product is used.

(Engine 62) The onboard air compressor also provides the air component to produce a "finished foam product" leaving the discharge and use of a _____ _____ nozzle directs and applies the product to the fire.

The film and foam layer applied to a fuel or fire will begin to breakdown and lose the original qualities. Normal bubble structure degradation, _____, wind, disturbance, _____ and other factors such as the type of fuel can all contribute to the breakdown. Foam solution may have to be continuously applied or reapplied until danger of a _____ is eliminated.

Match Nozzle locations for each chart





___ _____ USE A NOZZLE WITH _____ GPM FLOW THAN THE EDUCTOR'S RATED GPM!

		PSI at Nozzle	GPM	Stream Reach
	✘	50psi	85gpm	50'
	✔	75psi	____gpm	60'
	✔	____psi	120gpm	___'

It is important to remember that application rates that are below recommendations may simply be a waste of foam concentrate and effort... you may need to _____ attack until sufficient concentrate and ____ _____ resources are on scene and ready.

_____ rate is how much of foam solution is applied in a specified time.

In judging square feet involved, what are the following areas?
Crosslay by Crosslay = _____FT^2
Crosslay by a yardstick = _____FT^2

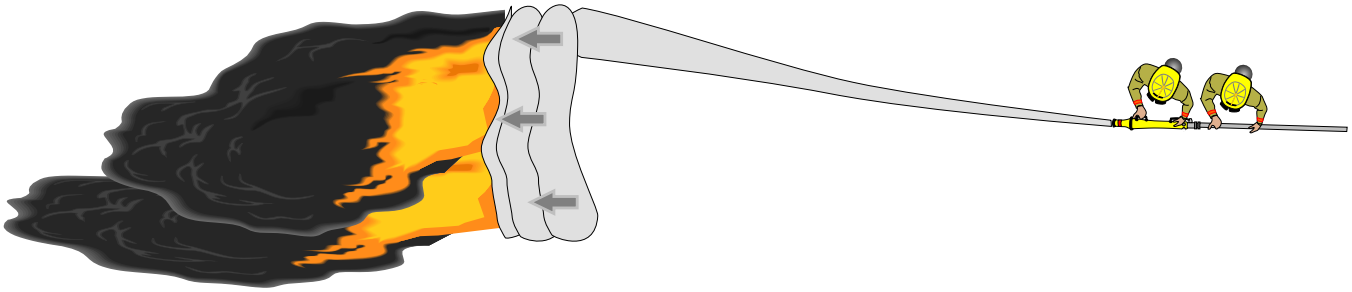
Application rates will remain the same for hydrocarbon fuels (*at _____ gpm foam solution per square foot*). Polar solvents generally require a minimum _____gpm foam solution per square foot and certain polar solvents may require applications rates up to ____gpm per square foot.

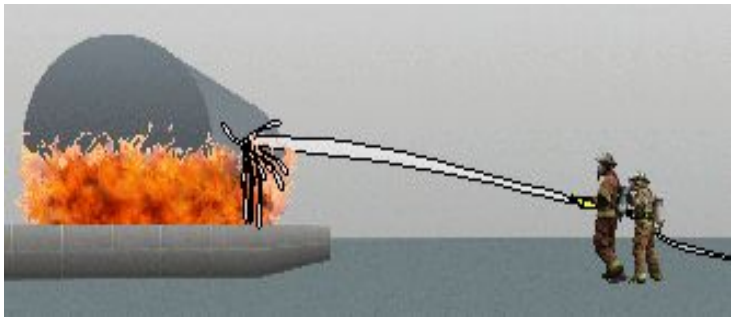
A minimum ___ minute application time is used per NFPA11.

A foam eductor should be provided 200psi at the eductor's intake as per manufacturer's specifications.

“The more _____ the foam is applied, the more _____ the extinguishment and the lower the total amount of agent required.”

Write the application technique near or on each graphic





F_____ **O**_____ **A**_____ **M**_____	**R**_____ **E**_____ **V**_____ **A**_____ **S**_____

The Asheville Airport Fire Rescue states they will respond mutual aid with equipment up to _____ miles from the airport.

Class B firefighting requires all personal protective equipment (including _____) the same as structural firefighting.

When using or handling Class A or B foams, limit exposure to _____ or _____ and wear _____ protection when there is a potential for splashing.

C_____ A_____ F_____ S_____

The enhancement of the intermolecular attractive forces at the surface is called surface _____.

Match drainage rates to foam description

Foam Description	Drainage Rate
FLUID FOAM ____	A. VERY FAST
DRY FOAM ____	B. FAST
WET FOAM ____	C. MODERATE
FOAM SOLUTION ____	D. SLOW

Providing .1% foam solution will break the _____ _____and greatly aid in reducing mop-up time. Providing a higher % rate will only use _____ foam concentrate _____ _____.

Plain water has a Dynes rating of _____, and foam additives from .1-1.0 will reduce it to ___ - ___ Dynes.

Placing a thick shaving cream blanket of foam over deep fuels such as hay, pine straw, wood, smoldering clothing and other materials may serve more to _____ the smoldering material rather than cool it.

Flowing ____ than .2%-.3% foam concentrate when using compressed air will most likely produce "____" flow.

Refer to handout/wall poster	% range	GPM range
Urban Interface - foaming a house		
Mopup		
Interior structural firefighting *Information in manual referred to one line. More flow will be used when needed fire flow is larger.*		

Foam solution should be started _____ charging the line.

If two 1¾" and one 2½" preconnect (200' each) are pulled and charged, _____ gallons of water is already used

1._____
2._____
3._____
4._____
5._____
6._____
7._____

During CAF operations, only the "_____ _____ _____" intake should be used for water supply.

When using Foam solution or Compressed Air Foam for the deck gun, only the _____ labeled valves controls should be open.

Brush 6 has an "_____ the _____" foam system

Standard Structure Defense Engine Orders

_____ the engine into position from the last known _____

Avoid parking next to or under such hazards as _____, flammable trees, ___ gas tanks, Fuel tanks or pressure vessels, buildings that might burn or on roadways with fire below.

Leave the doors _____ with windows rolled ___.

"STAY _____"

_____ your water, don't wet down

Other objectives supervised by an officer	**Time**	**Officer Initials**
Engaging pumps & Compressor for E62		
Operating/flowing CAFS on E62		
Flushing the foam system on E62 after use		
Where to put foam in tank on E62		
Identify location of E6's eductor/nozzle and demonstrate how it is hooked up/adjusted		
Identify location of E63's eductor/nozzle and demonstrate how it is hooked up/adjusted		
Operating pump & foam system on Brush 6		
Where to put the foam in Brush 6's tank		
Visit to Davidson Oil storage facility behind Exxon with walk around outside of fence		
Touring district and bringing back digital photos of flammable liquid storage that <u>is not</u> Davidson's Oil, a gasoline station and is more than a typical home heating fuel tank		
Completing drainage plan maps for gas stations and other storage areas		
+Time for completing study guide		
Total time		