ROCKETS—HOW THEY WORK

A Captioned Film
for
Upper Intermediate and Advanced Classes

By Arrangement with
Encyclopedia Britannica Films

Captioned Films for the Deaf
U.S. Office of Education
Washington, D.C.

I. Film Summary

Modern interest in space exploration is used to create interest in rockets and how they work. The principle of action and reaction is explained. It is pointed out that rockets need neither friction nor anything to push against. The film tells why rockets must carry their own liquid oxygen, how being built in stages increases their efficiency, and how to increase a rocket's speed.

II. Purpose of the Film

A. To Teach the Scientific Principle of Action Producing Reaction

B. To Explain How Rockets Are Built to Utilize This Principle

C. To Show How Some Practical Problems Can Be Overcome to Make Rockets Faster and More Efficient

III. Preparation for Film

A. Teacher Preparation

1. Preview the film.

2. Examine the accompanying caption script.

3. Select terms for pupil study to aid them in understanding the captions.

B. Pupil Preparation

1. Ask for student comments on rocket launchings they have seen on television.

2. Discuss Newton's Third Law of Motion. Use a balloon to demonstrate it.

3. Discuss several examples of action and reaction.

4. Let the students handle a gyroscope.

5. Discuss how rockets are controlled in flight.

6. Discuss the history of rockets from the ancient Chinese to the present day.

7. Discuss military uses of rockets.

8. Discuss peaceful uses of rockets.

9. Let the students examine a model of a rocket.

10. Partial vocabulary list

launching site	used up
launching platform	coast (verb)
radar	flight
trace (follow)	multi-stage rocket
engineers	effort
blockhouse	guided
military	accurate
action and reaction	guidance system
realize	gyroscope
automatic rifle	electronic brain
reload (a rifle)	steering mechanism
friction	fins (airplane)
outer space	impulse (electronic)
skyrocket	jet action
hollow	tense (nerves)
cylinder	

11. Things to look for while viewing the film

    a. How do rockets demonstrate the principle of action and reaction?

    b. What other examples of action and reaction are shown?

    c. Why are space rockets built in stages?

    d. How does rocket fuel burn in space where there is no air?

    e. How can a rocket’s speed be increased?

IV. Follow-up

A. Review of the Film

1. View the film again.

2. Discuss the film in class, writing important points on the chalkboard.

3. Questions for writing or discussion

    a. Give at least four examples of action and reaction.

    b. Why are space rockets built in stages?

c. How can a rocket’s speed be increased? (Name two ways.)

d. Why is liquid oxygen pumped into space rockets before launching?

e. When you shoot a gun you feel it “kick.” Is the “kick” an action or a reaction?

f. Can a rocket move faster in space or in the lower atmosphere? Why?

g. Why are gyroscopes put in rockets?

h. Why do rocket-launching centers have radar?

i. How does a rocket turn?

j. Which stage of a multi-stage rocket uses more fuel—the first stage or the last? Why?

k. Why do rockets not need fins in space?

l. What happens if a rocket has too little fuel?

m. Tell how a rocket can coast for great distances without fuel in outer space.

B. Suggested Activities

1. Find out as much as you can about the United States space program.

2. Tell how you felt while watching a rocket launching on TV.

3. Study the differences in propulsion by use of friction (as in automobiles, trains, etc.) and rocket or jet propulsion.

4. Ask students for examples of action—reaction and write them on the chalkboard.

5. Repeat the experiment with the candle flame as shown in the film. How does this apply to the operation of rockets?

6. Both liquid and solid fuels are used in rockets. Find out advantages and disadvantages of each.

7. Find out why the “countdown” leading up to a rocket launching takes so long.

8. Why is a heat-resistant nose cone used on most rockets?

9. Discuss possible uses of rocket power, both on earth and in space exploration.

10. Examine a model of a rocket.

11. Prepare a bulletin board or other display of rockets and how they work. Use student-made or student-written materials, news and magazine articles, and pictures.

12. Write NASA and other sources for additional information.

V. Additional Resource Materials

A. Printed Matter

1. Science fiction

2. Popular Science and other magazines

3. News stories and clippings of satellite or rocket launchings

4. Supplementary textbooks

5. Library reference materials

6. Pictures and charts

7. Other books

a. Bendick, Jean. First Book of Space Travel. Watts

b. Frost, Frances. Rockets Away! McGraw

c. Neurath, Marie. Rockets and Jets. New York. Lothrup. 1952

d. Colby, Carroll B. Operation Watchdog: Rockets, Guided Missiles, Aircraft and Radar. New York. Coward. 1956

e. Coggins, Jack and Pratt, Fletcher. Rockets, Jets, Guided Missiles and Space Ships. New York. Random. 1951

f. Pratt, Fletcher. All About Rockets and Jets. New York. Random. 1955

g. Stine, G. Harry. Rocket Power and Space Flight. New York. 1957

B. Films

1. “Earth Satellites, Explorers of Outer Space,” EBF

2. “A Trip to the Moon,” EBF

3. “Laws of Motion,” EBF

C. Filmstrips

1. Walt Disney: Space and the Atom Series, EBF

a. Man in Space

   b. Flight into Space

   c. Flight Around the Moon

   d. Flight to Mars

2. Newton’s Laws of Motion, SVE

3. Space and Space Travel Series, SVE

   a. Leaving the World

   b. Current Events in Space

   c. Space Travel

   d. Man in Space