



# 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



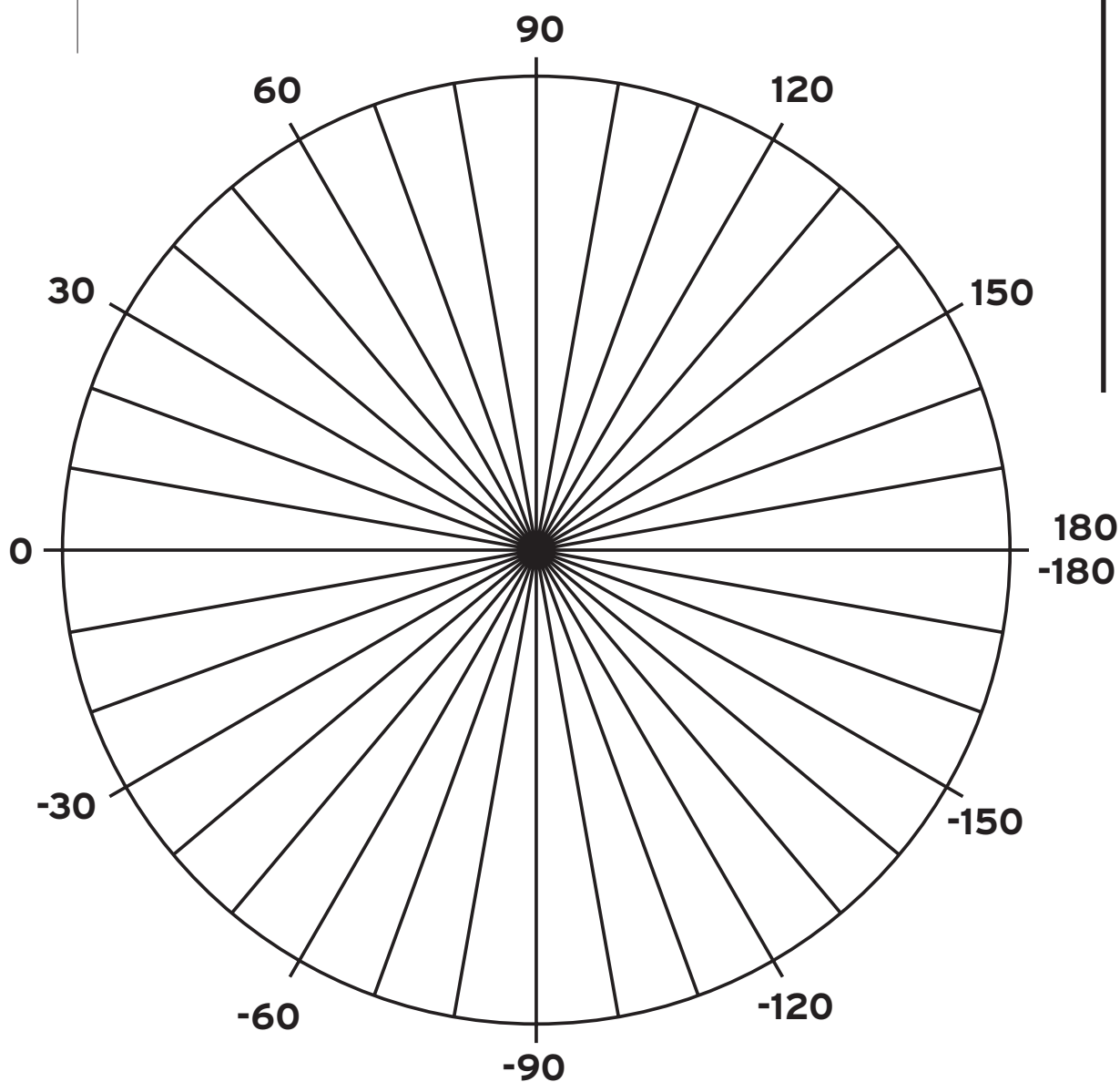
In this experiment you will be answering the research question:

*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

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



**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