Strategies to Create a Coherent Science Content Storyline
Analysis Guide D1:
Selecting and Using Content Representations

Main learning goal: The forces acting on an object have a strength and direction that can be represented using arrows of various lengths and directions.

Description of content representation: A set of foam-board arrows of different sizes representing the strength and direction of forces acting on an object

Part 1: Selecting the Content Representation

Is the Content Representation …	Yes	No
1. Scientifically accurate?		
2. Closely matched to the main learning goal?		
3. Presenting science ideas in ways that are comprehensible to students?		
4. Reinforcing or introducing student misconceptions?		
5. Addressing common student misconceptions?		
6. Distracting students from the main learning goal with too many details or new terms?		

Part 2: Engaging Students in Using the Content Representation

Is the Content Representation Used in a Way That Involves Students In …	Yes	No
1. Modifying or creating the content representation?		
2. Analyzing the meaning of the content representation?		
3. Critiquing the content representation?		

Part 3: Suggestions for Improvement

Strategies to Create a Coherent Science Content Storyline
Analysis Guide D2:
Selecting and Using Content Representations

Main learning goal: When bumps on the surfaces of two objects push against one another, they create a force called *friction*. Friction is the reason moving objects on Earth slow down and eventually stop.

Description of content representation: Hand-strip model made from a long strip of paper with flexible tabs showing printed hands that stick up. As an object rolls over the hand strip, the paper tabs push in the opposite direction of the object's motion.

Part 1: Selecting the Content Representation

Is the Content Representation …	Yes	No
1. Scientifically accurate?		
2. Closely matched to the main learning goal?		
3. Presenting science ideas in ways that are comprehensible to students?		
4. Reinforcing or introducing student misconceptions?		
5. Addressing common student misconceptions?		
6. Distracting students from the main learning goal with too many details or new terms?		

Part 2: Engaging Students in Using the Content Representation

Is the Content Representation Used in a Way That Involves Students In …	Yes	No
1. Modifying or creating the content representation?		
2. Analyzing the meaning of the content representation?		
3. Critiquing the content representation?		

Part 3: Suggestions for Improvement

Strategies to Create a Coherent Science Content Storyline
Analysis Guide D3:
Selecting and Using Content Representations

Main learning goal: Ideas about forces can help us predict the motion of objects.

Description of content representation: Foam-board arrows of different lengths are used to represent the forces in two scenarios: two students arm wrestling and a child gliding down a waterslide.

Part 1: Selecting the Content Representation

Is the Content Representation …	Yes	No
1. Scientifically accurate?		
2. Closely matched to the main learning goal?		
3. Presenting science ideas in ways that are comprehensible to students?		
4. Reinforcing or introducing student misconceptions?		
5. Addressing common student misconceptions?		
6. Distracting students from the main learning goal with too many details or new terms?		

Part 2: Engaging Students in Using the Content Representation

Is the Content Representation Used in a Way That Involves Students In …	Yes	No
1. Modifying or creating the content representation?		
2. Analyzing the meaning of the content representation?		
3. Critiquing the content representation?		

Part 3: Suggestions for Improvement

Strategies to Create a Coherent Science Content Storyline
Analysis Guide D4:
Selecting and Using Content Representations

Main learning goal: If two forces of *equal* strength are pushing or pulling an object in opposite directions, the object won't move. If two forces of *unequal* strength are pushing or pulling an object in opposite directions, the object will move in the direction the stronger force is pushing or pulling.

Description of content representation: Two hand strips making contact with each other

Part 1: Selecting the Content Representation

Is the Content Representation …	Yes	No
1. Scientifically accurate?		
2. Closely matched to the main learning goal?		
3. Presenting science ideas in ways that are comprehensible to students?		
4. Reinforcing or introducing student misconceptions?		
5. Addressing common student misconceptions?		
6. Distracting students from the main learning goal with too many details or new terms?		

Part 2: Engaging Students in Using the Content Representation

Is the Content Representation Used in a Way That Involves Students In …	Yes	No
1. Modifying or creating the content representation?		
2. Analyzing the meaning of the content representation?		
3. Critiquing the content representation?		

Part 3: Suggestions for Improvement

Strategies to Create a Coherent Science Content Storyline
Analysis Guide D5:
Selecting and Using Content Representations

Main learning goal: The consistent tilt of Earth on its axis produces opposite seasons in the Northern and Southern Hemispheres.

Description of content representation: Earth-Sun model. Students simulate Earth's orbit around the Sun and seasonal variations in opposite hemispheres based on Earth's orbital position in relation to the Sun.

Part 1: Selecting the Content Representation

Is the Content Representation …	Yes	No
1. Scientifically accurate?		
2. Closely matched to the main learning goal?		
3. Presenting science ideas in ways that are comprehensible to students?		
4. Reinforcing or introducing student misconceptions?		
5. Addressing common student misconceptions?		
6. Distracting students from the main learning goal with too many details or new terms?		

Part 2: Engaging Students in Using the Content Representation

Is the Content Representation Used in a Way That Involves Students In …	Yes	No
1. Modifying or creating the content representation?		
2. Analyzing the meaning of the content representation?		
3. Critiquing the content representation?		

Part 3: Suggestions for Improvement