



Communications satellites

Looking at the Earth

time

50 minutes

learning outcomes

To:

- know different ways of communicating with people around the world
- know the purpose of a communications satellite
- know why there are a large number of communications satellites at certain locations around the world

materials needed

- 1 drawing compass
- 12 protractors
- A2 paper
- 24 atlases

end product

- a chart showing the location of a number of communications satellites around the world

Preparation

For the activity **Can you see the satellites?** the children need to know what a meridian is (see lesson 65). For this activity copy the circle from the worksheet onto a sheet of A2 paper and display it at the front of the class.



How do you communicate? 10 min.

Who knows what communication is? Ask the children how they communicate with their friends. Do they use a mobile phone to talk or text? Or talk or chat via the internet? What makes these forms of communication possible?

Does anyone know what a satellite is? Explain that satellites orbit the Earth. One type of satellite is the communications satellite. This is a satellite that transfers information from one place to another. The information comes from telephones, radio, television, and internet. Many of these communication satellites travel in a geostationary orbit around the Earth. This means that the satellite travels at the same speed as the Earth turns, so it stays in the same position relative to the Earth.



The children investigate which areas have many communications satellites overhead.



Can you see the satellites? 25 min.

The children complete Task 1 on the worksheet. Show the list of satellites from the worksheet and clarify the information. Explain that the satellites are listed per 5-degree meridian line and that the children are going to mark the position of the satellites by drawing a cross by the correct meridian in the circle on the chart. Mark the position of some satellites together with the children so they can see what they need to do. Share the other meridians in the list among the pairs of children. Make sure each pair has approximately the same number of satellites to mark. After the children have marked their satellites on their own worksheets, they can mark them on the large circle on the chart at the front of the class.



Many, more, most! 15 min.

Discuss the tasks. Look at the large circle together. Conclude that there are very many communications satellites. The children complete Task 2 on the worksheet. They use the atlas to see which areas of the world have the most satellites overhead. Encourage them to name the countries and continents. Why are there more communications satellites over these areas? These are areas where very many people live, so there is a lot of television, telephone, and internet traffic.



Communications satellites



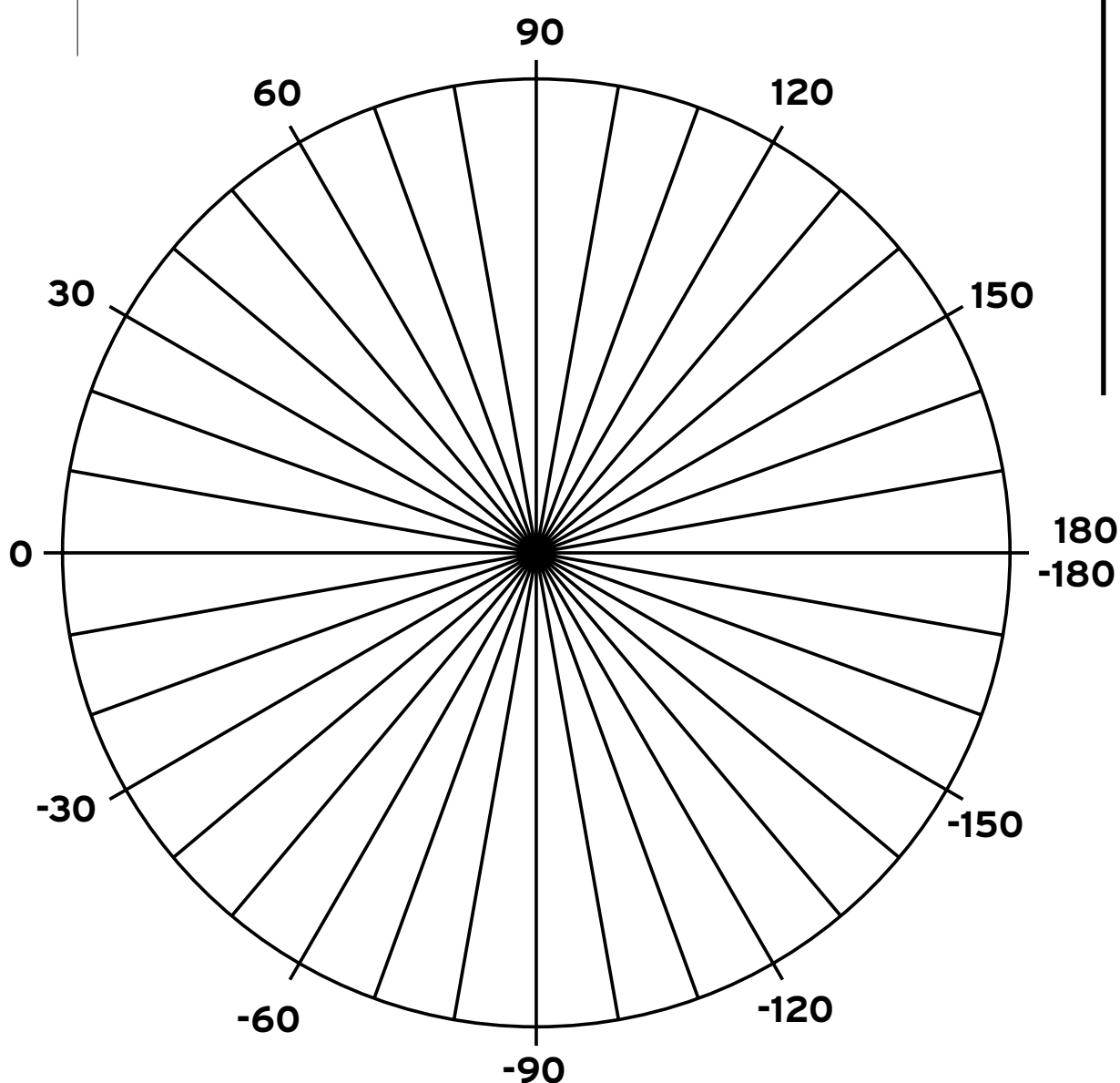
In this experiment you will be answering the research question:

Which parts of the world have a large number of communications satellites overhead?

1 *Can you see the satellites?*



1 Your teacher has given you a list of satellites. Mark their location on the chart on your worksheet by putting a cross on the circle by the correct meridian.





2 Take your worksheet to the large circle in the front of the class.

3 Copy the crosses marking your satellites onto the large class chart.

a

What do you notice about the distribution of satellites in the class chart?

2

Many, more, most!

a

Use the atlas to find out which countries lie on the meridians with the most



satellites. Write the countries in the space below.

b

Why do these countries need so many communications satellites?



List of geostationary satellites

Meridian -180 UHF 4 MARISAT 3 LEASAT 2	Meridian -105 ANIK E2 UHF 6 LEASAT 3 MARISAT 1 AURORA 1 GSTAR 4	Meridian -60 BRAZILSAT A1	Meridian -10 COSMOS 2291 GORIZONT 26 METEOSAT 6	Meridiaan 30 DFS 2 ARABSAT 1C Meridian 35 GORIZONT 17 RADUGA 28 EUTELSAT 1F1
Meridian -175 INTELSAT 513 TDRS 5	Meridian -100 GSTAR 1 DBS 1 ASC 2 AMSC 1 DBS 3 DBS 2 ACTS FLEETSATCOM 7 GALAXY 4	Meridian -55 INMARSAT 2F4	Meridian -5 TELECOM 2A TELECOM 2B	Meridian 40 GORIZONT 31 TURKSAT 1B
Meridian -170 RADUGA 21		Meridian -45 TDRS 6 PANAMSAT 1	Meridian 0 INTELSAT 707 SKYNET 4C TVSAT 2 THOR METEOSAT 5	Meridian 45 RADUGA 23 INTELSAT 507
Meridian -155 INTELSAT 702		Meridian -40 PANAMSAT 3R TDRS 4 INTELSAT 502	Meridian 5 TELECOM 2C TELE X SIRIUS 1 NATO 4B EUTELSAT 2F4	Meridian 50 RADUGA 1-3 RADUGA 1-2 GORIZONT 27 SKYNET 4B
Meridian -150 TDRS 7		Meridian -35 ORION 1 INTELSAT 603 SKYNET 4A	Meridian 10 EUTELSAT 2F2 COSMOS 2224 RADUGA 29 RADUGA 22 ITALSAT 1 HOTBIRD 1 EUTELSAT 2F1	Meridian 60 INTELSAT 510 RADUGA 26 INTELSAT 604 INTELSAT 602
Meridian -140 AURORA 2	Meridian -95 TELSTAR 401 GALAXY 3R			Meridian 65 INMARSAT 2F1 INTELSAT 505 DSCS 2-15 INTELSAT 704
Meridian -135 SATCOM C1 SATCOM C4 GOES 9	Meridian -90 GSTAR 3 BRAZILSAT A2 GALAXY 7 TELSTAR 402R	Meridian -30 COSMOS 2282 INTELSAT 506 HISPASAT 1B HISPASAT 1A INTELSAT 601		Meridian 70 PANAMSAT 4 RADUGA 1-1 RADUGA 32 UHF 2 UHF 5 GALS 1 GALS 2 LEASAT 5 COSMOS 2133 INTELSAT 501 MARISAT 2
Meridian -130 GALAXY 1R SATCOM C3 DSCS 3-01	Meridian -85 SPACENET 3R TELSTAR 302 SATCOM K1	Meridian -25 INTELSAT 605 FLEETSATCOM 8 COSMOS 2209	Meridian 15 EUTELSAT 2F3	Meridian 75 COSMOS 2085 INSAT 2A ELECTRO LUCH 1
Meridian -125 GALAXY 5 GSTAR 2	Meridian -80 SATCOM K2 SBS 4	Meridian -20 INTELSAT K INTELSAT 512 NATO 3D TDF 2 TDF 1 NATO 4A INTELSAT 515	Meridian 20 ASTRA 1E ASTRA 1B ASTRA 1A ASTRA 1D ASTRA 1C TELSTAR 301 EUTELSAT 1F5 MARECS A	
Meridian -120 TELSTAR 303 SBS 5 ECHOSTAR 1	Meridian -75 COMSTAR 4 ANIK C2 GOES 8 GALAXY 6 SBS 6			
Meridian -115 MORELOS 2 ANIK C3		Meridian -15 COSMOS 2054 UHF 3 INMARSAT 2F2 FLEETSATCOM 1 MARECS B2 COSMOS 2172 EXPRESS 1	Meridian 25 DFS 3 EUTELSAT 1F4 GORIZONT 20 ASTRA 1F INMARSAT 3F1	
Meridian -110 SOLIDARIDAD 2 ANIK E1 GOES 7 SOLIDARIDAD 1	Meridian -70 ANIK C1 SBS 2 BRAZILSAT B1 SPACENET 2 TDRS 1			
	Meridian -65 BRAZILSAT B2			

Meridian 80

THAICOM 2
THAICOM 1
COSMOS 2319
GORIZONT 24
INSAT 1D
RADUGA 31

Meridian 85

RADUGA 30
TDRS 3

Meridian 90

PRC 22
GORIZONT 28
MEASAT 1
INSAT 2C
INSAT 2B

Meridian 95

LUCH 0
GORIZONT 19

Meridian 100

PRC 26
EKRAN 19
EKRAN 20
ASIASAT 2
GORIZONT 25

Meridian 105

ASIASAT 1

Meridian 110

PALAPA B2R
YURI 3N
YURI 3A
YURI 3B
PRC 25
PALAPA C1
PALAPA B2P

Meridian 115

KOREASAT 1
SPACENET 1
KOREASAT 2

Meridian 120

PALAPA B4
GMS 4

Meridian 130

RADUGA 27
JCSAT 3
GORIZONT 29
N STAR A
SAKURA 3A

Meridian 135

GORIZONT 22
SAKURA 3B
N STAR B

Meridian 140

APSTAR 1
GORIZONT 18
GMS 5
GORIZONT 30

Meridian 145

GORIZONT 21

Meridian 150

JCSAT 1
ETS 5
OPTUS A3

Meridian 155

JCSAT 2
OPTUS B3
INTELSAT 503

Meridian 160

SUPERBIRD A2
OPTUS B1
SUPERBIRD B1

Meridian 165

OPTUS A2

Meridian 170

PANAMSAT 2
FLEETSATCOM 4

Meridian 175

INTELSAT 701
INTELSAT 703

Meridian 180

INMARSAT 2F3
INTELSAT 511