

Mars in Reverse

Student Version

Adapted from the Athena Mars Exploration Rovers web site located at athena.cornell.edu/kids/home_03.html

Why should your team do this activity?

Early astronomers believed that as Mars moved through its orbit, it would stop, go in reverse, and then go forward again. Today, that sounds like a crazy way for a planet to move, but that's still the way it looks from Earth despite the fact that we now know Mars travels in an elliptical orbit around the Sun without backing up. Why does Mars appear to go backwards? Try this simple activity, and you'll soon find out!

The Necessities:

- Your Idaho TECH Engineering Team split into groups of two (pairs)
- A bike, pair of inline skates, or skateboard
- A helmet for the person riding the bike, inline skates, or skateboard
- Your Idaho TECH Lab Notebook

Directions:

1. Go to your school's playground or a park and find a long, clear straightaway with few pedestrians.
2. Have one person in each pair put on inline skates, or get your bike or skateboard ready. The other person in each pair will remain on foot.
3. Pick a starting point and ending point on the straightaway, and then find a stationary object in the middle of the straightaway to focus on.
4. Both members of each pair should begin at the starting point, and the person on foot should then begin walking forward at a steady pace towards the ending point. While walking, this person should focus on the middle point. After the person on foot has walked a bit (but NOT past the middle point) the person on wheels should begin moving forward, slightly slower than the person walking, while focusing on the middle point.
5. The person on wheels should keep their eyes on the middle focus point, and then speed up and pass their walking partner. What do you think they will see?

What did you see?

Your walking partner never stopped moving forward, but from your point of view, he or she appeared to back up! The same thing happens when Earth moves faster and passes Mars on its way around the Sun – Mars only *appears* to go in reverse. This type of apparent motion is called retrograde motion. The odd retrograde motion of Mars helped to clue some astronomers into the flaws inherent in some early models of the Solar System – why would this one planet go backwards for such a short period when the others move steadily in one direction? Mars going in reverse may have put astronomy in fast-forward!

