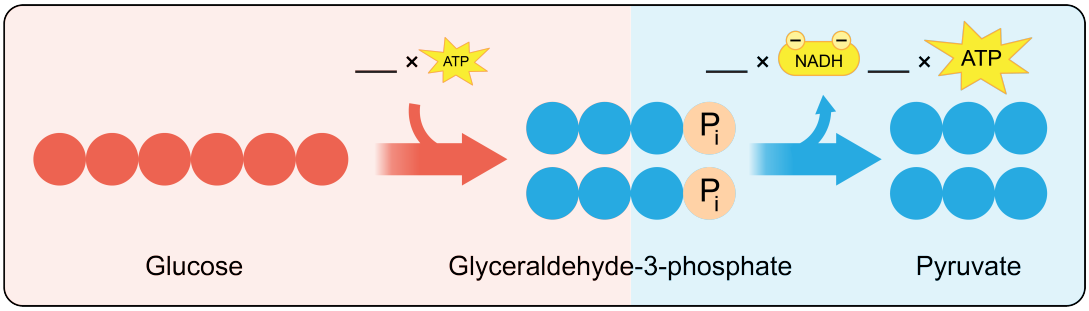
CONCEPT: GLYCOLYSIS SUMMARY

Glycolysis Energy Output

- Glycolysis oxidizes glucose to pyruvate and produces ___ NADH and ___ ATP molecules.



	Glycolysis
Start Molecule	Glucose
ATP	
$FADH_2$	
NADH	
End Molecule	2 Pyruvate

- 10 reactions _____ divided into 2 phases.
- Reactions 1 and 3 are irreversible and use ATP.

MEMORY TOOL 1: I IRResponsibly ____e one-_____ of a pizza.

- Reaction 6 produces 2 NADH.
- Reactions 7 and 10 produce 2 ATP each.

MEMORY TOOL 2: A 2ND ____-pack AT the _____ - ____.

MEMORY TOOL 3: Road 10 is ONE WAY

EXAMPLE: Which of the following glycolysis reactions produce ATP?

a) Reactions 6 and 7

b) Reactions 1 and 3

c) Reactions 7 and 10

d) Reactions 3 and 10

PRACTICE: How many NADH molecules are produced in phase B of glycolysis?

a) 2

b) 3

c) 1

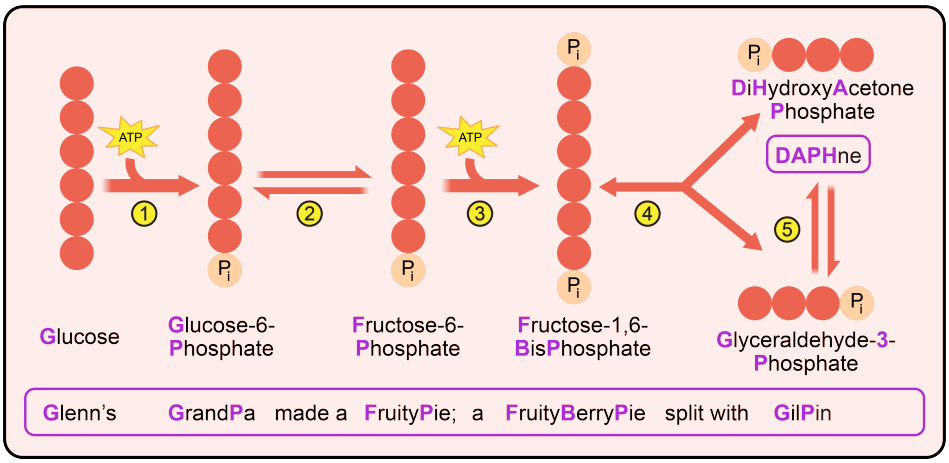
d) 4

CONCEPT: GLYCOLYSIS SUMMARY

Remembering Glycolysis Phase A

- Glycolysis reactions can be remembered by memorizing the metabolite names.

MEMORY TOOL 4: Glenn's GrandPa made a FruityPie; a FruityBerryPie split with DAPHne GilPin.



- The name of the enzyme can be predicted by knowing the _____ and the type of reaction.

HINT 1: Phosphorylation reactions (1 and 3) are catalyzed by _____.

HINT 2: Isomerization reactions (2 and 5) are catalyzed by _____.

EXCEPTION 1: Reaction 2 and 3 enzymes are named as phospho-substrate-function.

EXCEPTION 2: Bond cleavage (4) is catalyzed by _____.

EXAMPLE: Which enzyme in glycolysis catalyzes the conversion of G6P to F6P?

a) Glucokinase

b) Phosphoglucoisomerase

c) Phosphofructokinase

d) Aldolase

PRACTICE: Write the names of the substrate and the product of reaction 3 of glycolysis.

a) Glucose and glucose-6-phosphate

b) Fructose-6-phosphate and fructose-1-phosphate

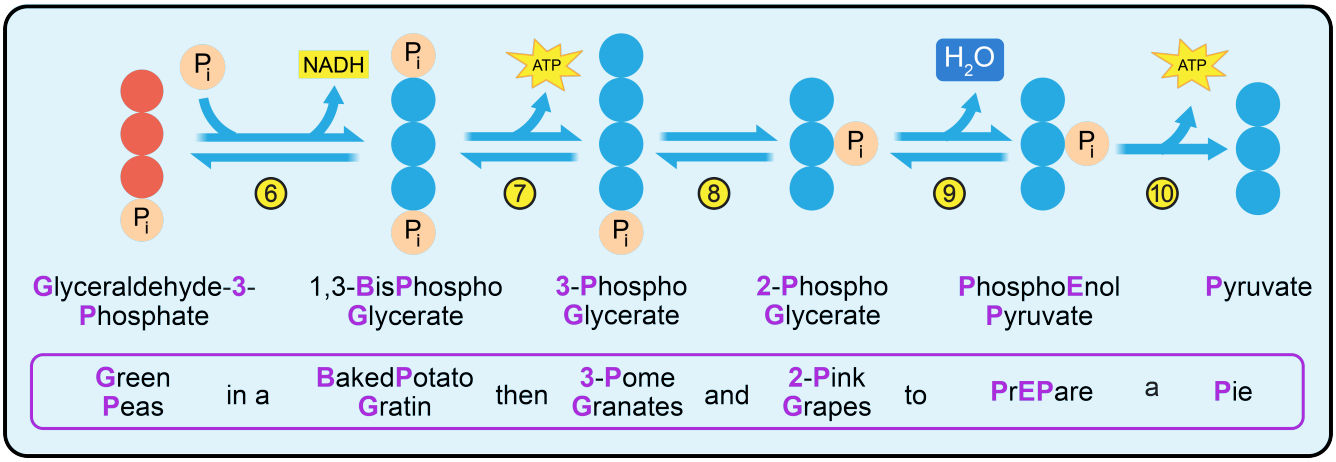
c) Fructose-1,6-bisphophate and glyceraldehyde-3-phosphate

d) Fructose-6-phosphate and fructose-1,6-bisphosphate

CONCEPT: GLYCOLYSIS SUMMARY

Remembering Glycolysis Phase B

MEMORY TOOL 5: GreenPeas in a BakedPotatoGratin then 3-PomeGranates and 2-PinkGrapes to PrEPare a Pie.



- The name of the enzyme can be predicted by knowing the substrate and the type of reaction.

HINT 3: Oxidation reaction (6) is catalyzed by a _____.

HINT 4: Dephosphorylation reactions (7 and 10) are catalyzed by _____.

EXCEPTION 3: Change in P_i location (reaction 8) is catalyzed by a _____.

EXCEPTION 4: Dehydration reaction (9) is catalyzed by an _____.

EXAMPLE: Which enzyme in glycolysis catalyzes the conversion of 3PG to 2PG?

a) Glyceraldehyde-3-phosphate dehydrogenase

b) Phosphoglycerate isomerase

c) Phosphoglycerate kinase

d) Phosphoglycerate mutase

PRACTICE: What is the name of the product of glycolysis reaction 9?

a) 3-Phosphoglycerate

b) Phosphoenolpyruvate

c) 2-Phosphoglycerate

d) Pyruvate

CONCEPT: GLYCOLYSIS SUMMARY

PRACTICE: Which two steps of phase A of glycolysis utilize ATP as a coenzyme?

a) Reactions 2 and 3

b) Reactions 1 and 3

c) Reactions 4 and 5

d) Reactions 2 and 4

Glenn's GrandPa made a FruityPie; a FruityBerryPie split with DAPHne GilPin

GreenPeas in a BakedPotatoGratin then
3-PomeGranates and 2-PinkGrapes to PrEPare a Pie

PRACTICE: What is the name of the product when 1,3-bisphosphoglycerate loses a phosphate group?

a) Phosphoenolpyruvate

b) 1-Phosphoglycerate

c) 2-Phosphoglycerate

d) 3-Phosphoglycerate

PRACTICE: Which one of the following statements is incorrect about phase A of glycolysis?

a) Phosphorylation in reactions 1 and 3 requires ATP as the coenzyme.

b) Energy from ATP hydrolysis is required to cleave the C–C bond in reaction 4.

c) Except for the energy-consuming reactions 1 and 3, the other three reactions are reversible.

d) Isomerization of DHAP into G3P is reversible.

PRACTICE: For each of the following reactions described below, identify a corresponding step of glycolysis.

a) ____ Phosphorylation of glucose to produce glucose-6-phosphate.

b) ____ Formation of a hexose phosphate from a hexose.

c) ____ An oxidation reaction is catalyzed by glyceraldehyde-3-phosphate dehydrogenase.

d) ____ Phosphorylation of fructose-6-phosphate to produce fructose-1,6-bisphosphate.

PRACTICE: What compound is converted to phosphoenolpyruvate in glycolysis?

a) Pyruvate

b) 1,3-Bisphosphoglycerate

c) 2-Phosphoglycerate

d) Glucose-6-phosphate

CONCEPT: GLYCOLYSIS SUMMARY

PRACTICE: What is the name of the product of the glycolysis reaction which produces NADH?

a) Glyceraldehyde-3-phosphate

b) 3-Phosphoglycerate

c) 2-Phosphoglycerate

d) 1,3-Bisphosphoglycerate

PRACTICE: Which reaction of glycolysis produces a hexose bisphosphate from a hexose phosphate?

a) 1

b) 6

c) 3

d) 2

PRACTICE: Which reactions of the glycolysis pathway involve a phosphate transfer?

a) Reactions 1, 3, 7, and 10

b) Reactions 1, 6, 8, and 10

c) Reactions 1, 3, 7, and 9

d) Reactions 2, 3, 6, and 8

PRACTICE: Which reaction of the glycolysis pathway is catalyzed by the enzyme pyruvate kinase?

a) Reaction 9

b) Reaction 10

c) Reaction 6

d) Reaction 7