Welcome...

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Always Learning

Sponsored by:
Building Scalable & Sustainable Learning Centers that Support Formal & Social Learning
Science Objects supported by
Scalable & Sustainable

- Example
- Development Process
- Results
- Creative Gap Analysis – PD Indexer
Animation Analysis

The following animation shows a ball rolling along a track. Replay the motion a number of times and then answer the multiple-choice questions that follow. In answering those questions, feel free to replay the animation if necessary. Select the icon to launch the animation in a new window.

![Animation of a ball rolling along a track](image)

Figure 5.2 Ball on Complex Track Animation

For those unable to engage with the interactive component, select this link for a long text description: [Text Description](#)

Practice

Okay, now that those mental wheels are turning, see if you can answer these questions. If you miss an answer or two or three, it might be worth your while to review the appropriate sections of this Science Object.

What is the approximate position of Point E in relationship to Point A?

- E is about 350 centimeters away from A, at an angle of about 80 degrees with respect to Line Y.
Question: The ball has zero acceleration at ...

- Point E, because the ball is at rest at that point.
- Point B, because the direction is constant there.
- Point D, because it's slowing down at that point. It is decelerating but not accelerating.
- Point A, because neither its speed nor its direction are changing there.

Answer Feedback:

Both direction and speed must be unchanging for the acceleration to equal zero.

Points is the instantaneous speed of the ball the

D. The ball is moving fastest at those Points. 

it is changing its speed the fastest at that point.

the speed has to largest at the beginning in order for 
the ball is slowing down at Point D, it can't have a 

Close
The ball has zero acceleration at ...

- Point E, because the ball is at rest at that point.
- Point B, because the direction is constant there.
- Point D, because it's slowing down at that point. It is decelerating but not accelerating.

✓ Point A, because neither its speed nor its direction are changing there.

Answer Feedback

Incorrect!

If the ball is at rest, that means the instantaneous velocity is zero. Acceleration, however, is measured by changes in velocity. An object at rest does not necessarily have zero change in velocity.

For more information:
- For help revisit the One More Definition section.
- To see how this information relates to each position in the path.

D. The ball is moving fastest at those Points. Instantaneous speed depends only on the magnitude of the velocity, and it is changing its speed the fastest at that point. The speed has to be largest at the beginning in order for it to change. If the ball is slowing down at Point D, it can’t have a maximum there.

Check
Hands-On Activity

Grab a ruler or meterstick, a marble or a ball bearing, and about a meter-long section of Hot Wheels® track. If you don’t have access to kids’ toys, just use anything you can find that’s flexible and will allow a marble to roll along it. What works well is a section of clear plastic tubing (try the hardware or plumbing supply store) and a ball bearing that’s small enough to roll freely inside the tubing.

Find a friend or family member to help you with this next part. Hold the track in a U shape so the lowest part just touches a table top or a floor, as seen in Figure 3.10.

![Figure 3.10](image)

Now measure the vertical distance from the floor or table to one end of the track. For the directionally challenged, that vertical distance is shown in Figure 3.11.

If your memory isn’t great, write this distance down. You’ll need to keep this one side of the track at that same vertical distance as you do the next few things. With your accomplice helping you, hold the track in a U shape with the bottom of the U touching the table or floor; holding your end at the vertical distance you’ve measured, drop the marble at the top of that end of the track.
Content Development
High Level Production Cycle

Process Repeats for each Science Object

Analysis and Design

- Scope completed
- Key Ideas and Evidences Identified
- Pedagogical Implications (PI) component for scope created
- Evidences refined in light of PI content
- PI for SciPack started

Development Phase 1
- Writer creates content outline and narrative
- Media storyboards created
- Content authored into LCMS via established inquiry-based templates

Review Round 1
- Content reviewed
- Reviews Conducted: end user, assessment, scope adherence, content breadth, depth, currency
- Revisions based on reviews
- Flash sim media outsourced imported into LCMS
- Static graphics interactives in LCMS in-house

Development Phase 2
- Content reviewed online after chunked
- Reviews: end users assessment, accessibility, content, and editorial
- Content reviewed from development to public delivery server
- Quality Assurance testing

Review Round 2
- Content ported from development to public delivery server

Release
- Formative evaluation of SciPacks and SO’s
- Analysis of captured assessment data
- Analysis of Data collected through LMS/LCMS

Pilot Testing

Annual Evaluation

~8-9 months to complete 1 SciPack
Quasi-Experimental Efficacy Study with self-directed SciPacks. Three District Pilot Results (Charlotte-Mecklenburg, NC; Omaha, NE; Everett, WA)

Participant Feedback: Confidence in teaching subject matter:
- 7%: Very Confident Before completing F&M SciPack
- 60%: Very Confident After completing F&M SciPack
- 98%: Found SciPack content relevant to their needs
- 96%: Would recommend SciPack to their colleagues
- 98%: Found interactive simulations worthwhile to their learning

Pre/Post Assessment and Final Assessment Results
- Third Party Evaluator Research Instrument:
  Positive significant gains in learning between pre/post test
- Final Assessment: 92% passed the final assessment

Evaluation of Online, On-Demand Science Professional Development Material Involving Two Different Implementation Models, JSOT, Vol. 17, N. 1, Feb 2008
Example Pre/Post Assessment Data — Significant Documented Improvement

### Force and Motion Assessment
- 1350 Pre-tests taken with a 58% avg score
- 407 Post-tests taken with a 70% avg score
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### Energy Assessment
- 950 Pre-tests taken with a 67% avg score
- 280 Post-tests taken with a 82% avg score
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Additional Data Tracked for Administrators:

- Which resources are added and shared across libraries
- Frequency of usage and percentage of completion
- Assessment Pass/Fail Data for Every SciPack
PD Indexer

- Diagnose gaps in Content Knowledge Understanding
- View Recommended Resources and Opportunities for Consideration
How did you develop thousands of learning assets, with minimal resources, in multiple formats?
What methodology is used to keep content fresh, relevant and current?
The NSTA has an interesting model for self-diagnosis of knowledge gaps and prescribing recommended learning, tell us how this works.
Questions for.....

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Always Learning
August 3, 2010
Title: Organizing Learning Content for Multiple Outputs and Uses

Guests: Rob Lauber, Vice President & Mary Beth Schuckman, Manager of Learning Technologies; YUM! University