🌀 Science in the Movies: Interstellar (2014)

Grade Level: 8–12
Topics: Space Science · Gravity · Relativity · Environmental Systems
Scene: Cooper and his team experience time dilation near the black hole "Gargantua."
Approx. Timestamp: 01:25:00–01:32:00

🌱 Before You Watch

Think–Pair–Share:

1. What is gravity, and how does it affect time and motion?
2. What do you think a black hole is and how it might behave?
3. Why do scientists study distant planets as potential new homes for humanity?

💭 Prediction Time!

How might traveling near a black hole change the way time passes for the astronauts compared to people on Earth?

🧪 A. Science Connections

1. What is the scientific explanation for why time passes differently near a black hole?
2. How does gravity influence both space and time in the movie?
3. What role does math and data play in helping the astronauts make decisions?
4. What ethical dilemma do the scientists face regarding their mission to save humanity?

📊 B. Data & Analysis

1. On Miller's Planet, one hour equals **seven years** on Earth due to time dilation.
    - If the crew spends **3 hours** on the planet, how many years pass on Earth?
2. If the black hole's gravity pulls light so strongly that not even photons escape, what does this reveal about its mass and density?

3. What real-world equations describe this phenomenon (hint: Einstein's *General Theory of Relativity*)?

🌍 C. Real-World Connection

1. What are current scientific missions that explore planets beyond our solar system?
2. How do scientists use data from telescopes to study black holes?
3. What can Earth learn from the movie's depiction of climate and survival challenges?

💡 D. Reflection

- What message does *Interstellar* convey about science, sacrifice, and the human spirit?
- Why is scientific curiosity essential even in the face of uncertainty?
- ✨ *Complete:* "Science helps us explore the unknown by..."

🎞️ Did You Know?

The black hole *Gargantua* was so scientifically accurate that physicist **Kip Thorne** used real equations to generate its image.
It was the **first Hollywood depiction** of a black hole based on actual physics — and led to **two published scientific papers**!

💭 "We've always defined ourselves by the ability to overcome the impossible." – Cooper

---

🎯 Extension (Optional)

Design a **Mission to a New World!**
Sketch or describe a spaceship and plan for exploring a new planet.
Label how your design addresses gravity, communication delay, and sustainability.
