A cart with competing forces

Forces and motion | constructed motion data

Instructional alignment HS-PS2-1

Targets selected reasoning within the named code. Review the full standard and any assessment boundary before making a mastery or PLD claim.

Practice Use mathematics and test a model
Crosscutting concept Cause and effect

1. Net force is 12 N east, giving acceleration 3 m/s² east.

2. Acceleration is determined by the net force. Velocity also depends on the cart's prior motion.

3. Measure velocity at repeated equal time intervals and compare the change per second with 3 m/s east.

One local criterion per numbered answer. Accept equivalent valid reasoning. Award the criterion only when the response supplies its requested evidence.

Interpret an error

Using the largest single force as the net force or confusing acceleration with velocity. Check the actual response and ask a diagnostic question before assigning this interpretation.

Independent transfer

Keep the same forces but begin with the cart moving west. Describe its initial change in speed.

Related public evidence

PHYS_NEW_2026_06_37 | public question

Official mapping for that example

PHYS_NEW_2026_06_18 | public question

Official mapping for that example

Original AI-assisted teaching stimulus; all numerical observations and named classroom settings are constructed

A landing pad that spreads a stop

Momentum and design | constructed force-time models

Instructional alignment HS-PS2-3

Targets selected reasoning within the named code. Review the full standard and any assessment boundary before making a mastery or PLD claim.

Practice Evaluate and refine a design
Crosscutting concept Cause and effect

1. Both impulses are (1/2)(base)(peak)=16 N s.

2. B has the lower peak and doubles stopping time while keeping equal modeled impulse.

3. The objects should have comparable changes in momentum. Material limits and actual force histories also matter.

One local criterion per numbered answer. Accept equivalent valid reasoning. Award the criterion only when the response supplies its requested evidence.

Interpret an error

Choosing by peak alone without checking whether the stopping requirement is comparable. Check the actual response and ask a diagnostic question before assigning this interpretation.

Independent transfer

Require a maximum thickness or stopping distance and explain the new trade-off.

Related public evidence

PHYS_NEW_2026_06_20 | public question

Official mapping for that example

PHYS_NEW_2026_06_17 | public question

Official mapping for that example

Original AI-assisted teaching stimulus; all numerical observations and named classroom settings are constructed

Energy before the gate

Energy accounting | constructed energy budget

Instructional alignment HS-PS3-1

Targets selected reasoning within the named code. Review the full standard and any assessment boundary before making a mastery or PLD claim.

Practice Use an energy model
Crosscutting concept Energy and matter; systems

1. 120-30-20=70 J kinetic energy.

2. The 30 J has transferred into thermal energy. Total energy accounting includes it even though it is absent from the cart's mechanical subtotal.

3. Kinetic energy becomes 120-60-20=40 J, under the same stated conditions.

One local criterion per numbered answer. Accept equivalent valid reasoning. Award the criterion only when the response supplies its requested evidence.

Interpret an error

Treating decreased mechanical energy as destruction of energy. Check the actual response and ask a diagnostic question before assigning this interpretation.

Independent transfer

Write a boundary-explicit diagram for cart alone versus cart plus track.

Related public evidence

PHYS_NEW_2026_06_36 | public question

Official mapping for that example

Original AI-assisted teaching stimulus; all numerical observations and named classroom settings are constructed

Two lamps on a supply

Electrical energy | constructed circuit

Instructional alignment HS-PS3-6

Targets selected reasoning within the named code. Review the full standard and any assessment boundary before making a mastery or PLD claim.

Practice Use mathematical circuit models
Crosscutting concept Energy and matter

1. I6=2 A and I3=4 A; total 6 A.

2. P=VI=72 W, so E=720 J in 10 s.

3. The 6-ohm branch remains at 12 V and 2 A. Total supply current falls to 2 A.

One local criterion per numbered answer. Accept equivalent valid reasoning. Award the criterion only when the response supplies its requested evidence.

Interpret an error

Splitting voltage between parallel branches as if the circuit were series. Check the actual response and ask a diagnostic question before assigning this interpretation.

Independent transfer

Give the supply an internal resistance and identify which prediction needs revision.

Related public evidence

PHYS_NEW_2026_06_32 | public question

Official mapping for that example

PHYS_NEW_2026_06_34 | public question

Official mapping for that example

Original AI-assisted teaching stimulus; all numerical observations and named classroom settings are constructed

A wave crosses a boundary

Waves | constructed wave data

Instructional alignment HS-PS4-1

Targets selected reasoning within the named code. Review the full standard and any assessment boundary before making a mastery or PLD claim.

Practice Use a mathematical representation
Crosscutting concept Patterns

1. lambdaA=4 m and lambdaB=2 m from v=f*lambda.

2. Frequency is fixed by the source. Lower speed at fixed frequency gives shorter wavelength.

3. Measure spacing of adjacent crests in each medium and verify the source's cycles per second.

One local criterion per numbered answer. Accept equivalent valid reasoning. Award the criterion only when the response supplies its requested evidence.

Interpret an error

Holding wavelength constant and changing frequency at the boundary. Check the actual response and ask a diagnostic question before assigning this interpretation.

Independent transfer

Double source frequency while keeping medium speeds fixed and revise the wavelengths.

Related public evidence

PHYS_NEW_2026_06_26 | public question

Official mapping for that example

PHYS_NEW_2026_06_10 | public question

Official mapping for that example

Original AI-assisted teaching stimulus; all numerical observations and named classroom settings are constructed

Two nuclear representations

Nuclear processes | constructed particle model

Instructional alignment HS-PS1-8

Targets selected reasoning within the named code. Review the full standard and any assessment boundary before making a mastery or PLD claim.

Practice Develop and compare models
Crosscutting concept Energy and matter

1. A models fission; B models fusion.

2. A decrease in rest mass corresponds to released energy under $E=mc^2$. Total mass-energy is conserved.

3. Total charge and nucleon count must balance for the specified reaction, with emitted particles included.

One local criterion per numbered answer. Accept equivalent valid reasoning. Award the criterion only when the response supplies its requested evidence.

Interpret an error

Interpreting a lower product rest mass as a failure of total mass-energy conservation. Check the actual response and ask a diagnostic question before assigning this interpretation.

Independent transfer

Replace B with a radioactive decay. Identify what additional particles or radiation must be represented.

Related public evidence

PHYS_NEW_2026_06_24 | public question

Official mapping for that example

PHYS_NEW_2026_06_23 | public question

Official mapping for that example

Original AI-assisted teaching stimulus; all numerical observations and named classroom settings are constructed